

PRE-APPLICATION DOCUMENT



Prepared by:



June 2017

©Copyright 2017. New York Power Authority. All Rights Reserved

**GREGORY B. JARVIS PROJECT
RELICENSING**

FERC NO. 3211



**NY Power
Authority**

Table of Contents

1	Introduction	1
1.1	Purpose of the Pre-Application Document (PAD)	1
1.2	Overview of the Integrated Licensing Process	2
1.3	History of the Jarvis Hydroelectric Project	2
2	Proposed Process Plan and Schedule (18 C.F.R § 5.6(d)(1))	5
2.1	Document Distribution and Mailing Lists	5
2.1.1	Document Distribution	5
2.1.2	Mailing List	5
2.1.3	Source Materials Referenced in PAD	5
2.2	Proposed Schedule	5
3	Project Location, Facilities, and Operation (18 C.F.R § 5.6(d)(2))	8
3.1	Authorized Agent	8
3.2	Project Location and Lands	8
3.3	Project Facilities	11
3.4	Current Project Operations	16
3.4.1	Relevant Background Information	16
3.4.2	Project Operations	17
3.5	Current License Requirements	20
3.6	Summary of Project Generation and Outflow Records	20
3.7	Current Net Investment	22
3.8	Compliance History	22
3.9	Proposed New Facilities and/or Changes in Project Operation	22
4	Description of Existing Environment and Resource Impacts (18 C.F.R § 5.6(d)(3))	23
4.1	General Description of the River Basin (18 C.F.R § 5.6(d)(3)(xiii))	23
4.1.1	Major Land Uses	23
4.1.2	Major Water Uses	24
4.1.3	Basin Dams	24
4.1.4	Tributary Streams	24
4.2	Geology and Soils (18 C.F.R § 5.6(d)(3)(ii))	34
4.2.1	Topography	34
4.2.2	Geology	34
4.2.3	Soils	36
4.2.4	Reservoir Shoreline and Streambanks	38

4.3	Water Resources (18 C.F.R § 5.6(d)(3)(iii)).....	45
4.3.1	Water Quantity	45
4.3.2	Water Quality	46
4.4	Fish and Aquatic Resources (18 C.F.R § 5.6(d)(3)(iv))	94
4.4.1	Historic Fish Community Information.....	94
4.4.2	Hinckley Reservoir Fisheries Resources	95
4.4.3	Fisheries Resources Downstream of Hinckley Dam	96
4.4.4	Aquatic Habitat.....	96
4.4.5	Rare, Threatened, and Endangered Fish Species	97
4.4.6	Recreational Fishery	97
4.4.7	Benthic Macroinvertebrates	98
4.4.8	Mussels.....	98
4.4.9	Ichthyoplankton and Zooplankton.....	99
4.5	Wildlife and Botanical Resources (18 C.F.R § 5.6(d)(3)(v))	110
4.5.1	Regional Setting	110
4.5.2	Upland Botanical Resources	110
4.5.3	Wildlife Resources	111
4.6	Wetlands, Riparian, and Littoral Habitat (18 C.F.R § 5.6(d)(3)(vi)).....	115
4.6.1	Wetland Habitats	115
4.6.2	Wetland and Riparian Zone Vegetation.....	115
4.6.3	Littoral Zone Habitat and Vegetation	116
4.6.4	Wetland, Riparian, and Littoral Wildlife.....	116
4.7	Rare, Threatened, and Endangered Species (18 C.F.R § 5.6(d)(3)(vii)).....	119
4.7.1	T&E Species (Federal and State Listed Species)	119
4.7.2	Species of Special Concern.....	119
4.7.3	Significant Habitats	120
4.8	Recreation and Land Use (18 C.F.R § 5.6(d)(3)(viii))	123
4.8.1	Recreation.....	123
4.8.2	Land Use.....	124
4.8.3	Shoreline Management Policy	126
4.9	Aesthetic Resources (18 C.F.R § 5.6(d)(3)(ix))	130
4.9.1	Visual Character of Project Lands and Waters.....	130
4.9.2	Scenic Attractions	130
4.10	Cultural Resources (18 C.F.R § 5.6(d)(3)(x)).....	131
4.10.1	Cultural Resources Introduction and Geographic Overview	131

4.10.2	Archeological Sites	131
4.10.3	Historic Properties	131
4.10.4	Previous Surveys	132
4.10.5	Precontact Background	132
4.10.6	Historic Background.....	133
4.11	Socio-Economic Resources (18 C.F.R § 5.6(d)(3)(xi))	139
4.11.1	Development Patterns	139
4.11.2	Population Patterns and Projections	139
4.11.3	Economic and Employment Patterns	140
4.12	Tribal Resources (18 C.F.R § 5.6(d)(3)(xii))	146
5	Preliminary Issues and Studies List (18 CFR § 5.6(d)(4))	147
5.1	Issues Pertaining to the Identified Resources.....	147
5.1.1	Geology and Soils.....	147
5.1.2	Water Resources	147
5.1.3	Fish and Aquatic Resources.....	147
5.1.4	Wildlife and Botanical Resources	148
5.1.5	Wetlands, Riparian, and Littoral Habitat	148
5.1.6	Rare, Threatened, and Endangered Species	148
5.1.7	Recreation and Land Use	148
5.1.8	Aesthetic Resources.....	149
5.1.9	Cultural Resources	149
5.1.10	Socio-Economic Resources.....	149
5.1.11	Tribal Resources.....	149
5.2	Potential Studies or Information Gathering	149
5.2.1	Assessment of Fish Entrainment and Turbine Passage Survival.....	149
5.3	Relevant Qualifying Comprehensive Waterway Plans	150
5.4	Relevant Resource Management Plans	150
6	Literature and Information Sources Cited in the Descriptions and Summaries of Existing Resource Data (18 C.F.R § 5.6(c)(2))	152

List of Appendices

Appendix A – Summary of Contacts and Correspondence Letters Made to Gather Relevant Information for Preparing the PAD

Appendix B – Current License

Appendix C – Water Quality Monitoring Data

Appendix D – Tables Listing Potential Wildlife Species in the Vicinity of the Jarvis Project

List of Tables

Table 2.2-1: Proposed Process Plan and Schedule	6
Table 3.6-1: Annual and Monthly Gross Generation (MWh) for the Jarvis Hydroelectric Project (2006-2015)	21
Table 4.1.1-1: West Canada Creek Watershed Land-use	26
Table 4.1.1-2: Land-use within 1,000 ft. of the Project Boundary	26
Table 4.1.2-1: Average Monthly MVWA and NYSCC Reservoir Withdrawals	27
Table 4.2.3-1 Erodibility of Soils in the Vicinity of the Project	39
Table 4.3.1.1-1: Median Monthly and Annual Reservoir Water Surface Elevations (1938-2016)	54
Table 4.3.1.2-1: Daily Inflow (cfs) Statistics for Hinckley Reservoir	55
Table 4.3.1.2-2: Daily Outflow (cfs) Statistics for Hinckley Reservoir	55
Table 4.3.1.2-3: Comparison of Monthly and Annual Inflow to Outflow for Hinckley Reservoir.....	55
Table 4.3.2.2-1: NYSDEC Classifications for Project Waterbodies	56
Table 4.3.2.2-2: NYSDEC Water Quality Standards	57
Table 4.3.2.4-1: Annual Min, Max, and Averages of Certain Parameters from MVWA Water Quality Data Collected Between 2000 and 2016	58
Table 4.3.2.4-2: NYSDEC LCI Water Quality Sampling Results from Hinckley Reservoir– 2011 Surface Samples.....	60
Table 4.3.2.4-3: NYSDEC LCI Water Quality Sampling Results from Hinckley Reservoir – 2011 Bottom Samples.....	61
Table 4.4.2-1: Summary of New York State Department of Environmental Conservation Fisheries Surveys Conducted in Hinckley Reservoir 1989-2014	100
Table 4.4.2-2: Summary of Catch (N) with Mean and Range of Total Length (mm) by Year (Survey) and Species Collected in NYSDEC Fisheries Surveys Conducted in Hinckley Reservoir, 1989-2014	101
Table 4.4.2-3: NYSDEC Fish Stocking Summary (including regular and surplus fish stocking) for West Canada Creek above Hinckley Reservoir, Hinckley Reservoir, and Prospect Reservoir, 2011-2016.....	102
Table 4.4.2-4: Summary of NYSDEC Fisheries Surveys Conducted in West Canada Creek Upstream and Downstream of the Jarvis Station Project Area, 1988-2010	103
Table 4.4.2-5: Occurrence of fish species in NYSDEC Fisheries Surveys, 1988-2014 in West Canada Creek (including two tributary surveys in close proximity) Upstream of the Project Area, within the Project Area (Hinckley Reservoir), and Downstream of the Project Area.....	104
Table 4.4.8-1: Unionid mussel records for Erie Canal and Mohawk River drainage, New York.....	105
Table 4.5.2-1: Typical Botanical Resources Found in Upland Forests Surrounding the Project	113
Table 4.5.2-2: Invasive Plant Species Documented Adjacent to Hinckley Reservoir	114
Table 4.6.1-1: NWI Classification Code Descriptions	117
Table 4.7.2-1: Federally Listed Birds of Conservation Concern	121

Table 4.7.2-2: New York State Listed Species of Conservation or Special Concern	122
Table 4.8.1.1-1: Formal Recreation Sites in the Vicinity of the Gregory B. Jarvis Project (FERC No. 3211)	127
Table 4.8.1.3-1: Relative Index of Need for Recreation Opportunities in Herkimer and Oneida Counties ^a	127
Table 4.10.2-1: Archeological Sites Within Two Miles (3.2 km) of the Project.....	136
Table 4.10.3-1: Inventoried Properties Within Two Miles (3.2 km) of the Project	137
Table 4.10.4-1: Relevant Previous Surveys Within Two Miles (3.2 km) of the Project	137
Table 4.11.1-1 Place of Residence and Density, 2010	141
Table 4.11.1-2: Housing Characteristics, 2010 (% of Total Units)	141
Table 4.11.2.1-1: Historical Population, 1980 through 2015	142
Table 4.11.2.2-1: Population Projections, 2015 through 2040	143
Table 4.11.3.1-1: Labor Force and Unemployment, 2015	143
Table 4.11.3.2-1: Income and Poverty, 2014	144
Table 4.11.3.3-1: Industry and Occupation for Civilian Population 16 Years and Over, 2014.....	145

List of Figures

Figure 3.2-1: Project Boundary	10
Figure 3.3-1: Project Facilities	14
Figure 3.3-2: One-line Diagram	15
Figure 3.4-1: 2012 Hinckley Reservoir Operating Diagram	19
Figure 4.1-1: West Canada Creek Watershed	30
Figure 4.1.1-1: Watershed Land-use Classifications Upstream of Hinckley Dam	31
Figure 4.1.1-2: Land-use Classifications within 1,000 feet of the Project Boundary	32
Figure 4.1.3-1: Key Features in the Vicinity of the Project	33
Figure 4.2.1-1: Topography Surrounding the Project Area	40
Figure 4.2.2.1-1: Bedrock Geology in the Vicinity of the Project	41
Figure 4.2.2.2-1: Surficial Geology in the Vicinity of the Project	42
Figure 4.2.3-1: Soils in the Vicinity of the Project	43
Figure 4.3.1.1-1: Hinckley Reservoir Water Surface Elevation Annual Duration Curve	62
Figure 4.3.1.1-2: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – January	63
Figure 4.3.1.1-3: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – February	64
Figure 4.3.1.1-4: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – March	65
Figure 4.3.1.1-5: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – April	66
Figure 4.3.1.1-6: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – May	67
Figure 4.3.1.1-7: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – June	68
Figure 4.3.1.1-8: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – July	69
Figure 4.3.1.1-9: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – August	70
Figure 4.3.1.1-10: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – September	71
Figure 4.3.1.1-11: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – October	72
Figure 4.3.1.1-12: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – November	73
Figure 4.3.1.1-13: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – December	74
Figure 4.3.1.1-14: Hinckley Reservoir Water Surface Elevation 2001-2016	75
Figure 4.3.1.2-1: Annual Inflow and Outflow Duration Curves	76
Figure 4.3.1.2-2: Monthly Inflow and Outflow Duration Curves – January	77
Figure 4.3.1.2-3: Monthly Inflow and Outflow Duration Curves – February	78
Figure 4.3.1.2-4: Monthly Inflow and Outflow Duration Curves – March	79
Figure 4.3.1.2-5: Monthly Inflow and Outflow Duration Curves – April	80
Figure 4.3.1.2-6: Monthly Inflow and Outflow Duration Curves – May	81
Figure 4.3.1.2-7: Monthly Inflow and Outflow Duration Curves – June	82
Figure 4.3.1.2-8: Monthly Inflow and Outflow Duration Curves – July	83

Figure 4.3.1.2-9: Monthly Inflow and Outflow Duration Curves – August	84
Figure 4.3.1.2-10: Monthly Inflow and Outflow Duration Curves – September	85
Figure 4.3.1.2-11: Monthly Inflow and Outflow Duration Curves – October.....	86
Figure 4.3.1.2-12: Monthly Inflow and Outflow Duration Curves – November.....	87
Figure 4.3.1.2-13: Monthly Inflow and Outflow Duration Curves – December.....	88
Figure 4.3.2.4-1: Vertical Profiles of NYSDEC Fisheries Department Water Samples at Hinckley Reservoir: 1989, 1994, 2009, 2010	89
Figure 4.3.2.4-2: Vertical Profiles of NYSDEC Water Samples at Hinckley Reservoir: 2011	90
Figure 4.4.2-1: NYSDEC Fishery Survey Site Locations in Hinckley Reservoir, 1989-2014.....	106
Figure 4.4.2-2: NYSDEC Fishery Survey Site Locations, West Canada Creek Upstream of the Jarvis Project area, 1988-2010.	107
Figure 4.4.2-3: NYSDEC Fishery Survey Site Locations, West Canada Creek Downstream of the Jarvis Project area, 1988-2010.	108
Figure 4.4.3-1: Fishery Survey Site Locations in Prospect Reservoir, 2009.....	109
Figure 4.6.1-1: State and Federal Wetlands in the Project Vicinity.....	118
Figure 4.8.1.1-1: Formal Recreation Sites in the Vicinity of the Gregory B. Jarvis Project.....	128
Figure 4.8.1.2-1: Estimated Daytime Recreation Use at the Gregory B. Jarvis Project (P-3211) ^a	129
Figure 4.10.6-1: A circa 1920 view of the Hinckley Dam with the pulp mill's log boom behind the dam, slasher house on the earthen portion of the dam, and a large conveyor system below the dam, at the site of future Jarvis Hydroelectric Project, see circle.....	138

List of Abbreviations

A.D.	Anno Domini (Common Era)
APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program
B.C.	Before Common (Era)
°C	Degrees centigrade
CaCO ₃	Calcium carbonate
cfs	cubic feet per second
cm	centimeter
Commission	Federal Energy Regulatory Commission
CRIS	New York State Cultural Resource Information System
CROTS	catch rate oriented trout stocking
CWA	Clean Water Act
DHP	Division for Historic Preservation
DO	Dissolved oxygen
E	endangered
El.	elevation
EPA	Environmental Protection Agency
EPT	Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)
ESA	Federal Endangered Species Act
°F	Degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
ft	foot/feet
h	height
HOCCP	Herkimer-Oneida Counties Comprehensive Planning Program
IGTS	Iroquois Gas Transmission system
IHNv	infectious hematopoietic necrosis
ILP	Integrated Licensing Process
IPNv	infectious pancreatic necrosis virus
Kf	erodibility of the whole soil
Kw	erodibility of the fine-earth fraction

LCI	Lake Classification and Inventory
LMBv	Largemouth Bass virus
m	meter
MGD	Million Gallons per Day
mg/L	Milligram per Liter
mi	mile
mL	milliliter
m/s	Meters per second
MVWA	Mohawk Valley Water Authority
MW	megawatt
MWh	megawatt hours
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NO ₂	nitrogen dioxide
NOI	Notice of Intent
NOX	mono-nitrogen oxides
NR	National Register (of historic properties)
NRE	properties determined eligible for the NR
NRL	National Register List
NRCS	Natural Resources Conservation Service
NTU	Nephelometric Turbidity Unit
NWI	National Wetland Inventory
NWSRS	National Wild and Scenic River System
NY 365	New York State Route 365
NY or NYS	New York State
NYNHP	New York Natural Heritage Program
NYPA	New York Power Authority
NYSCC	New York State Canal Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSTA	New York State Thruway Authority
OPRHP	New York State Office of Parks, Recreation, and Historic Preservation

ORP	Oxidation Reduction Potential
PAD	Pre-Application Document
PLP	Preliminary Licensing Proposal
PO4	phosphate ion
PRISM	Partnerships for Regional Invasive Species Management
PSP	Proposed Study Plan
PT	Proposed threatened
RIBS	rotating integrated basin studies
RSP	Revised Study Plan
RTE	Rare, Threatened and Endangered
s	second
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCUBA	self-contained underwater breathing apparatus
SD1	Scoping Document 1
SHPO	State Historic Preservation Officer
SUVA	Specific UV absorbance
SVCv	spring viremia of carp virus
T	threatened
TCPs	traditional cultural properties
The Power Authority	The Power Authority of the State of New York/ New York Power Authority
The Project	Gregory B. Jarvis Power Project
The Working Group	Hinckley Reservoir Working Group
TOC	Total Organic Carbon
ug/L	microgram per liter
USACE	U.S. Army Corps of Engineers
uS/cm	microsiemens per centimeter
USDA Forest Service	United States Department of Agriculture Forest Service
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Society
WI/PWL	Waterbody Inventory/Priority Waterbodies List
WSRRA	Wild, Scenic and Recreational Rivers Act

VHSV

viral hemorrhagic septicemia

1 Introduction

1.1 Purpose of the Pre-Application Document (PAD)

The Power Authority of the State of New York (d/b/a “New York Power Authority” and referred to as “the Power Authority”) is licensed by the Federal Energy Regulatory Commission (FERC or Commission) to operate the Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211-NY). The Project is located on West Canada Creek, a tributary of the Mohawk River, at the Hinckley Reservoir Dam. The Project is approximately 0.5 miles upstream of the Town of Hinckley in the counties of Oneida and Herkimer, NY. The original license was issued on August 12, 1982 and expires on July 31, 2022.

The Power Authority is filing with the Commission a Notice of Intent (NOI) to relicense the Project, which generally consists of north and south embankment dams, a non-overflow concrete gravity section with integrated intake structure, a 15-foot diameter penstock which bifurcates into two 10.5-foot diameter penstocks, a powerhouse containing two 4.5 megawatt (MW) turbine/generator units, tailrace channel, step-up transformer, and appurtenant facilities. As required by law, the Power Authority will be applying for a new license for the Project on or before July 31, 2020.

The Commission’s relicensing regulations (18 CFR § 5.6) require that, as an initial step in officially commencing the licensing process, a licensee must prepare and distribute a Pre-Application Document (PAD). In accordance with the Commission’s regulations, the PAD is being filed simultaneously with the NOI and will be distributed to federal and state resource agencies, local governments, Native American Nations, and members of the public that may have an interest in the relicensing of the Project. To assist in disseminating information throughout the relicensing process, the Power Authority has developed a website (www.jarvis.nypa.gov), which will be used to post schedules, agendas, meeting minutes, study plans, study reports, and other documents created during the relicensing process, including the PAD.

The PAD is a tool for providing relevant engineering, operational, economic, and environmental information pertaining to the Project that is reasonably available at the time the NOI is filed. The PAD also serves to help interested parties scope issues and identify study needs for the Commission’s National Environmental Policy Act (NEPA) document. The PAD supplies information to help interested parties understand the Project and identify information that may be needed to support the issuance of a new license. This evaluation will be documented in the license application to be prepared by the Power Authority and filed with the Commission at least two years prior to license expiration, or by July 31, 2020.

In compliance with the Commission’s regulations governing the content of the PAD, the Power Authority contacted appropriate federal and state resource agencies and parties who may be interested in the relicensing of the Project. The Power Authority requested that parties provide any relevant studies, data, and information on topics such as geology, water quality, fisheries, recreation, wildlife, wetlands, aesthetics, and cultural resources.

The information contained in this document was assembled based on the requirements set forth in 18 CFR § 5.6 (c) and (d) and is organized as follows:

[Section 2](#) – Proposed process plan and schedule for all pre-application activities, 18 CFR § 5.6(d)(1).

[Section 3](#) – General description of the Project location, facilities, and operations, 18 CFR § 5.6(d)(2).

[Section 4](#) – Description of the existing environment and resource impacts, 18 CFR § 5.6(d)(3).

[Section 5](#) – Identification of preliminary resource issues and potential studies or information gathering needs associated with the issues, 18 CFR § 5.6(d)(4).

[Section 6](#) – Literature and information sources cited in the descriptions and summaries of existing resource data, 18 CFR § 5.6(c)(2).

[Appendix A](#) – Summary of contacts and correspondence letters made to gather relevant information for preparing the PAD, 18 CFR § 5.6(d)(5).

[Appendix B](#) – Current License, 18 CFR § 5.6(d)(2)(v)(A).

[Appendix C](#) – Water Quality Monitoring Data

[Appendix D](#) – Wildlife Species Data

1.2 Overview of the Integrated Licensing Process

The Power Authority will use the Integrated Licensing Process (ILP) as set forth in the Commission's Final Rule and Tribal Policy Statement issued on July 23, 2003 (Final Rule, Order No. 2002). The ILP was developed to integrate the applicant's pre-filing consultation with the Commission's scoping pursuant to NEPA. The primary activities that are undertaken in the ILP include: the filing of the NOI and PAD; FERC's public scoping of issues; the development of a study plan to assess the impacts of continuing Project operation on power and non-power resources; study execution; and report development and preparation of a license application. These activities will take place over a multi-year period ending with the filing of the application for a new license by July 31, 2020. The Commission will then complete its environmental analysis and processing of the license application.

The Power Authority's filing of the NOI and PAD initiates the ILP set forth in Part 5 of the Commission's regulations. As set forth in 18 CFR § 5.7, within 30 days of this filing Commission staff will attempt to meet with each federally recognized Native American Nation that is "likely to be affected by" the Power Authority's relicensing application.

Next, as required in 18 CFR § 5.8, the Commission will issue a notice of commencement of the licensing proceeding and a Scoping Document 1 (SD1) within 60 days of the filing of this NOI/PAD. SD1 will include a preliminary list of issues to be assessed during the licensing proceeding and will solicit stakeholder comments on the scope of analysis of issues. FERC will then hold a public scoping meeting and site visit within 30 days of issuing SD1. The site visit will allow stakeholders an opportunity to observe the Project layout and the area, understand operations, and participate in a question and answer session about the Project. Subsequent to the scoping meeting and site visit, Commission staff may issue a revised scoping document based on public and agency input.

A detailed Process Plan and Schedule, which depicts all major milestones required in the ILP along with a timetable for those milestones, is set forth in [Section 2](#) of the PAD.

1.3 History of the Jarvis Hydroelectric Project

Prior to construction of Hinckley Reservoir, West Canada Creek was used as a source of drinking water for the Utica area and to produce hydropower by predecessors of the current independent hydropower

producers. West Canada Creek also provided water to the old Erie Canal, prior to its conversion into the modern day Barge Canal, via its natural channel to the Mohawk River near Herkimer. At that time there were four incorporated users of West Canada Creek water: Consolidated Water Company of Utica (now the Mohawk Valley Water Authority), who maintained an intake in the Creek at Hinckley, NY; Utica Gas and Electric Company (now Erie Boulevard Hydropower, LP), who has long maintained a hydropower station at Trenton Falls, NY;¹ International Paper Company (now Trafalgar Power, Inc.), who used water from the Creek to operate a pulp and paper facility in Herkimer, NY; and Newport Electric Light and Power (now Newport Hydro Associates), who maintained a hydropower station in Newport, NY.

The Jarvis Project was developed in the early 1980s at the already-existing Hinckley Dam, for the limited purpose of capturing the electric generation potential of releases from the dam that had long served other purposes (e.g., navigation, public water supply, generation by Erie Boulevard, and recreation). Construction of the Hinckley Dam, which predates the Project by approximately 70 years, commenced in November 1910 by the New York State Department of Public Works (predecessor of the New York State Department of Transportation (NYSDOT)); work was completed on September 14, 1915. The dam was originally constructed to provide flow augmentation for the New York State Barge Canal. Secondary functions included serving as the municipal water supply for the City of Utica and recreational use.

In December 1981, the Power Authority applied to FERC for a license to construct the Jarvis Hydroelectric Project at the existing Hinckley Reservoir and Dam. On August 12, 1982, FERC issued a license to the Power Authority approving construction of the Project. In 1983, the NYSDOT conveyed a permanent easement to the Power Authority for “constructing, reconstructing, operating, and maintaining a hydroelectric generating facility or facilities.” This easement includes the area surrounding the generating facilities, the dam itself, a substation site on the north side of New York State (NYS) Route 365, a recreational boat launching site, and the lands associated with Hinckley Reservoir up to El. 1225.0.² Construction on the new powerhouse began in 1983. The power plant was commissioned on June 22, 1986, and the Power Authority dedicated the hydroelectric development at Hinckley in honor of Gregory B. Jarvis, a local native who died in the Challenger space shuttle tragedy on January 28, 1986.

The Hinckley Dam, reservoir, and associated lands are owned by the People of the State of New York, under the jurisdiction of the New York State Canal Corporation (NYSCC), formerly a subsidiary of the New York State Thruway Authority (NYSTA) (The New York State Legislature transferred control of the NYS Canal System from NYSDOT to NYSTA in 1992). On January 1, 2017, the NYSCC became a subsidiary of the Power Authority. The Power Authority owns the generating station and ancillary equipment at the Project.

Today, the reservoir continues to serve a variety of purposes including: (1) supplying water to the NYS canal system; (2) serving as the sole source of drinking water for approximately 130,000 people in the greater Utica area; (3) supplementing flows for the downstream hydropower generation owned and operated by Erie Boulevard Hydropower, LP and aquatic resources; and (4) recreation. As NYSCC releases

¹ The West Canada Creek Project, FERC No. 2701, owned by Erie Boulevard consists of the Trenton Falls development and the Prospect Development that began operation in 1959.

² All elevations are referenced to the Hinckley Datum. Elevations referenced to the Hinckley Datum are 1.04 feet higher than elevations referenced to the National Geodetic Vertical Datum (NGVD 1929 or Mean Sea Level (MSL)), thus, 1225.0 Hinckley Datum = 1223.96 NGVD29. Note that the Hinckley Datum is the same as the Barge Canal Datum.

flows for these purposes, the Power Authority captures the electric generation potential of these releases at the Jarvis Project.

Much of the northern and eastern portions of the reservoir are comprised of state-owned lands associated with the Adirondack Park and under the regulatory jurisdiction of the Adirondack Park Agency (APA).

2 Proposed Process Plan and Schedule (18 C.F.R § 5.6(d)(1))

2.1 Document Distribution and Mailing Lists

2.1.1 Document Distribution

The Power Authority has developed a website (www.jarvis.nypa.gov) to assist in disseminating information throughout the relicensing process. The website will be used to post schedules, agendas, meeting minutes, study plans, study reports, and other documents created during the relicensing process. Copies of licensing documents such as the PAD will also be available for public inspection during business hours at the Marcy Town Hall located at 8801 Paul Becker Road in the Town of Marcy, NY.

2.1.2 Mailing List

The Power Authority will maintain a mailing list of all stakeholders in the relicensing process. Stakeholders may sign up for the mailing list through the relicensing website at www.jarvis.nypa.gov.

2.1.3 Source Materials Referenced in PAD

In accordance with 18 CFR § 5.6(c)(2), sources referenced in the PAD will be available to the public. Sources available in electronic format are available to the public on the relicensing website (www.jarvis.nypa.gov).

Alternatively, members of the public may file a request with the Power Authority for source materials. The Power Authority will provide requested information within 20 days of receipt of a request for information. In responding to a request, the Power Authority will provide any requested reference electronically, if possible. If members of the public would like to request sources referenced in the PAD, please send an email to Jarvis.Relicensing@nypa.gov. The Power Authority may charge for out-of-pocket costs for reproduction of reference materials that were not generated by the Power Authority (e.g., books) and, if applicable, postage fees. Such requests will be handled on a case-by-case basis. Copyrighted sources referenced in the PAD will be available for viewing, and to the extent allowed by copyright, reproduction, through the Marcy Town Hall.

2.2 Proposed Schedule

A proposed Process Plan and Schedule with a timetable for the balance of the licensing process is shown in [Table 2.2-1](#). The proposed Process Plan and Schedule may reflect deadlines that fall on weekend days (Saturday or Sunday) or holidays. Deadlines falling on a weekend, holiday, or day when the Commission is closed due to adverse conditions are deemed to fall on the close of business of the next Commission business day in accordance with FERC guidelines. While the proposed Process Plan and Schedule were developed in accordance with and incorporate the timeframes set forth in 18 CFR Part 5, the Commission is expected to establish the applicable Process Plan and Schedule when it issues SD1.

Table 2.2-1: Proposed Process Plan and Schedule

Activity	Responsibility	Required Time Frame	Citation	Deadline ³
File Notice of Intent (NOI) and Pre-Application Document (PAD)	Power Authority	At least 5 (but no more than 5 1/2) years before existing license expires	18 CFR § 5.5(d)	June 30, 2017
Hold Initial Tribal Consultation Meeting	FERC	Within 30 days of filing of NOI & PAD	18 CFR § 5.7	July 30, 2017
Notice NOI/PAD and Issue Scoping Document 1 (SD1)	FERC	Within 60 days of filing of NOI & PAD	18 CFR § 5.8(a)	August 29, 2017
Hold Scoping Meeting at Marcy Town Hall and Site Visit	FERC	Within 30 days of issuance of SD1	18 CFR § 5.8(b)(3)	September 28, 2017
Comment on PAD and SD1; Submit Study Requests	Stakeholders	Within 60 days of issuance of SD1	18 CFR § 5.9(a)	October 28, 2017
File Proposed Study Plan (PSP)	Power Authority	Within 45 days of deadline for filing comments on PAD and SD1	18 CFR § 5.11	December 12, 2017
Hold Study Plan Meeting	Power Authority	Within 30 days of deadline for filing PSP	18 CFR § 5.11(e)	January 11, 2018
Comment on Proposed Study Plan	Stakeholders	Within 90 days of filing PSP	18 CFR § 5.12	March 12, 2018
File Revised Study Plan (RSP)	Power Authority	Within 30 days of deadline for filing comments on PSP	18 CFR § 5.13(a)	April 11, 2018
Comment on Revised Study Plan	Stakeholders	Within 15 days of filing of RSP	18 CFR § 5.13(b)	April 26, 2018
FERC Issues Study Plan Determination	FERC	Within 30 days of filing of RSP	18 CFR § 5.13(c)	May 11, 2018
Initiate Formal Study Dispute Resolution Process (if necessary)	Agencies with mandatory conditioning authority	Within 20 days of issuance of Study Plan Determination	18 CFR § 5.14(a)	May 31, 2018
File Response to Study Dispute(s) (if necessary)	Power Authority	Within 25 days of Notice of Study Dispute	18 CFR § 5.14(i)	June 25, 2018
FERC Dispute Panel Issues Finding (if necessary)	Dispute Panel	Within 50 days of Notice of Study Dispute	18 CFR § 5.14(k)	July 20, 2018
FERC Issues Determination on Study Dispute (if necessary)	FERC	Within 70 days of Notice of Study Dispute	18 CFR § 5.14(l)	August 9, 2018
Conduct Field Studies	Power Authority	Pursuant to approved SP	18 CFR § 5.15	Spring – Fall 2018
File Initial Study Report	Power Authority	Pursuant to approved SP or no later than 1 year after approval of SP	18 CFR § 5.15(c)(1)	May 11, 2019
Hold Initial Study Report Meeting	Power Authority	Within 15 days of filing of initial study report	18 CFR § 5.15(c)(2)	May 26, 2019

³ Note that although the “Time Frames” are dictated by 18 CFR Part 5, the specific dates or deadlines are dependent on the timing of prior events and thus may differ from the dates presented in this Table. For updated dates, see www.jarvis.nypa.gov.

Activity	Responsibility	Required Time Frame	Citation	Deadline ³
File Initial Study Report Meeting Summary	Power Authority	Within 15 days of study results meeting	18 CFR § 5.15(c)(3)	June 10, 2019
File Meeting Summary Disagreements (if necessary)	Stakeholders	Within 30 days of filing of study results meeting summary	10 CFR § 5.15(c)(4)	July 10, 2019
File Responses to Disagreements (if necessary)	Power Authority	Within 30 days of filing of meeting summary disagreements	18 CFR § 5.15(c)(5)	August 9, 2019
Resolve Disagreements (if necessary)	FERC	Within 30 days of filing of responses to disagreements	18 CFR § 5.15(c)(6)	September 8, 2019
Conduct Second Season Field Studies (if necessary)	Power Authority	Pursuant to approved Study Plan Determination	18 CFR § 5.15	Spring – Fall 2019
File Preliminary Licensing Proposal (PLP) or Draft License Application	Power Authority	No later than 150 days before final application is filed	18 CFR § 5.16(a)	March 3, 2020
File Updated Study Report (if applicable)	Power Authority	Pursuant to approved SP or no later than 2 years after approval of SP	18 CFR § 5.15(f)	May 11, 2020
Hold Updated Study Report Meeting (if applicable)	Power Authority	Within 15 days of Updated Study Report	18 CFR § 5.15(c)(2)	May 26, 2020
Comment on PLP, Additional Information Requests (if necessary)	Stakeholders	Within 90 days of filing of PLP or draft license application	18 CFR § 5.16(e)	June 1, 2020
File Updated Study Report Meeting Summary (if applicable)	Power Authority	Within 15 days of Study Results Meeting	18 CFR § 5.15(c)(3)	June 10, 2020
File Meeting Summary Disagreements (if necessary)	Stakeholders	Within 30 days of filing of study results meeting summary	18 CFR § 5.15(c)(4)	July 10, 2020
File Responses to Meeting Summary Disagreements (if necessary)	Power Authority	Within 30 days of filing of meeting summary disagreements	18 CFR § 5.15(c)(5)	August 9, 2020
Resolve Updated Study Report Meeting Disagreements (if necessary)	FERC	Within 30 days of filing of response to disagreements	18 CFR § 5.15(c)(6)	September 8, 2020
File License Application	Power Authority	No later than 24 months before existing license expires	18 CFR § 5.17(a)	July 31, 2020

3 Project Location, Facilities, and Operation (18 C.F.R § 5.6(d)(2))

3.1 Authorized Agent

The exact name, business address, and telephone for each person authorized to act as agent for the applicant is as follows:

Mark E. Slade, Director of Licensing
New York Power Authority
123 Main St.
White Plains, NY 10601
Telephone: (914) 681-6659
E-Mail: Mark.Slade@nypa.gov

Justin E. Driscoll, Executive Vice President, General Counsel
Susan L. Watson, Principal Attorney
New York Power Authority
123 Main St.
White Plains, NY 10601
Telephone: (914) 390-8070
E-Mail: Susan.Watson@nypa.gov

Charles R. Sensiba, Partner
Van Ness Feldman, LLP
1050 Thomas Jefferson Street NW
Seventh Floor
Washington, D.C. 20007
Telephone: (202) 298-1800
E-Mail: crs@vnf.com

3.2 Project Location and Lands

The Gregory B. Jarvis Power Project is located on the West Canada Creek approximately ½ mile upstream of the Hamlet of Hinckley in the Towns of Remsen, Russia, Ohio, and Trenton, in the counties of Oneida and Herkimer, New York. In this area, the West Canada Creek flows south out of the Adirondack Mountains, through the reservoir, and then approximately 35 miles to its confluence with the Mohawk River. When full (El. 1225), the reservoir has a surface area of approximately 4.46 mi², a volume of approximately 25.8 billion gallons, and a total drainage area at the Project site of approximately 372 mi². Much of the northern and eastern portions of the reservoir are within the Adirondack Park.

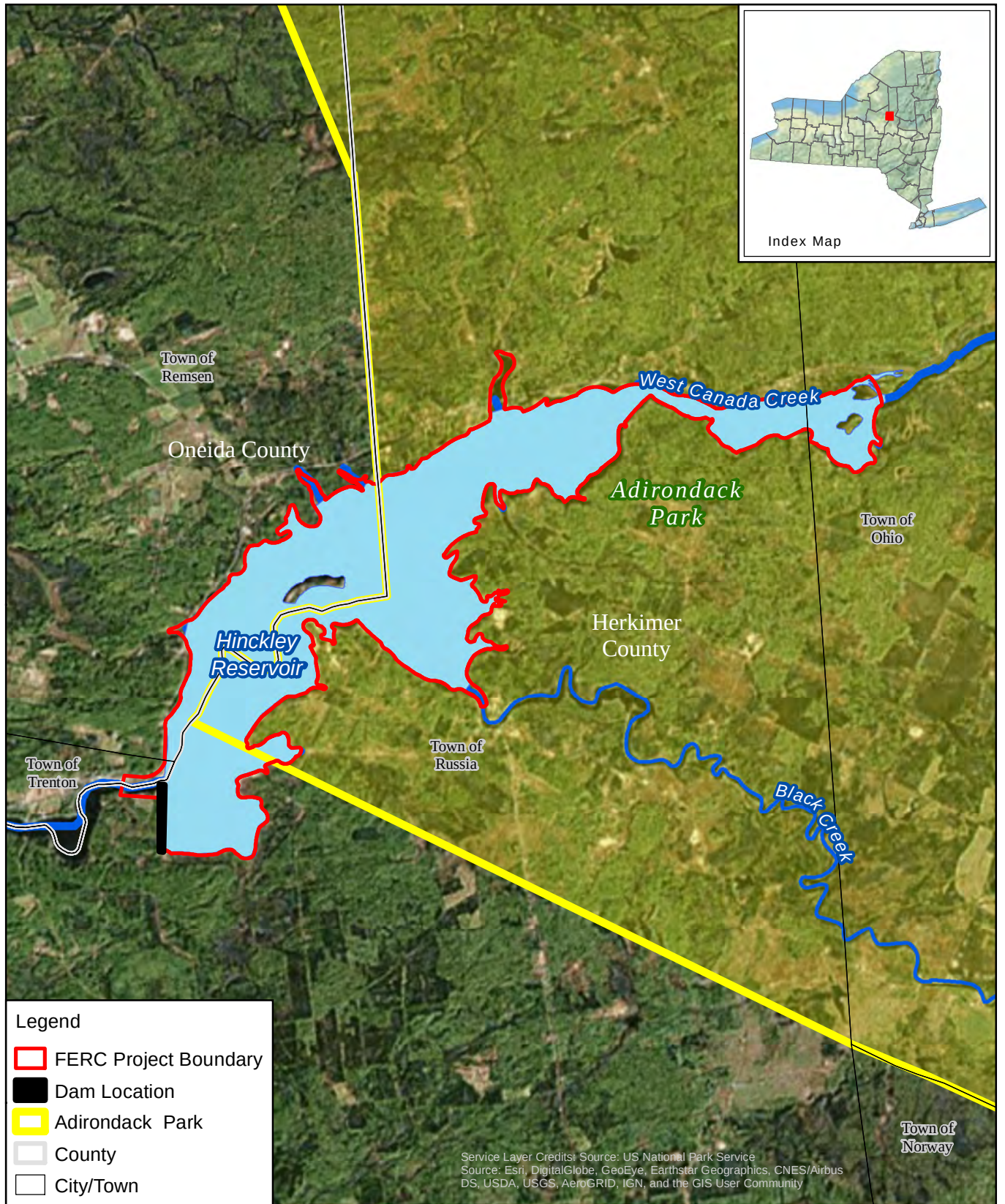
The Project Boundary follows the shoreline of Hinckley Reservoir at the normal pool elevation of 1225 extending upstream to the Harvey Road Bridge and downstream approximately 0.3 miles from Hinckley Dam to the Hinckley Road Bridge ([Figure 3.2-1](#)). The Project Boundary encompasses a total of approximately 2,850 acres and has approximately 17 miles of shoreline. The NYSCC owns the lands surrounding Hinckley Reservoir. The Power Authority has an easement to these lands as part of the 1983 agreement with NYSDOT⁴.

Downstream of Hinckley Reservoir is the West Canada Creek Hydroelectric Project (FERC No. 2701), which is comprised of the Prospect and Trenton Falls Developments. The Prospect Dam is located approximately 2.5 miles downstream of the Jarvis Project, and the Trenton Falls Dam is located

⁴ The New York State Legislature transferred control of the NYS Canal System from NYSDOT to NYSTA in 1992 and then from NYSTA to the Power Authority in 2016. On January 1, 2017, the NYSCC became a subsidiary of the Power Authority

approximately 1.6 miles below the Prospect Dam. The West Canada Creek Project is owned and operated by Erie Boulevard Hydropower, L.P. Approximately one mile downstream of the Trenton Falls Dam is the Nine Mile Creek Feeder Dam (also known as the Morgan Dam), which is the site of the NYS canal diversion used to divert water from West Canada Creek to the Nine Mile Feeder Canal.

The National Register nomination form for the New York State Barge Canal Historic District identifies Hinckley Dam and Reservoir and the Nine Mile Creek Feeder Dam as discontinuous contributing elements of the Historic District. The Jarvis plant is listed in the nomination as a non-contributing element. National Historic Landmark designation was given to the New York State Barge Canal Historic District in January 2017.



Gregory B. Jarvis Project
 (FERC No. P-3211)
 Pre-Application Document



©Copyright 2017
 New York Power Authority. All Rights Reserved



Figure 3.2-1:
 Project Boundary

3.3 Project Facilities

As viewed when looking downstream, Hinckley Dam consists of a north (right) embankment dam, a non-overflow intake structure, a concrete spillway, and a south (left) embankment. The Jarvis Project powerhouse is located approximately 200 feet downstream of the intake structure. [Figure 3.3-1](#) denotes the location of the Project facilities discussed below.

North and South Embankments

The embankment sections at Hinckley Dam have a maximum height of 53 feet and a crest width of about 11 feet at El. 1242. The north embankment dam is approximately 570 feet long, and the south embankment dam is approximately 2,600 feet long. The upstream slopes, which are covered with riprap, are 1V:2.5H from the dam crest to El. 1227.0, 1V:3H from El. 1227.0 to El. 1210.0, and 1V:3.5H below El. 1210.0. In 1987-1988, a berm was added to portions of the upstream and downstream slopes. The downstream slopes are 1V:2H with two 8-foot wide berms, one at El. 1226 and the other at El. 1213.

The embankment dams contain a concrete core wall, which extends to rock except as noted below. The core walls vary from a width of 2.75 feet at the top (El. 1238.0) to 8.0 feet at the base. Drawings and construction photographs show that the vertical and horizontal joints of the core walls have keys that overlap joints by about 1 foot. The 300 feet of the core wall from Sta. 34+00 to Sta. 37+00 at the south abutment extends 30 feet into overburden and does not reach bedrock. The 350 feet of core wall on the north abutment also does not reach bedrock.

Non-Overflow Intake

The non-overflow section is constructed of cyclopean concrete (concrete with boulders embedded during placement). This structure is approximately 65 feet long and 82 feet high, with the top at El. 1240. The intake to the powerhouse is housed in the cyclopean non-overflow section. This structure originally contained four 60-inch diameter cast-iron outlet conduits at centerline El. 1169.5. A 5-foot by 5-foot sluice gate for each conduit was located at the upstream face of the non-overflow section. From 1984 to 1985 the Power Authority substantially modified the non-overflow structure to construct the Jarvis Power Project. Three of the 60-inch diameter outlet conduits were eliminated, and a 15-foot diameter penstock and penstock bypass were added. After the addition of the powerhouse, one of the original 60-inch diameter water pipes (sluice gate no. 4) remained. The one remaining water pipe now acts as an outlet for small discharges, and is located on the powerhouse side through the non-overflow section.

The calculated water velocity approximately 1-foot in front of the intake trashracks is 2.57 ft/sec. The intake structure trashracks have a rack spacing of 6-inches from centerline to centerline of each bar. Given that each bar is $\frac{5}{8}$ -inches thick, the actual space between bars at the intake structure is $5\frac{3}{8}$ -inches. Trashrack spacing on the remaining sluice gate #4 is 4-inches from centerline to centerline of each bar. Given that each bar is $\frac{1}{2}$ -inch thick, the resulting sluice gate trashrack spacing is $3\frac{1}{2}$ -inches between bars.

Spillway

The cyclopean concrete spillway is an ungated ogee-type section with its crest at El. 1225.0. The spillway is approximately 400 feet long and has a maximum structural height, measured from crest to foundation, of 83 feet. The base of the section is founded at least 2 feet into bedrock with a 5-foot-deep, 8-foot-wide key

at the heel. A 40-foot concrete apron 4 feet thick extends beyond the structural toe of the section, and the downstream edge of the apron is keyed into rock.

Conveyance Systems

Water is conveyed to the powerhouse through a 15-foot-diameter penstock, which bifurcates into two 90-foot long, 10.5-foot diameter penstocks. The 10.5-foot diameter penstocks lead to two horizontal Kaplan turbine units. The powerhouse discharges into a short tailrace that meets West Canada Creek approximately 150 feet downstream of the powerhouse. This tailrace is cut into bedrock and has nearly vertical side slopes. There is also a penstock bypass which can act as a low level outlet (in addition to the 60-inch diameter water pipe).

The upstream section of the spillway's south wing-wall contains a gatehouse from which the Mohawk Valley Water Authority (MVWA) withdraws water for water supply. Flow into each of the two 42-inch-diameter water supply conduits is controlled by two 3-foot by 4-foot gate valves located on an outer gate shaft. These valves lead to a 42-inch diameter sluice gate at invert El. 1161.5, located in an inner gate shaft. The water supply conduits pass under the south embankment dam in a trench excavated into rock and backfilled with concrete.

Powerhouse

The Project powerhouse is a semi-underground structure located 200 feet downstream of the non-overflow intake. The powerhouse is 120 feet long, 55 feet wide, and 43 feet deep below grade. The powerhouse contains two 4.5-MW horizontal Kaplan turbine/generator units operating under a maximum head of 67.5 feet, plus surcharge, at normal pool (El. 1225) with a tailwater level at El. 1157.5.

Low Level Outlet

During the 1985 modifications for the Jarvis Power Project, three of the four 60-inch diameter outlet conduits through the non-overflow structure were eliminated. The one remaining water pipe is located on the powerhouse side of the non-overflow section, and now acts as a low level outlet for the Project. There is also a penstock bypass which can act as a low level outlet.

Hinckley Reservoir

Hinckley Reservoir was constructed by New York State in the early 1900s to serve as a primary water source for the Erie Canal portion of the New York State Barge Canal. The reservoir was constructed on the West Canada Creek, which flows south out of the Adirondack Mountains and through the reservoir on its route to the Mohawk River at Herkimer, NY. The reservoir was commissioned in 1915. The reservoir was constructed to have an average water depth of about 28 feet and a maximum depth of approximately 75 feet from the spillway crest at El. 1225.

Much of the northern and eastern portions of the reservoir are within the Adirondack Park, and the total drainage area at the Project site is approximately 372 mi² ([HRWG, 2008](#)). Under existing legal agreements, under certain conditions up to 75 cfs (48.5 MGD) may be drawn from the Hinckley Reservoir by the MVWA for water supply for the greater Utica area ([State of New York Supreme Court, 2013](#)); however, on average, withdrawals are typically much less.

The NYSCC maintains Hinckley Reservoir levels within a normal operating range of El. 1195 feet or above, except during adverse conditions. When full to the spillway crest (El. 1225), the reservoir has a surface area of approximately 4.46 mi² (~2,850 acres) and an estimated gross volume of 25.8 billion gallons. The lower limit of storage is at elevation 1173.5 feet, which is the minimum elevation required to pass the 230 cfs flow necessary for canal navigation. The minimum reservoir elevation of 1174.9 feet was observed on November 17, 1964 while the maximum reservoir elevation of 1230.74 feet was observed on April 28, 2011. Based on the 1921 reservoir volume curve, below El. 1173.5 feet the dead storage is approximately 0.54 billion gallons ([HRWG, 2008](#)). Therefore, the estimated usable storage capacity of Hinckley Reservoir when full to the spillway crest is 25.3 billion gallons.

Switchyard

A transformer is located in a fenced-off area in the Jarvis Power Project's powerhouse parking area. Generator leads run underground from the powerhouse about 50 feet to the transformer. A 200-foot long power line runs from the transformer to the switchyard located north of NYS Route 365, which is connected to National Grid's transmission lines. [Figure 3.3-2](#) depicts the one-line diagram for the Project.



NY Power Authority

Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document



Figure 3.3-1
Project Facilities

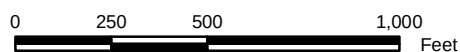
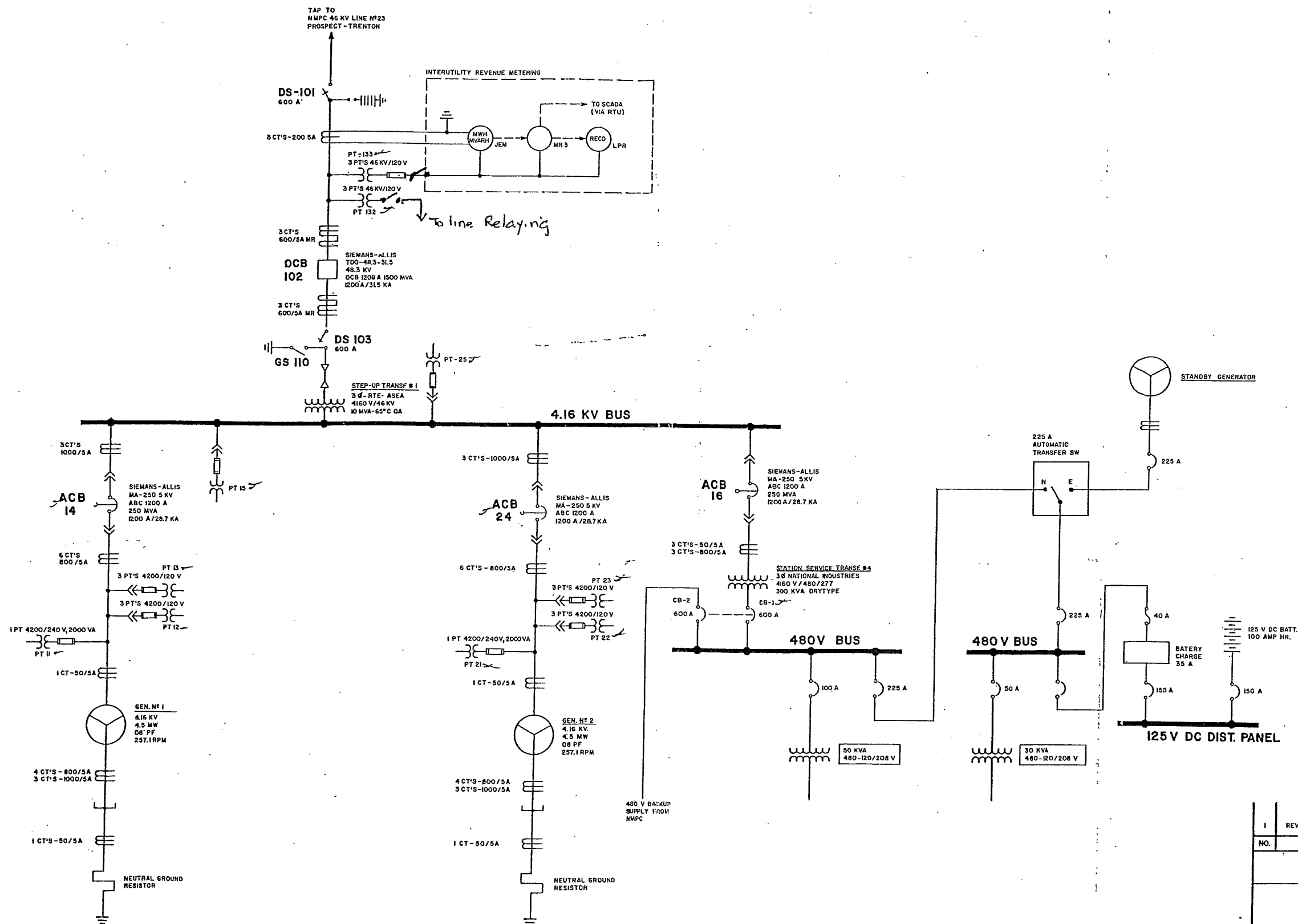


Figure 3.3-2: One Line Diagram



1	REVISED PROJECT TITLE	386	11/11/84
NO.	REVISION	APP. BY	DATE
NEW YORK POWER AUTHORITY OPERATIONS ENGINEERING			
SINGLE LINE DIAGRAM GREGORY JARVIS PROJECT			
(NYPA)			
DR. Alro Cortes	APPROVED	DATE	
CHK. 3d	11/11/84	REVISION N° 1	
DWG. N°	PA-212	SH. 1 OF 1	

3.4 Current Project Operations

Hinckley Reservoir is operated by the NYSCC in accordance with the 2012 Hinckley Reservoir Operating Diagram (Operating Diagram, [Figure 3.4-1](#)) for which the Jarvis Hydroelectric Project utilizes the reservoir releases to generate power. In addition, the current FERC license for the Project allows for peaking operations and requires a continuous minimum flow in West Canada Creek of 160 cfs as measured at the NYSCC diversion structure at the Nine Mile Creek Feeder Dam, which is located approximately 5.1 miles downstream of the Project. This section provides an overview of relevant background information pertaining to the Operating Diagram as well as a more detailed discussion of the current Project operations.

3.4.1 Relevant Background Information

In 1915, the NYS Department of Public Works constructed the Hinckley Dam and Reservoir for the purpose of supplying water to the NYS canal system. Hinckley Reservoir is owned by the NYSCC and outflows from the reservoir are governed by legally binding operating agreements between the NYSCC, MVWA and Erie Boulevard. In 1986, the Power Authority constructed the Jarvis Project at the Hinckley Dam to capture hydropower generation from NYSCC's reservoir releases. Construction of the Jarvis Project entailed reconfiguring discharge outlets at the dam to install turbine generators capable of producing hydropower from the existing releases. The Power Authority does not have the authority or the rights to deviate from these releases and if the Jarvis Project were not to exist, the same reservoir water levels and discharges would still occur in accordance with the Operating Diagram. In other words, the Jarvis Project simply redirects reservoir outflow (determined by the Operating Diagram) through the Project's power generating equipment, which is released by the NYSCC for purposes other than generation at the Jarvis Project and which would be made even in the absence of the Project. NYSCC does not manage Hinckley Reservoir water levels or releases to promote generation at the Jarvis Project.

After the construction of Hinckley Dam, various lawsuits and subsequent agreements resulted over water rights. One result of this litigation was the development of the 1920 Operating Diagram to establish the release of water from Hinckley Reservoir based on varying water levels throughout the year. Both the MVWA and Erie Boulevard have water rights based on the 1920 Operating Diagram that was incorporated into two separate settlement agreements: the 1917 Settlement Agreement between New York State and Consolidated Water Company of Utica, and the 1921 Settlement Agreement between New York State and the Utica Gas & Electric Company. The 1920 Operating Diagram was used until it was superseded by the 2012 Operating Diagram⁵ ([Figure 3.4-1](#)). In comparison to the 1920 Operating Diagram, the 2012 Operating Diagram generally has a higher reservoir elevation associated with lower flows and less of a drawdown in the early spring.

Today, pursuant to the 2012 Operating Diagram, the NYSCC maintains Hinckley Reservoir water levels within a normal operating range of El. 1195 feet or above, except during adverse conditions. Under some conditions, NYSCC deviates from the Operating Diagram release rates as necessary to maintain reservoir water levels. Releases through the powerhouse are determined by the time of year and Hinckley Reservoir elevation, as plotted in the Operating Diagram. Project operations are adjusted on a twice weekly basis in accordance with the Operating Diagram.

⁵ The 2012 Operating Diagram was accepted and became effective in 2013 by two agreements: an agreement by NYSCC and MVWA dated February 1, 2013, and an agreement by NYSCC and Erie Boulevard dated January 13, 2015

The NYSCC can make deviations from the Operating Diagram in the following situations:

Decreased release:

- at low reservoir levels to maintain MVWA water supply;
- at low reservoir levels so that 160 cfs minimum release downstream of the NYSCC diversion weir at Nine Mile Creek Feeder Dam will always be available if it is anticipated that low reservoir inflow will occur in the immediate future;
- for public safety (to allow bridge reconstruction, alleviate downstream flooding, etc.);

Increased release:

- at high reservoir levels to possibly provide some flood storage;

Additionally, in accordance with the various legal agreements, reservoir water withdrawals occur to support canal navigation, MVWA, and Erie Boulevard Hydropower generation operations. A 2013 Settlement Agreement between NYSCC and the MVWA allows the MVWA to withdraw up to 75 cfs if certain conditions are met, although their current monthly average withdrawal amount is 30-35 cfs. In addition, the canal diversion at the Nine Mile Creek Feeder Dam also withdraws water from West Canada Creek during the navigation season to support canal operation; therefore, increased releases may be made to supplement downstream canal water levels to maintain navigability during this time.

3.4.2 Project Operations

As previously noted, the Jarvis Project simply takes advantage of the releases determined by NYSCC in accordance with the Operating Diagram to generate power. Releases are determined by the time of year and Hinckley Reservoir elevation in accordance with the Operating Diagram ([Figure 3.4-1](#)). Project operations are adjusted on a twice-weekly basis. The Power Authority does not deviate from the Operating Diagram unless directed to do so by NYSCC. Reservoir levels are usually maintained between El. 1195 and El. 1225 (the elevation of the spillway crest); however reservoir water levels can fall below El. 1195 when prolonged dry conditions occur. The Jarvis Project does not operate when reservoir levels are below El. 1195. Consistent with the 2012 Operating Diagram, during the winter months, the reservoir is generally drawn down and then allowed to refill during spring melt.

The Project has two horizontal Kaplan units which are each capable of operating between 300 and 900 cfs for a total hydraulic capacity of 1,800 cfs under normal operating conditions. At flows within the operating range of the units (300 to 1,800 cfs), the Project provides outflow via generation. At flows below 300 cfs, or when the reservoir water surface elevation is below El. 1195, the Project usually does not operate. The low-level sluice gate no. 4 is used to pass the minimum flow when there is no power generation. At flows greater than 1,800 cfs, and when the reservoir water surface elevation is greater than El. 1225, downstream releases are passed via a combination of generation and spillage.

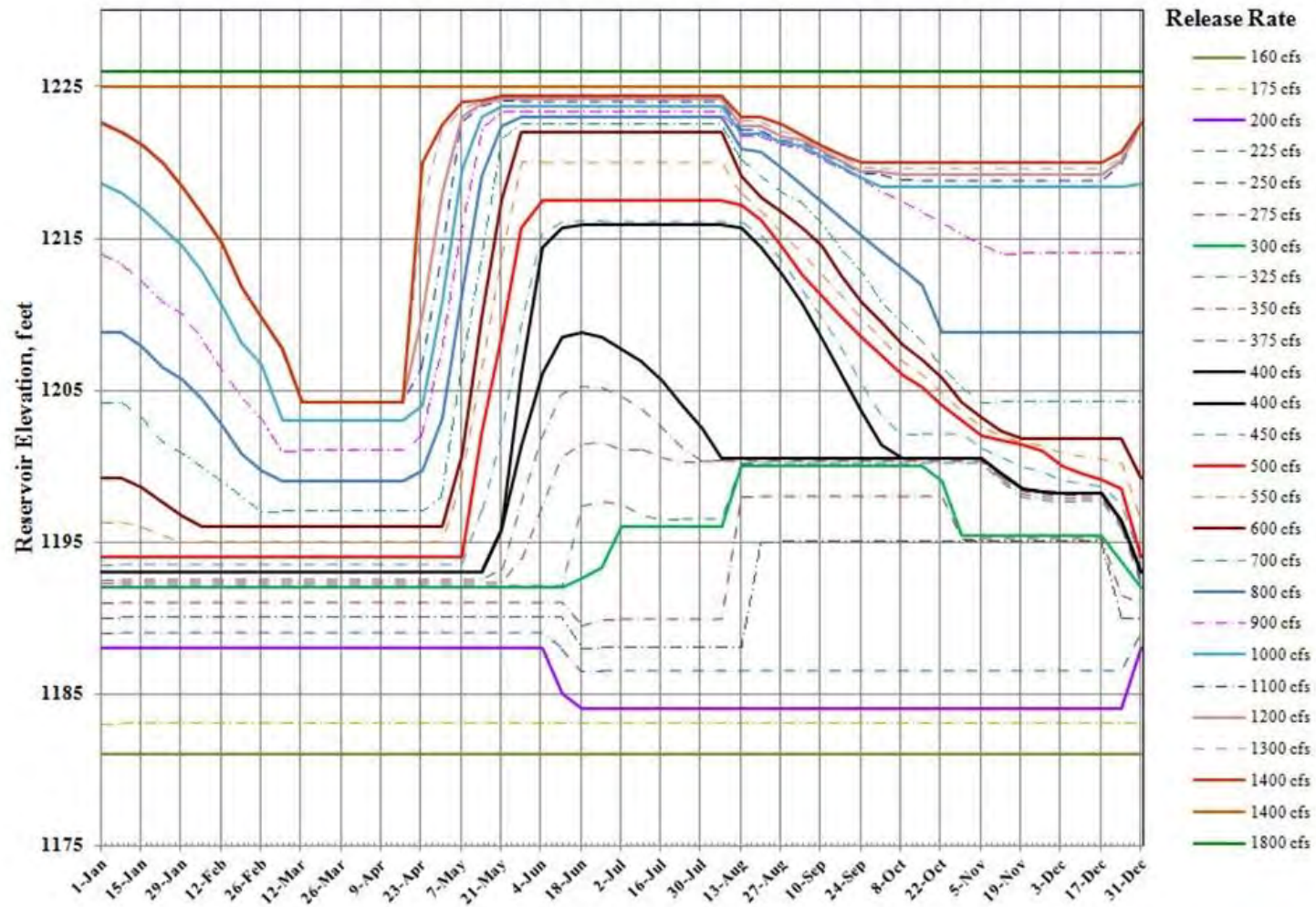
The current FERC license allows for the Project to operate in a peaking generation mode. When the Power Authority is peaking it will average the outflow required by the Operating Diagram over the course of the day. When operated in this manner, the Project will generate with a lower outflow during non-peak demand periods and then generate with a higher outflow during peak demand periods such that the total daily average flow is equal to the outflow required by the Operating Diagram.

Minimum Flow Requirement

In accordance with the current FERC license, a continuous minimum flow of 160 cfs must be maintained in West Canada Creek, as measured downstream of the NYSCC diversion weir at the Nine Mile Creek Feeder Dam. During the Canal's operating season, the minimum flow below Trenton Falls must equal the sum of the FERC required minimum flow of 160 cfs, as measured below the Nine Mile Creek Feeder Dam structure, plus the amount diverted into the Nine Mile Feeder Canal by the NYSCC.

Figure 3.4-1: 2012 Hinckley Reservoir Operating Diagram

2012 Hinckley Reservoir Operating Diagram



3.5 Current License Requirements

The FERC license articles govern how the Project was designed and is operated. The articles refer to issues such as power production, public safety, streamflows, and recreation, among others. A list of FERC license articles that govern the current operation of the Project can be found in [Appendix B](#).

3.6 Summary of Project Generation and Outflow Records

Summary of Project Generation

[Table 3.6-1](#) provides the annual gross generated megawatt hours (MWh) at the Project for the past ten years (2006-2015). The average monthly gross generation of the plant is also provided in the table for the same period. As observed in the table, in September of 2012, there was no generation at the Project due to flows below the unit operating range during the entire month. It should be noted that Unit #2 was out of service from June 29, 2012 to November 2015, which is reflected in the lower power generation for the corresponding years of 2012 to 2015.

Dependable Capacity

There are two capability periods: summer (May 1 – October 31) and winter (November 1 – April 30). For each capability period, the New York Independent System Operator (NYISO) calculates the dependable capacity for small hydro projects. The calculation is based on the amount of generation the Project produced during the NYISO's 20 peak load hours for each capability period. Each capability period has a five year rolling average. For the most recent periods, the Project's dependable capacity amount was 3.2 MW for the summer period and 4.1 MW for the winter period. These lower amounts are based on the fact that one turbine was out of service for repairs from June 2012 through November 2015. Due to the rolling average calculation, NYPA forecasts its dependable capacity to gradually increase to 4.4 MW for the summer periods and 7.7 MW for the winter periods by 2021.

Outflow Records

[Figures 4.3.1.2-1](#) through [4.3.1.2-13](#) depict the annual and monthly outflow duration curves at the Project. As observed in the figures, for all months except March and April, outflow exceeds inflow, as the inflow is supplemented with reservoir storage. This is typical of a seasonal store and release reservoir. [Section 4.3](#) provides additional information pertaining to this.

Table 3.6-1: Annual and Monthly Gross Generation (MWh) for the Jarvis Hydroelectric Project (2006-2015)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2006	4,048	4,290	3,549	4,549	3,607	2,863	4,132	2,358	1,325	3,257	4,698	4,275	42,952
2007	5,623	2,071	2,128	5,172	3,637	1,553	1,302	1,003	120	626	3,141	3,259	29,635
2008	3,227	4,031	4,835	5,757	3,024	1,725	2,067	2,636	2,204	1,848	2,709	3,278	37,342
2009	3,394	1,792	3,041	4,182	3,723	1,921	2,136	2,438	2,132	2,740	3,126	3,179	33,805
2010	2,310	1,681	1,522	3,629	2,475	1,384	2,024	1,467	2,422	3,133	3,244	3,460	28,750
2011	2,394	577	2,272	3,865	3,608	2,075	2,538	1,644	2,902	3,144	3,177	3,495	31,692
2012	3,548	2,960	2,948	2,938	3,069	1,999	737	621	0	1,628	1,699	1,712	23,859
2013	2,044	2,024	1,030	2,368	2,689	2,766	2,560	1,435	1,268	397	2,702	2,604	23,888
2014	2,916	1,794	240	2,523	3,240	2,420	2,420	2,154	2,124	2,067	2,159	2,391	26,449
2015	2,876	900	55	2,325	2,675	2,453	2,450	633	237	1,470	2,409	2,513	20,995
Average	3,238	2,212	2,162	3,731	3,175	2,116	2,237	1,639	1,473	2,031	2,906	3,017	29,937

Note: It should be noted that Unit #2 was out of service from June 29, 2012 to November 2015.

3.7 Current Net Investment

As of the end of the year 2016, the current net investment in the Project is \$19.20 million.

3.8 Compliance History

The Power Authority operates the Project in accordance with the terms and conditions of the license and has had no instances of non-compliance with the license. Over the term of the license, the Project has been subject to FERC's standard operational and environmental inspections. The Power Authority has promptly implemented and completed all necessary actions to address the comments and recommendations arising from FERC's inspections.

3.9 Proposed New Facilities and/or Changes in Project Operation

The Power Authority is not proposing to construct new facilities or to alter Project operations as part of this relicensing.

4 Description of Existing Environment and Resource Impacts (18 C.F.R § 5.6(d)(3))

4.1 General Description of the River Basin (18 C.F.R § 5.6(d)(3)(xiii))

The Jarvis Project, which includes Hinckley Reservoir, is located at Hinckley Dam on West Canada Creek. West Canada Creek originates in the Adirondack Mountains (approximately El. 2350) from a series of lakes and tributaries and extends approximately 75 miles to its confluence with the Mohawk River (approximately El. 401). The Mohawk River is a tributary to the Hudson River, is approximately 140 miles long, and has a drainage area of approximately 3,460 mi². The total drainage area for West Canada Creek, which is the second largest tributary to the Mohawk River, is approximately 561 mi².

From its headwaters in the Adirondack Mountains, West Canada Creek flows approximately 35 miles in a south or south-westerly direction into Hinckley Reservoir. The confluence of West Canada Creek and the South Branch of West Canada Creek is located approximately 11 miles upstream of Hinckley Reservoir. The reservoir's primary source of water is stream inflow from the West Canada Creek and Black Creek. Black Creek is estimated to drain 25% of the Hinckley Reservoir watershed ([HRWG, 2008](#)). A number of more minor tributaries also drain into the reservoir. Tributaries found in the basin are discussed in greater detail in [Section 4.1.4](#). Hinckley Dam is located approximately 35 miles upstream of the Mohawk River confluence. The total drainage area at Hinckley Dam is approximately 372 mi².

Upon its exit from Hinckley Reservoir, West Canada Creek flows in a south or south-easterly direction approximately 35 miles before draining into the Mohawk River. Approximately 4 miles downstream of Hinckley Dam, West Canada Creek flows through Trenton Falls Gorge, which is comprised of a number of waterfalls and unique geomorphic and geologic features. A number of dams are located on West Canada Creek between Hinckley Dam and the Mohawk River. These are described in more detail in [Section 4.1.3](#).

[Figure 4.1-1](#) presents a map of the West Canada Creek watershed.

4.1.1 Major Land Uses

The upper watershed of West Canada Creek (upstream of Hinckley Dam) is primarily undeveloped and sparsely populated. Approximately 93% of the Hinckley Reservoir watershed is located within the Adirondack Park ([EPA, 2001](#)). Based on review of the available land-use data, approximately 83% of the land in this area is classified as either Deciduous Forest (55%), Evergreen Forest (16%), or Mixed Forest (12%). The remaining 17% is a mix of water, various types of wetlands, or vegetative cover (i.e., shrub/scrub) ([Homer et al., 2015](#)). [Table 4.1.1-1](#) provides a breakdown of the various land-use classifications found throughout the West Canada Creek watershed upstream of Hinckley Dam, while [Figure 4.1.1-1](#) depicts the various land-use classifications in this area.

The adjacent land use within 1,000 ft. of the Project Boundary is dominated by Hinckley Reservoir. The area surrounding the reservoir is largely undeveloped with approximately 29% classified as forested (Deciduous Forest ~16%, Evergreen Forest ~8%, and Mixed Forest ~6%) and approximately 20% classified as wetlands (Emergent Herbaceous ~12% and Woody ~8%), while 14% is a combination of Barren Land (Rock/Sand/Clay), Shrub/Scrub, or Developed Open Space ([Homer et al., 2015](#)). Although the majority of the land-use within 1,000 ft of the Project Boundary is undeveloped, there is some limited roadway and residential development scattered throughout this area. [Table 4.1.1-2](#) provides a breakdown of the various

land-use classifications found within 1,000 ft. of the Project Boundary, while [Figure 4.1.1-2](#) depicts the various land-use classifications in this area.

4.1.2 Major Water Uses

Today, the reservoir continues to serve a variety of purposes including: (1) supplying water to the NYS canal system; (2) serving as the sole source of drinking water for approximately 130,000 people in the greater Utica area; (3) hydropower generation at the Jarvis Project; (4) supplementing flows for downstream hydropower generation and aquatic resources; and (5) recreation. As NYSCC releases flows for these purposes, the Power Authority captures the electric generation potential of these releases at the Jarvis Project. [Section 3.4.1](#) provides relevant background information on the various water uses of the reservoir and the settlement agreements which have been reached over time.

As noted in [Section 3.4.1](#), Hinckley Reservoir release rates are determined by the Operating Diagram ([Figure 3.4-1](#)). Deviations from the Operating Diagram are determined by NYSCC and are only allowed during specific situations. MVWA and NYSCC can also withdraw additional water from the reservoir per the historic settlement agreements.

[Table 4.1.2-1](#) summarizes monthly average withdrawals by the MVWA and NYSCC from 2009 through August 2016. Historically the monthly average withdrawals have ranged between a maximum of 37.6 cfs and a minimum of 27.0 cfs. Flows diverted by the NYSCC for the same time period ranged from a maximum of 82 cfs to a minimum of 0 cfs (0 cfs typically occurred during months outside of the Canal navigation season). The 82 cfs maximum daily flow diverted by NYSCC occurred on a daily basis for most readings in July and August 2012. Records of MVWA and NYSCC withdrawals were not always available on a daily basis, therefore monthly averages were determined only from those days that withdrawal flows were available ([NYS Canal Corporation, 2016b](#)).

4.1.3 Basin Dams

Downstream of Hinckley Reservoir is the West Canada Creek Hydroelectric Project (FERC No. 2701), which is comprised of the Prospect and Trenton Falls Developments. The Prospect Dam is located approximately 2.5 miles downstream of the Jarvis Project, and the Jarvis Project discharges directly into the Prospect impoundment. The Trenton Falls Dam is located approximately 1.6 miles below the Prospect Dam. The West Canada Creek Project is owned and operated by Erie Boulevard. Approximately one mile downstream of the Trenton Falls Dam is the Nine Mile Creek Feeder Dam, which is the site of the NYSCC diversion from West Canada Creek into the Nine Mile Feeder Canal. The final two dams on West Canada Creek are those associated with the Newport (FERC No. 5196) and Herkimer (FERC No. 9709) Hydroelectric Projects. The Newport and Herkimer dams are located approximately 13 and 26.5 miles, respectively, downstream of the Nine Mile Creek Feeder Dam. [Figure 4.1.3-1](#) denotes the various hydroelectric projects and dams found on West Canada Creek. There are no dams on West Canada Creek or on the tributaries upstream of Hinckley Reservoir.

4.1.4 Tributary Streams

Few tributaries exist downstream of the Reservoir because the main portion of the Hinckley Reservoir watershed occurs northeast of the Reservoir. The other main tributary which contributes flow to Hinckley Reservoir besides the West Canada Creek is Black Creek, located on the southcentral portion of the Reservoir. Other minor tributaries which drain into the Reservoir include Kreskern Creek, Remus Brook,

Taynter Brook, Buttermilk Brook, Beaver Meadow Creek, the Thomas Pond outlet, and a few other unnamed tributaries.

[Figure 4.1-1](#) denotes the tributaries found throughout the West Canada Creek watershed.

Table 4.1.1-1: West Canada Creek Watershed Land-use

Land Use Classification	Area (acres)	% Total
Deciduous Forest	131,451	54.9%
Evergreen Forest	38,256	16.0%
Mixed Forest	28,788	12.0%
Woody Wetlands	15,430	6.4%
Water	9,080	3.8%
Shrub/Scrub	8,685	3.6%
Emergent Herbaceous Wetland	2,845	1.2%
Developed Open Space	1,966	0.8%
Pasture/Hay	935	0.4%
Grasslands/Herbaceous	898	0.4%
Cultivated Crops	562	0.2%
Barren	247	0.1%
Developed, Low Intensity	161	0.1%
Developed, Medium Intensity	10	0.0%
Developed, High Intensity	0	0.0%
TOTAL	239,311	100.0%

[Homer et al., 2015](#)

Table 4.1.1-2: Land-use within 1,000 ft. of the Project Boundary

Land Use Classification	Area (acres)	% Total
Water	2,029	37.3%
Deciduous Forest	867	15.9%
Emergent Herbaceous Wetland	672	12.3%
Woody Wetlands	426	7.8%
Evergreen Forest	416	7.7%
Mixed Forest	312	5.7%
Barren	243	4.5%
Shrub/Scrub	223	4.1%
Developed Open Space	181	3.3%
Developed, Low Intensity	28	0.5%
Grasslands/Herbaceous	27	0.5%
Pasture/Hay	15	0.3%
Cultivated Crops	4	0.1%
Developed, Medium Intensity	2	0.0%
TOTAL	5,443	100.0%

[Homer et al., 2015](#)

Table 4.1.2-1: Average Monthly MVWA and NYSCC Reservoir Withdrawals

Date	Hinckley Reservoir Elevation (ft)	Hinckley Reservoir Discharge (cfs)	MVWA Withdrawal (cfs)	NYSCC Diversion for Barge Canal (cfs)
January 2009	1219.5	1089	30.0	0
February 2009	1203.4	882	33.8	0
March 2009	1214.2	1152	29.0	0
April 2009	1225.6	2052	28.4	1
May 2009	1225.0	1351	28.8	23
June 2009	1224.8	756	29.8	23
July 2009	1223.8	628	27.0	20
August 2009	1223.0	738	30.3	19
September 2009	1216.0	729	28.6	19
October 2009	1220.7	853	29.5	19
November 2009	1222.6	1018	29.4	4
December 2009	1219.6	1001	32.1	0
January 2010	1209.7	874	30.3	0
February 2010	1202.7	857	29.8	0
March 2010	1201.2	784	30.1	0
April 2010	1223.3	1258	28.4	1
May 2010	1215.9	821	29.2	18
June 2010	1218.6	548	28.7	18
July 2010	1222.9	632	31.3	18
August 2010	1222.1	769	28.8	18
September 2010	1218.4	779	29.9	18
October 2010	1225.2	1338	28.6	18
November 2010	1223.4	1005	28.8	5
December 2010	1223.3	1301	28.6	0
January 2011	1209.1	905	30.1	0
February 2011	1192.2	584	31.0	0
March 2011	1208.6	882	31.1	0
April 2011	1223.4	4210	29.8	0
May 2011	1225.3	1546	29.6	2
June 2011	1223.4	866	32.1	10
July 2011	1221.9	663	34.6	10
August 2011	1215.9	547	33.3	1
September 2011	1222.8	1102	33.4	0
October 2011	1223.5	1177	32.4	0
November 2011	1222.8	1002	32.1	0
December 2011	1224.9	1134	32.9	0
January 2012	1220.9	1088	34.1	0
February 2012	1215.3	1102	34.4	0

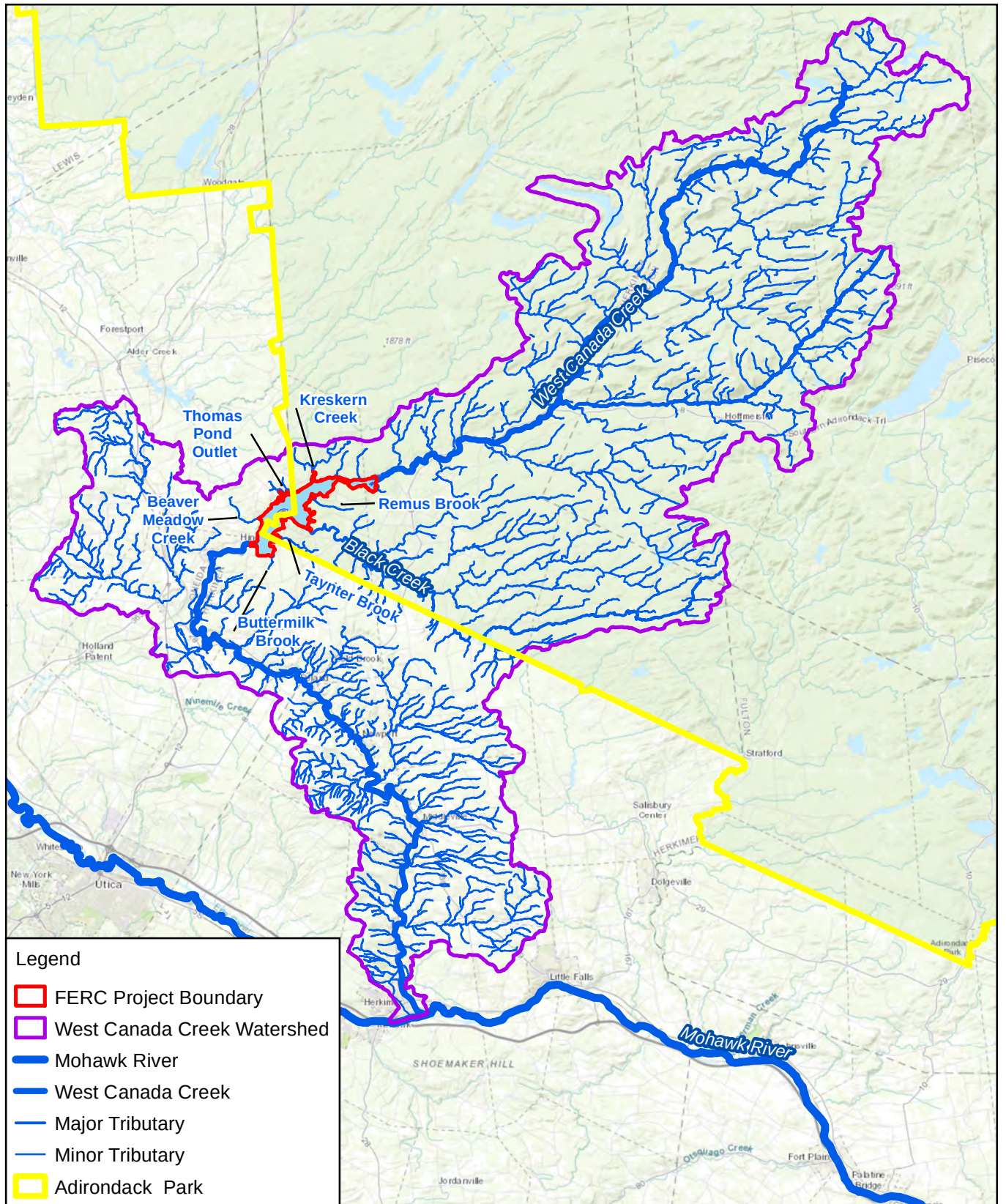
Date	Hinckley Reservoir Elevation (ft)	Hinckley Reservoir Discharge (cfs)	MVWA Withdrawal (cfs)	NYSCC Diversion for Barge Canal (cfs)
March 2012	1213.6	1320	33.3	0
April 2012	1221.2	928	31.5	0
May 2012	1224.5	1134	32.4	0
June 2012	1224.4	713	33.1	25
July 2012	1216.6	456	35.4	82
August 2012	1209.9	382	32.8	80
September 2012	1204.3	270	32.0	40
October 2012	1208.6	676	32.0	40
November 2012	1204.1	760	32.5	35
December 2012	1208.1	693	33.5	0
January 2013	1207.1	858	34.5	0
February 2013	1208.4	941	36.7	0
March 2013	1197.7	624	35.1	0
April 2013	1214.4	1526	33.7	0
May 2013	1220.4	972	32.7	8
June 2013	1223.5	1516	32.2	16
July 2013	1222.5	1829	34.3	16
August 2013	1215.4	475	32.8	16
September 2013	1209.8	487	32.0	16
October 2013	1208.1	355	32.8	4
November 2013	1224.2	1196	33.4	0
December 2013	1219.5	1277	34.8	0
January 2014	1218.5	1169	30.5	not available
February 2014	1203.3	891	37.5	not available
March 2014	1192.6	424	30.4	not available
April 2014	1217.7	2012	34.3	not available
May 2014	1224.1	1698	31.1	0
June 2014	1222.1	964	32.2	0
July 2014	1221.1	815	34.1	15
August 2014	1220.1	705	32.3	43
September 2014	1214.3	772	33.3	43
October 2014	1211.9	723	32.1	43
November 2014	1209.4	821	33.3	0
December 2014	1212.8	837	34.6	not available
January 2015	1216.9	1166	35.5	not available
February 2015	1197.0	575	37.2	not available
March 2015	1194.7	226	37.6	not available
April 2015	1213.6	1645	35.1	not available
May 2015	1219.9	970	34.8	45

Date	Hinckley Reservoir Elevation (ft)	Hinckley Reservoir Discharge (cfs)	MVWA Withdrawal (cfs)	NYSCC Diversion for Barge Canal (cfs)
June 2015	1223.3	987	35.0	53
July 2015	1218.9	1027	34.3	21
August 2015	1209.9	299	32.1	0
September 2015	1204.4	299	32.3	0
October 2015	1208.7	610	32.4	0
November 2015	1213.5	870	31.8	49
December 2015	1213.4	870	31.7	35
January 2016	1218.5	1162	32.4	0
February 2016	1212.6	1061	33.1	0
March 2016	1221.8	1554	32.1	0
April 2016	1222.6	1485	29.7	24
May 2016	1211.6	735	29.7	25
June 2016	1212.1	307	31.2	24
July 2016	1218.0	461	30.4	28
August 2016	1216.9	525	30.0	55
September 2016	1210.9	553	29.2	68
October 2016	1205.0	518	26.0	70
November 2016	1209.0	818	26.9	43
December 2016	1214.0	884	28.7	2

[NYS Canals Corporation, 2016](#)

Notes:

1. Data for this table was derived from NYSCC Canal Corporation website
<http://www.canals.ny.gov/wwwapps/waterlevels/hinckley/hinckleywaterlevels.aspx>
2. Records of MVWA and NYSCC withdrawals were not always available on a daily basis, therefore monthly averages were determined only from those days that withdrawal flows were available.



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document



©Copyright 2017
New York Power Authority. All Rights Reserved

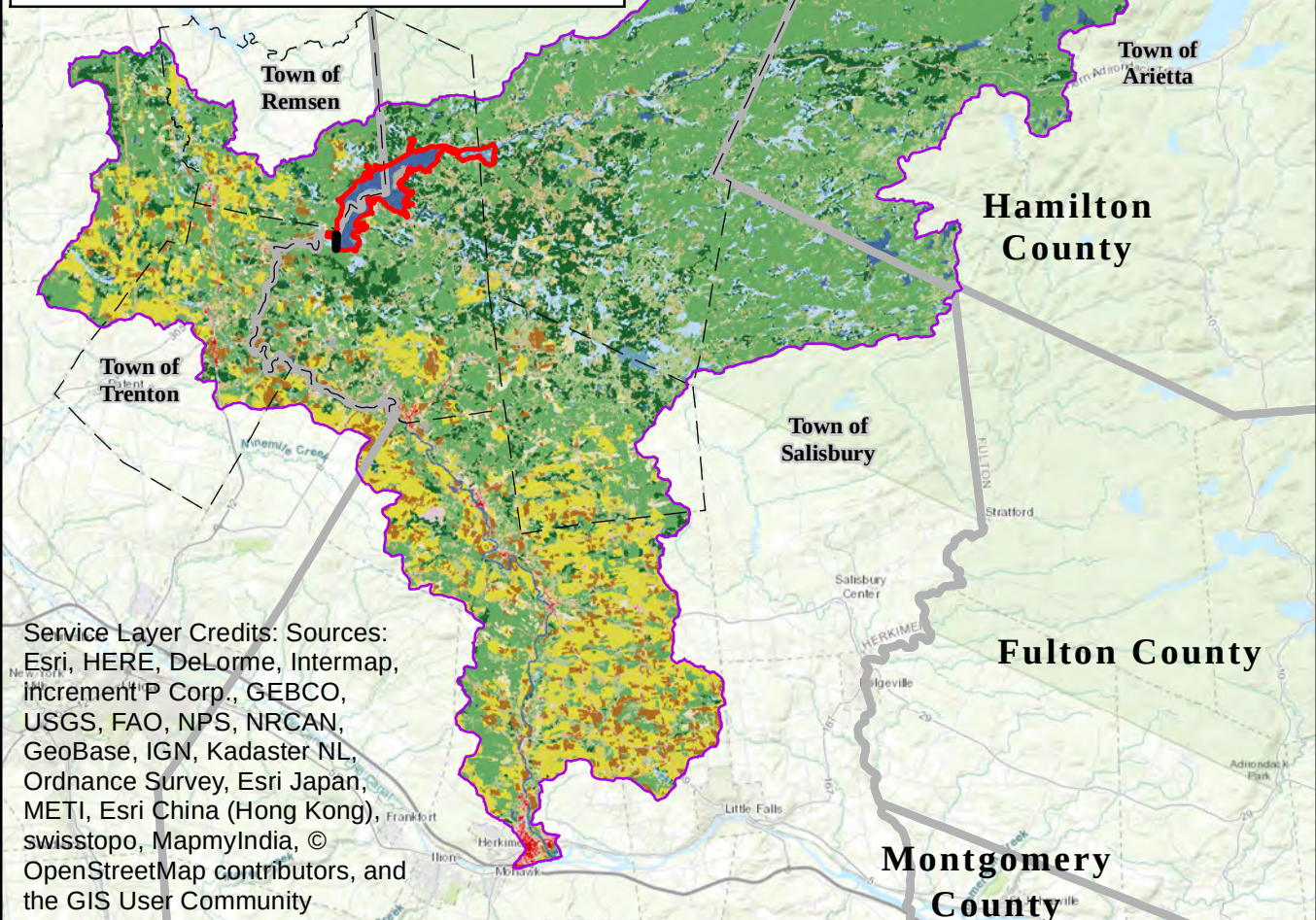
0 3 6 12
Miles



Figure 4.1-1:
West Canada Creek
Watershed

Legend

 FERC Project Boundary	 Developed, High Intensity
 Dam Location	 Barren Land (Rock/Sand/Clay)
 Municipality Line	 Deciduous Forest
 County	 Evergreen Forest
Land Use/Land Cover (NLCD 2011)	 Mixed Forest
 Open Water	 Shrub/Scrub
 Developed, Open Space	 Grassland/Herba...
 Developed, Low Intensity	 Pasture/Hay
 Developed, Medium Intensity	 Cultivated Crops
	 Woody Wetlands
	 Emergent Herbaceous Wetlands



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

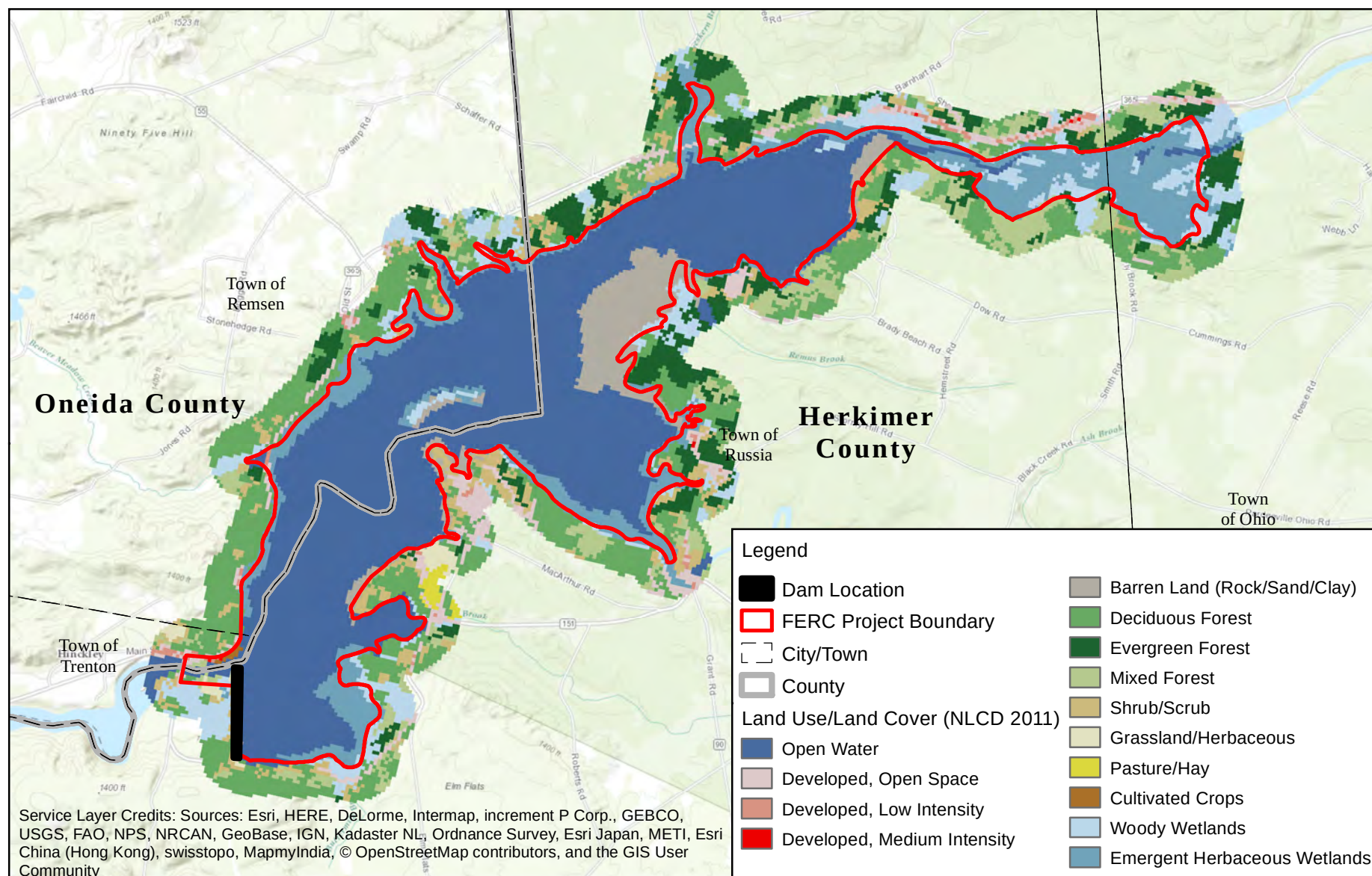


©Copyright 2017
New York Power Authority. All Rights Reserved

0 1 2 4
Miles



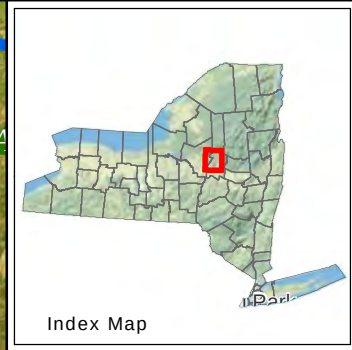
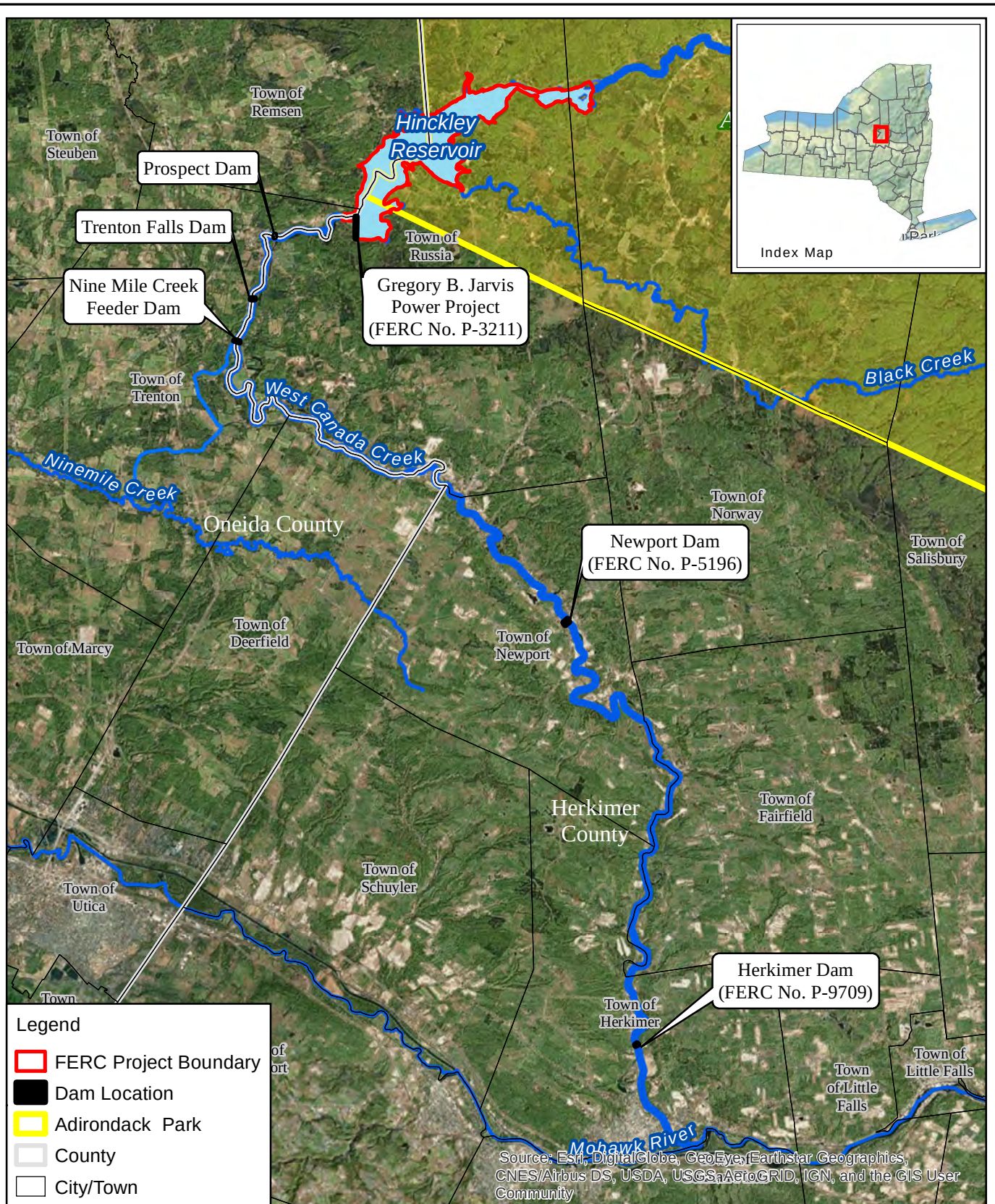
Figure 4.1.1-1:
Watershed Land-use
Classifications Upstream
of Hinckley Dam



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

0 2,000 4,000 8,000
Feet

Figure 4.1.1-2:
Land-use Classifications within 1,000 feet
of the Project Boundary



Legend

- FERC Project Boundary
- Dam Location
- Adirondack Park
- County
- City/Town

NY Power Authority

Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.1.3-1:
Key Features in the Vicinity
of the Project

©Copyright 2017
New York Power Authority. All Rights Reserved

0 1 2 4 Miles

N

4.2 Geology and Soils (18 C.F.R § 5.6(d)(3)(ii))

4.2.1 Topography

The Project is located within the Appalachian Highlands physiographic division, which extends from Alabama to Maine and includes the Appalachian, Adirondack, and New England provinces. The Appalachian Highlands physiographic division is a region characterized by rugged terrain. In the vicinity of the Project, the physiographic division is split into the Adirondack province and Appalachian Plateaus province; included in the Appalachian Plateaus province is the Tug Hill Plateau. The Project area straddles the border between the Adirondack province and Tug Hill Plateau. The Adirondack province ranges from 600 to 4,000 feet in elevation with a few isolated peaks over 4,300 feet. Less than 20 to 50 percent of this province is covered in gentle slopes (typically defined as being 2 to 5 degrees, [Hanson, 2016](#)), with 75 percent of the gentle slopes occurring in the lowlands ([USFS, 2016](#)). The Tug Hill Plateau is an asymmetrical dome located in the southwest corner of the Appalachian Plateau, tilting to the southwest. It is separated from the Adirondacks by the Black River Valley ([USFS, 2016](#)). The Tug Hill Plateau rises up to 250 feet in elevation along the western ridge and to 2,100 feet along the eastern edge ([Tug Hill Commission, 2016](#)).

Most of New York has been glaciated several times. As the ice melted from these glaciers, huge quantities of materials were left behind creating mantles of soil, otherwise known as till. Glacial deposits have left behind minor topographic landforms throughout the Appalachian Highlands area ([NYSDOT, 2013](#)).

As previously noted, West Canada Creek originates in the Adirondack Mountains at an approximate elevation of 2,350 ft. As the river flows in a south or south westerly direction, the elevation decreases until it enters Hinckley Reservoir at an approximate elevation of 1230 ft. Elevations within 1,000 feet of the Project Boundary get as high as approximately 1,400 feet. Typically, however, elevations remain below 1,300 feet and gradually decrease to approximately 1,225 feet at the reservoir shoreline. The river flows in a south or southeasterly direction after exiting the reservoir (spillway crest El. 1225, riverbed at the site El. 1150), through the Trenton Falls Gorge before eventually draining into the Mohawk River at an approximate elevation of 401 feet. The general topography of the West Canada Creek watershed in the vicinity of the Project is shown in [Figure 4.2.1-1](#).

4.2.2 Geology

West Canada Creek drains a portion of the southwestern flank of the Adirondacks. Its headwaters lie in the igneous and crystalline metamorphic rocks of the Adirondack Dome. The creek flows in a south or southwesterly direction until it reaches younger sedimentary rocks in the vicinity of Hinckley Reservoir. From this point the river flows southward across the sedimentary rocks to its confluence with the Mohawk River. As West Canada Creek flows downstream of the Project, it develops a moderately deep gorge in the younger, less resistant sedimentary rocks of the Trenton Group. The gorge walls have precipitous, near vertical slopes.

4.2.2.1 Bedrock Geology

The Project dam, spillway, and power plant is founded on or in bedrock composed of medium-to-thinly bedded, well-indurated, medium gray, fossiliferous (brachiopodal) limestone which contains thin interbeds of black, limy shale. The New York State Geologic Map includes these limestones and shales within the Trenton Group of Middle Ordovician Age (approximately 450 million years old). The shale limestone beds are generally unweathered, low to moderately hard, irregular (convoluted), calcareous, and contain shell

fragments. Shale composes 10% of the bedded sequence near the surface at the Project, increasing to 20% at about 30 feet below the spillway. Shale beds in several places appear weathered to clay, such as a prominent bed that was exposed in the powerhouse cut.

[Figure 4.2.2.1-1](#) denotes the bedrock characteristics which exist within 1,000-feet of the Project Boundary. The results of this analysis are summarized below:

- Glacial and Alluvial Deposits (Q-underlying bedrock geology unknown): 43%
- Trenton Group (Ot): 41%
- Interlayered metasedimentary rock and granitic, charnockitic, mangeritic, or syenitic gneiss (mug): 15%
- Black River Group (Obr): 1%
- Utica Shale (Ou): 0.3%

Descriptions for the top three classifications are included below ([USGS, 2016](#) and [NYSDOT, 2013](#)):

Glacial and Alluvial Deposits: Glacial and alluvial deposits originate from the Quaternary period of the Cenozoic era. They are primarily composed of alluvium, which is an unconsolidated detrital material, geologically recent in deposition from a body of running water. The secondary depositional material is glacial drift, a rock material transported and deposited by glaciers. The underlying bedrock geology in these areas is unknown.

Trenton Group: The Trenton Group originates from the Middle Ordovician epoch of the Paleozoic era. It is part of the Black River and Lorraine Groups up to 4,500 feet. The primary rock type of this group is sedimentary carbonate, limestone. The secondary rock type is sedimentary clastic mudstone, shale.

Interlayered metasedimentary rock and granitic, charnockitic, mangeritic, or syenitic gneiss: This metamorphic group originates from the Middle Proterozoic era and is primarily composed of metasedimentary rock. It is secondarily composed of gneiss, a foliated rock that often forms bands or sheet layers.

4.2.2.2 Surficial geology

Investigations in the vicinity of the Project have found that overburden in the flatter central portion of the valley consists of organic topsoil, various alluvial or fluvial gravel-silt-sand mixtures with little or no clay, and glacial till. At higher elevations near the north abutment of the dam, borings penetrated a deposit of fine sand to silty fine sand containing occasional lenses of silt and occasional gravel. From the terrace-like appearance of this deposit, these soils have been interpreted to be river terrace or kame deposits that are partially eroded and perhaps subsequently altered by colluvial processes. The till is a dense, silty sand with gravel. These deposits vary in thickness from 2 to 20 feet and are present throughout most of the site. Subsurface profiles drawn in the north-south direction along the embankment axis confirmed this variation.

[Figure 4.2.2.2-1](#) denotes the surficial characteristics which exist within 1,000-foot of the Project Boundary. Based on the results of the analysis, approximately fifty percent of the area was covered by the reservoir and therefore classified as water. The remaining results of this analysis are summarized below (descriptions from [NYSM, 2016](#)):

- Outwash sand and gravel (og): 35.3%

- Lacustrine sand (ls): 6.5%
- Kame moraine (Km): 8.1%

Outwash sand and gravel: Outwash sand and gravel has a thickness variable of approximately 7 to 66 feet. It is stratified coarse to fine gravel with proglacial fluvial deposition and sand. Outwash sand and gravel is stratified and well-rounded and generally finer in texture away from the ice border.

Lacustrine sand: Lacustrine sand is generally permeable, well sorted, stratified quartz sand deposited in proglacial lakes or on remnant ice. It is usually deposited near-shore or near a sand source and has a variable thickness of approximately 7 to 66 feet.

Kame moraine: Kame moraine is a somewhat rounded material with a generally variable texture. Its size ranges from boulders to sand and occurs from the deposition of an active ice margin during retreat. Kame moraine is constructional to kame and kettle topography. It is a calcareous cement with a thickness variable of approximately 33 to 98 feet.

4.2.3 Soils

Soil types adjacent to the Project Boundary are shown in [Figure 4.2.3-1](#). Based on the results of the analysis, approximately fifty-one percent of the area was covered by the reservoir and therefore classified as water. The remaining extent of soil material is summarized below, including descriptions of each series (from [NRCS et al., 2016](#) unless stated otherwise). The soil types discussed below represent the dominant soil classifications found in the vicinity of the Project. It should be noted that 15 other soil types were also found in this area; however, those soil classifications are not included in the list below as the percent of total area in which they are present is negligible (i.e., approximately 7%). It should also be noted that the soils data included from North Herkimer County is currently unpublished; however, the unofficial data was obtained from Amy Langner (NRCS, NY) via email on November 4, 2016.

- Adams loamy fine sand, 0 to 60 percent slopes (363A-E): 26.2%
- Searsport-Haplosaprists-Naumburg complex, 0 to 3 percent slopes (367A): 4.6%
- Croghan-Naumburg complex, 0 to 3 percent slopes (364A & 365A): 4.5%
- Monadnock-Adams-Colton complex, 3 to 15 percent slopes, bouldery (650C): 4.1%
- Colton-Adams complex, 3 to 70 percent slopes (375C-F): 2.4%

Adams: Adams loamy fine sand found within the vicinity of the Project has slopes between 0 and 60 percent but can slope up to 70 percent elsewhere. It is formed in glacial-fluvial or glacio-lacustrine sand and can be found within Northern New York and New England. It is an excessively drained soil series present on outwash planes, kames, terraces, eskers and lake planes. The thickness of the upper soil layers ranges from 16 to 35 inches. The depth to bedrock is over 72 inches.

Searsport: The Searsport series slopes between 0 and 3 percent within the vicinity of the Project. It consists of very poorly drained soils formed in thick sandy deposits occurring within pockets and depressions on outwash plains, terraces and deltas. Mineral horizons in this series are estimated to have high or very high saturated hydraulic conductivity.

Haplosaprists: The Haplosaprists series slopes between 0 and 3 percent within the vicinity of the Project. It consists of very poorly drained organic material over sandy glaciofluvial deposits and can be found in bogs and swamps. The depth to bedrock is over 60 inches.

Naumburg: The Naumburg series slopes between 0 and 3 percent within the vicinity of the Project but can slope up to 8 percent elsewhere. It consists of very deep, poorly and somewhat drained soils that formed in sandy deltaic or glaciofluvial deposits found on low-lying sand plains and terraces. It is typically found in forested areas. The thickness of the upper soil layers ranges from 19 to 42 inches. The depth to bedrock is more than 60 inches.

Croghan: The Croghan series slopes between 0 and 3 percent within the vicinity of the Project but can slope up to 15 percent elsewhere. It consists of very deep, moderately drained soils predominantly sandy in texture with some fine sandy loam within a depth of 10 inches from the mineral soil surface. The series is formed in deltaic or glacio-fluvial deposits. The mineral thickness of the upper soil layers ranges from 20 to 50 inches and the depth to bedrock is greater than 60 inches.

Monadnock: The Monadnock series slopes between 3 to 15 percent within the vicinity of the Project but may slope between 0 to 80 percent elsewhere. It consists of very deep, well drained soils that formed in loamy over sandy melt-out tills and mountains in glaciated uplands and are typically found on convex parts of summits, back slopes and shoulders. Its saturated hydraulic conductivity is estimated to be between moderately high or very high. The thickness of mineral upper soil layers ranges from 15 to 36 inches. The depth to bedrock is more than 65 inches.

Colton: The Colton series slopes between 3 to 70 percent within the vicinity of the Project but may slope as little as 0 percent elsewhere. It consists of very deep, excessively drained soils that were formed in glacio-fluvial deposits and can be found on kames, eskers, terraces and outwash plains. Saturated hydraulic conductivity is estimated to be high or very high in the upper soil layers and very high in the substratum. Thickness in the upper soil layers ranges from 18 to 49 inches and depth to bedrock is greater than 60 inches.

Soil Erodibility

Erosion factors for the soils series identified above were gathered from the Essex County Soil Survey developed by the NRCS in cooperation with the Cornell University Agricultural Experiment Station ([NRCS et al., 2010](#)). The Essex County Soil Survey was referenced for each of the following soil series in the unofficial North Herkimer County GIS layer obtained from Amy Langner (NRCS, NY). As discussed with Ms. Langner, the soils of North Herkimer County are within Major Land Resource Area 143, or the Northeast Mountains, and are similar to the soils in the surrounding counties (such as Oneida County).

The erosion factor, or K factor, indicates the susceptibility of a soil to sheet and rill erosion by water and is one of several factors used in the Universal Soil Loss Equation and the Revised Universal Soil Loss Equation to predict the average annual rate of soil loss. K factor values range from 0.02 to 0.69, with the higher the K factor value typically indicating a higher susceptibility to erosion ([NRCS, et al., 2010](#)). [Table 4.2.3-1](#) shows the Kw (erodibility of the whole soil) and Kf (erodibility of the fine-earth fraction) factors for the soils found in the vicinity of the Project. As shown in the table, these soils are characterized as having low to moderate erodibility.

4.2.4 Reservoir Shoreline and Streambanks

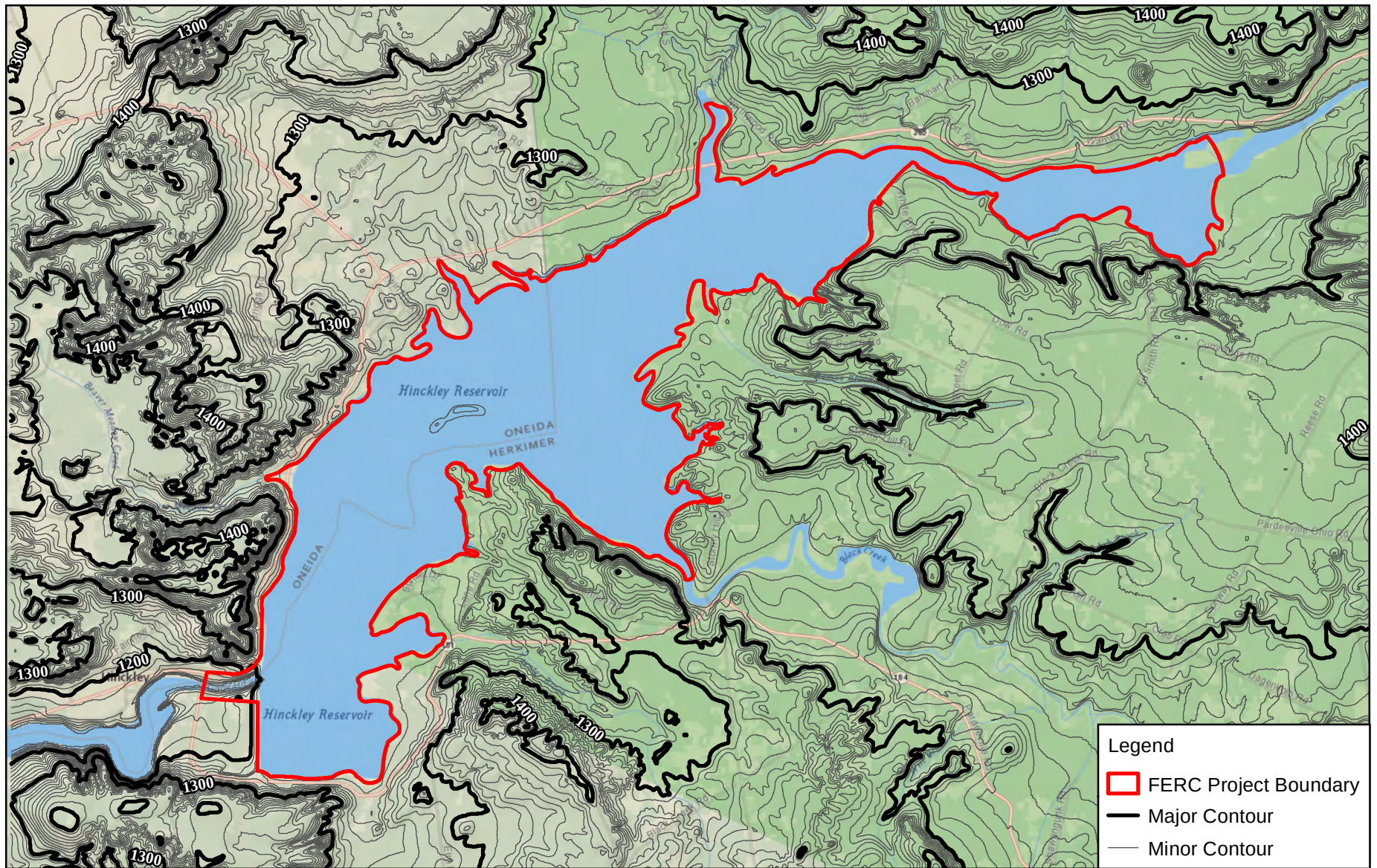
Hinckley Reservoir extends approximately 4.5 miles upstream from the dam, has a surface area of approximately 2,850 acres (at El. 1225), and approximately 17 miles of shoreline. Shoreline characteristics, including sediment composition, topography, and vegetative cover, tend to vary throughout the reservoir. In general, the shorelines are typically defined as being gradually sloping and composed of sand or sandy silt. As shown in [Table 4.2.3-1](#), soils found in the vicinity of the Project are characterized as having low to moderate erodibility. There is minimal to no erosion observed throughout the reservoir.

The banks along the river downstream of the dam and extending to the end of the Project Boundary have a narrow riparian buffer consisting of trees, shrubs, and low-lying vegetation. Banks in this area are moderately steep and are composed of Adams loamy and loamy fine sand (right bank) and cut fill land (left bank). Some limited streambank erosion has been observed in this area, particularly along the left bank. The banks of the tailrace are characterized as having been cut into bedrock with nearly vertical side slopes.

Table 4.2.3-1 Erodibility of Soils in the Vicinity of the Project

Soil Series	Kw Factor	Kf Factor
Adams	0.05-0.15	0.05-0.15
Searsport	0.10-0.37	0.10-0.37
Haplosaprists	0.20	0.20
Naumburg	0.10-0.20	0.10-0.20
Croghan	0.10-0.15	0.10-0.15
Monadnock	0.02-0.20	0.05-0.24
Colton	0.02-0.05	0.05-0.15

Source: [NRCS et al., 2010](#)



- Legend**
- FERC Project Boundary
 - Major Contour
 - Minor Contour

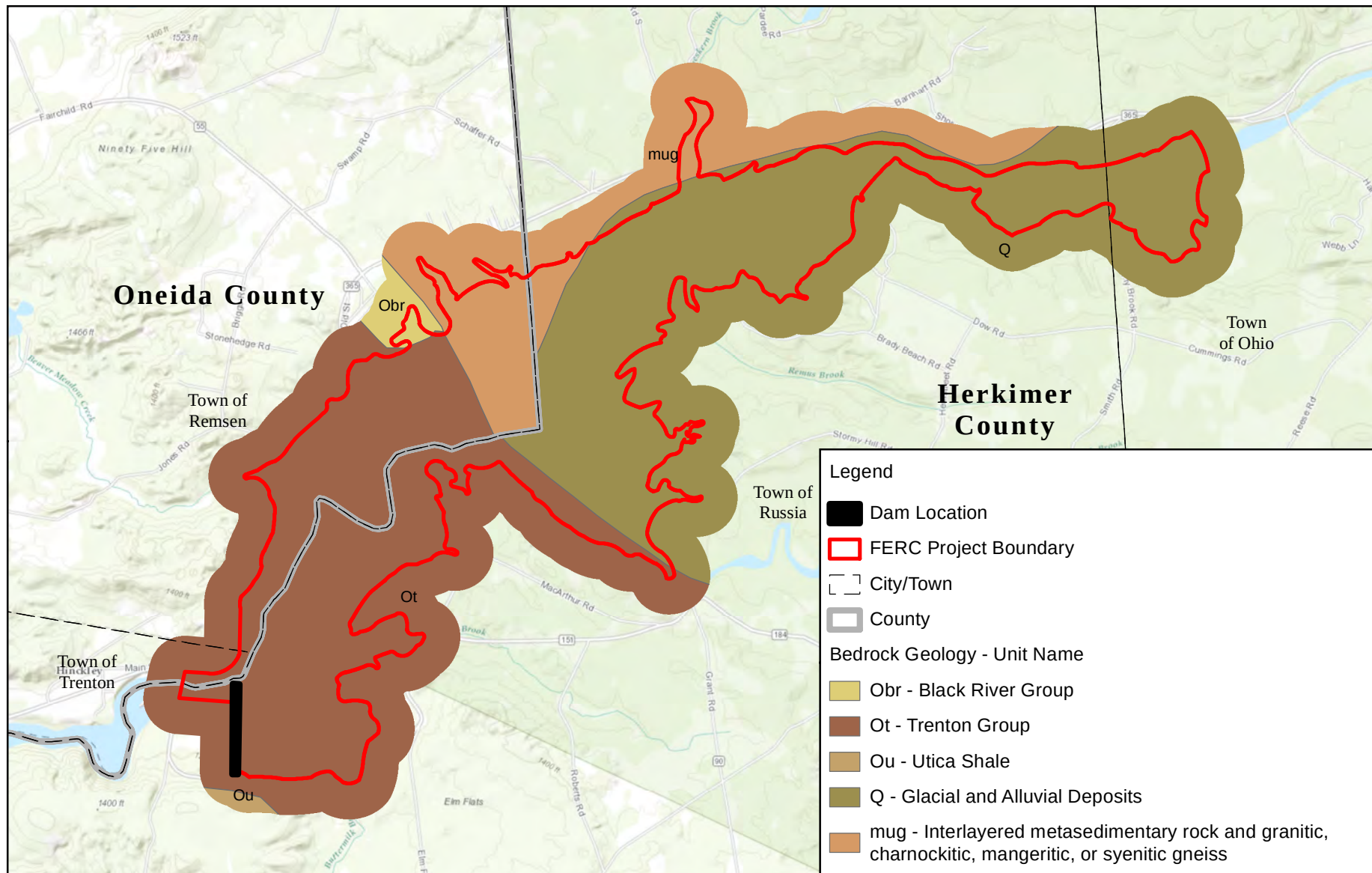
Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.2.1-1:
Topography surrounding the Project area

Contour data derived from Digital Elevation Model (DEM) created by
NYSDEC and USGS. Data accessed from NYSGIS Clearinghouse on
December 1, 2016.



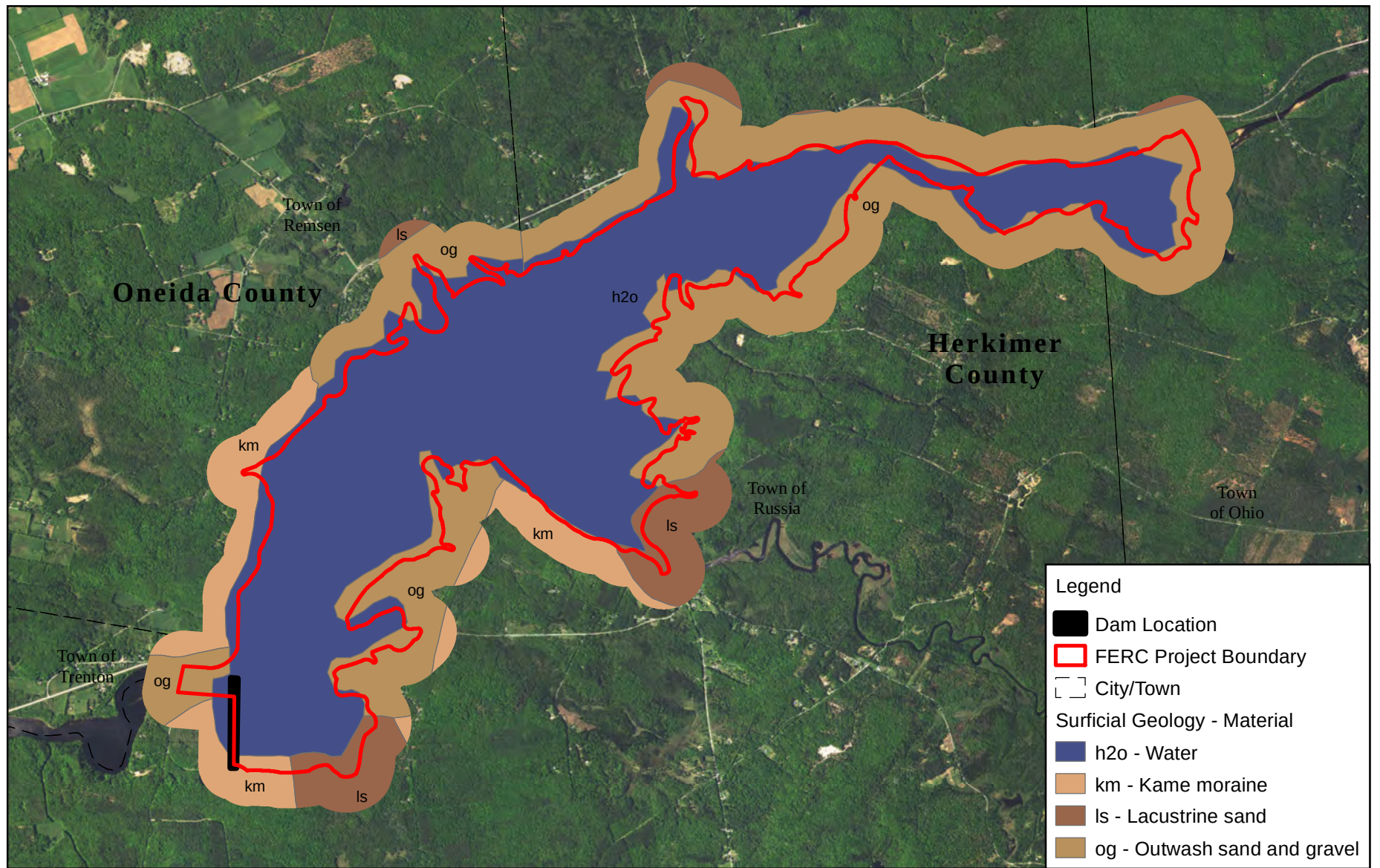
0 2,000 4,000 8,000
Feet



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.2.2.1-1:
Bedrock Geology in the Vicinity of the Project

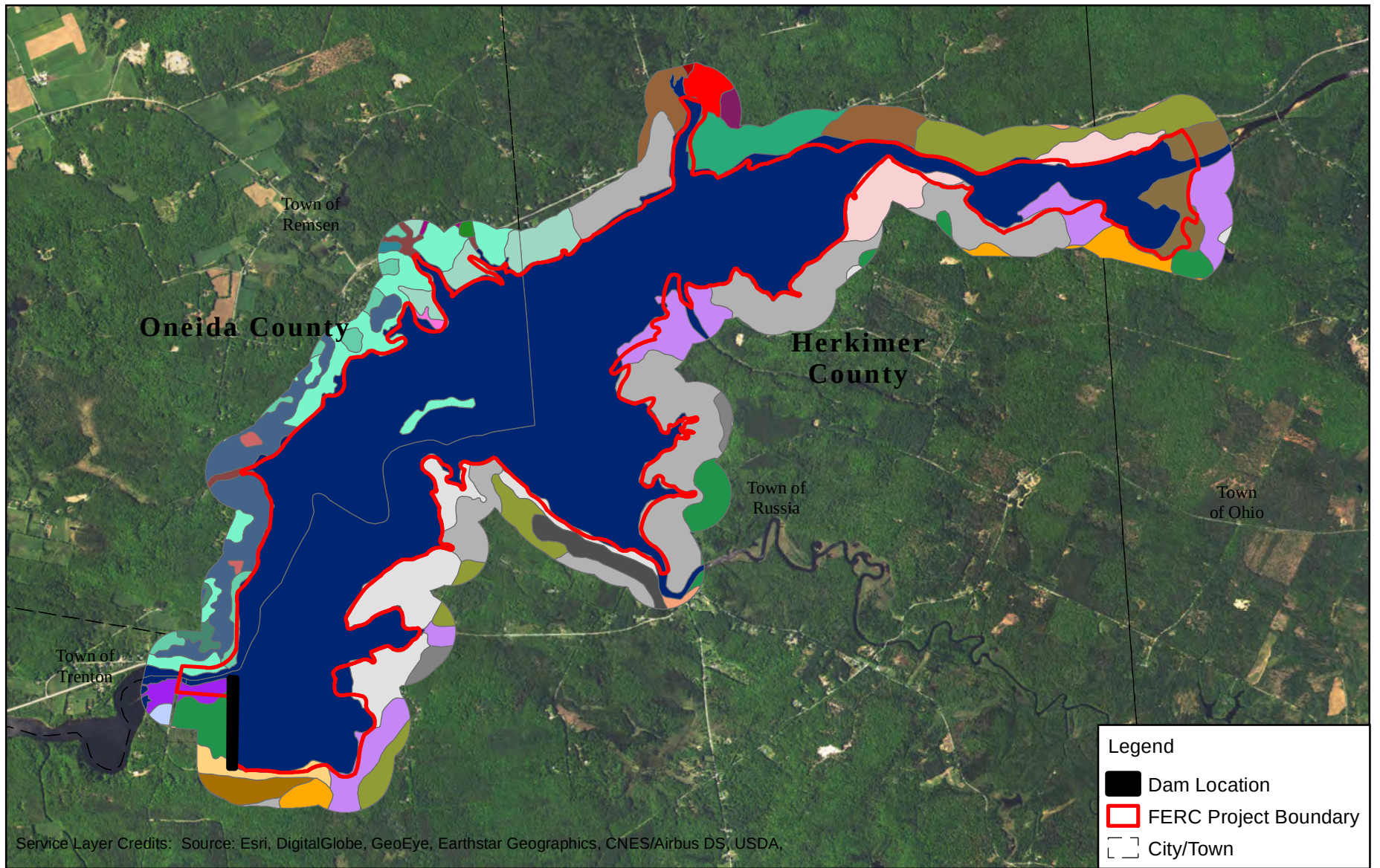
0 2,000 4,000 8,000
Feet



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.2.2.2-1:
Surficial Geology in the Vicinity of the Project





Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.2.3-1:
Soils in the Vicinity of the Project

0 2,000 4,000 8,000
Feet

Legend

	13 - Fluvaquents-Borosaprists complex
	20 - Pits, sand and gravel
	211A - Burnt Vly-Humaquepts-Pleasant Lake complex, 0 to 2
	221B - Roundabout-Nicholville complex, 0 to 8 percent slopes
	363A - Adams loamy fine sand, 0 to 3 percent slopes
	363B - Adams loamy fine sand, 3 to 15 percent slopes
	363D - Adams loamy fine sand, 15 to 35 percent slopes
	363F - Adams loamy fine sand, 35 to 60 percent slopes
	364A - Croghan-Naumburg complex, 0 to 3 percent slopes
	365A - Naumburg-Croghan complex, 0 to 3 percent slopes
	367A - Searsport-Haplosaprists-Naumburg complex, 0 to 3 percent slopes
	375C - Colton-Adams complex, 3 to 15 percent slopes
	375D - Colton-Adams complex, 15 to 35 percent slopes
	375F - Colton-Adams complex, 35 to 70 percent slopes
	390B - Salmon-Nicholville complex, 0 to 8 percent slopes
	55A - Adams loamy sand, 0 to 3 percent slopes
	55B - Adams loamy sand, 3 to 8 percent slopes
	55C - Adams loamy sand, 8 to 15 percent slopes
	55D - Adams loamy sand, 15 to 25 percent slopes
	55E - Adams loamy sand, 25 to 45 percent slopes
	57A - Croghan loamy fine sand, 0 to 3 percent slopes
	57B - Croghan loamy fine sand, 3 to 8 percent slopes
	650C - Monadnock-Adams-Colton complex, 3 to 15 percent slopes, bouldery
	654C - Monadnock-Sabattis complex, rolling, very bouldery
	705B - Adirondack-Tahawus complex, 0 to 8 percent slopes, very bouldery
	725B - Skerry-Becket complex, 3 to 15 percent slopes, very bouldery
	727B - Skerry-Adirondack complex, 0 to 8 percent slopes, very bouldery
	94 - Naumburg loamy sand
	99 - Greenwood peat
	Cu - Cut and fill land
	HmB - Hinckley gravelly loamy sand, 3 to 8 percent slopes
	PpB - Phelps gravelly fine sandy loam, 0 to 4 percent slopes
	W - Water



**NY Power
Authority**

Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.2.3-1:
Soils Legend

4.3 Water Resources (18 C.F.R § 5.6(d)(3)(iii))

4.3.1 Water Quantity

4.3.1.1 Overview

Hinckley Reservoir has a surface area of approximately 4.46 mi² when full to the spillway crest (El. 1225) and an estimated gross volume of 25.8 billion gallons. The reservoir was constructed to have an average water depth of about 28 feet and a maximum depth of approximately 75 feet from the spillway crest at El. 1225.

[Figures 4.3.1.1-1](#) through [4.3.1.1-13](#) illustrate annual and monthly water surface elevation duration curves for Hinckley Reservoir for the period of record from January 1938 to December 2016 (except for the years 1979 to 1986, for which there is no available water surface elevation data). The period from January 2001 to December 2016 is shown on these graphs as well, to show typical recent operations. [Table 4.3.1.1-1](#) shows the median water surface elevations for the period from January 1938 to December 2016. [Figure 4.3.1.1-14](#) shows the yearly and annual water surface elevation of the reservoir for recent years (January 2001 to December 2016). As shown in the monthly duration curves and the elevation graph, the reservoir is drawn down in the winter in preparation for greater flows during the spring months.

4.3.1.2 Hydrology and Streamflow

Approximately 95% of inflow to Hinckley Reservoir is provided by West Canada Creek and Black Creek. The U.S. Geological Survey (USGS) operates streamflow gaging stations on both of these tributaries. The gaging station on West Canada Creek (No. 01343060) is located in Wilmurt, approximately 3 miles upstream of the reservoir. This gage has a drainage area of 238 mi² and has been in operation since 2001. The gaging station on Black Creek (No. 01433403) has a drainage area of 60.9 mi², is located about 6 miles southeast of the reservoir, and has only been in operation since 2014.

The monthly flow statistics for inflow and outflow to the reservoir are presented in [Table 4.3.1.2-1](#) and [Table 4.3.1.2-2](#), respectively. Flow from the Wilmurt gage⁶ was prorated⁷ to represent inflow, and the outflow which includes turbine flow, spillway flow, sluice gate no. 4 flow, and penstock bypass flow was calculated by the Power Authority based on reservoir water level, power generation, turbine efficiency, and gate openings. [Table 4.3.1.2-3](#) shows the relationship between monthly and annual median inflow and outflow. In addition, this table provides the percent of time for which daily outflow exceeds inflow for several low flow rates. The table shows that inflow to the reservoir must be supplemented by reservoir storage to meet the minimum release of 160 cfs fairly often over the summer months. In August, flows are supplemented 31% of the time to reach 160 cfs. In July and September, the minimum flow needs to be supplemented approximately 20-30% of the time. Monthly and annual flow duration curves for the period of record (July 2001 – December 2016) were calculated using daily flows from these same sources, and are presented in [Figures 4.3.1.2-1](#) through [4.3.1.2-13](#).

Analysis of the data used to develop the annual flow duration curve ([Figure 4.3.1.2-1](#)) shows that inflows exceed 300 cfs at least 60% of the time. Additionally, the data also showed that when inflow is approximately 300 cfs or less, the reservoir outflow exceeds the inflow, indicating that the Project

⁶ Flow data from USGS Gage 01343060 is provisional from 9/30/2016 to 12/31/2016, meaning that values are subject to revision until they have been thoroughly reviewed and received final approval.

⁷ The proration factor is 1.56 as a result of the drainage area of Hinckley Reservoir (372 sqm) divided by the the drainage area of the gage (238 sqm). Reservoir inflows calculated by proration of flow data at the gage are higher than those calculated by the Power Authority by balancing the daily change in reservoir storage, the reservoir release, the MVWA withdrawal for public drinking water supply, evaporation, and precipitation (i.e. reverse routing).

supplements outflow by redistributing high inflows utilizing the reservoir storage. This is the result of Hinckley Reservoir operating as a seasonal reservoir (as defined by the Operating Diagram), with water levels at their peak after the spring freshet and then drawn down through the summer and fall months to supplement downstream flows. The reservoir then partially refills during the late fall and winter but is lowered during March and April in anticipation of spring snowmelt.

4.3.1.3 Hydraulic Gradient

Approximately 2.5 miles downstream of the Project is the Prospect Development which is owned by Erie Boulevard. The Prospect impoundment backs up to the Jarvis powerhouse, and the Project tailrace is essentially at the same elevation as the maximum operating level of the Prospect Development. Therefore, the downstream reach below the Project powerhouse is not affected by an appreciable gradient.

4.3.2 Water Quality

The following sections discuss water quality standards and classifications applicable to waterbodies in the Project vicinity, as well as results from water quality investigations that pertain to Hinckley Reservoir and related waterbodies at the Project.

4.3.2.1 Federal Clean Water Act

In 1972, the Federal Water Pollution Control Act Amendments established the Clean Water Act (CWA) as the foundation of modern surface water quality protection in the United States. Sections 303 and 305 of the CWA guide the national program on water quality. Subsections 303(a)-(c) of the CWA are relevant to this water quality discussion, as those subsections discuss the process by which all states are to adopt and periodically review water quality standards. Subsection 305(b) directs states to periodically prepare a report that assesses the quality of waters in the state.

4.3.2.2 State Water Quality Standards

In accordance with CWA Section 303(a)-(c), New York State has developed waterbody classifications and water quality standards which apply to all surface water and groundwater throughout the State. All waters in New York State are assigned a letter classification that denotes their best uses. [Table 4.3.2.2.-1](#) identifies the waterbody classifications of Hinckley Reservoir, the primary tributaries that drain to Hinckley Reservoir, and West Canada Creek downstream of Hinckley Dam. Refer to [Figure 4.1-1](#) for a location of the tributaries relative to Hinckley Reservoir.

As noted in the table, Hinckley Reservoir and its primary tributaries are all classified as Class AA or A. NYSDEC defines the best usages of Class AA and A waters as a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The NYSDEC also notes that the waters shall be suitable for fish, shellfish and wildlife propagation and survival. The area immediately downstream of the Reservoir, from Hinckley Dam to Prospect Dam, is classified as Class B. The NYSDEC defines these waters as best used for primary and secondary contact recreation and fishing. These waters are also suitable for fish, shellfish and wildlife propagation and survival. The symbol (T), appearing in an entry in the "Standards" column in the classification table, means that the classified waters in that specific item are trout waters ([State of New York, 2016a](#)). Any water quality standard, guidance value, or thermal criterion that specifically refers to trout or trout waters applies. With the exception of Remus Brook and Black Creek, the remaining tributaries and Hinckley Reservoir are designated as trout waters ([State of New York, 2016b](#)).

NYSDEC establishes water quality standards and other criteria for many specific parameters. These standards can be either narrative or numeric. [Table 4.3.2.2-2](#) outlines the water quality standards and criteria applicable to the surface waters of the Project.

4.3.2.3 Water Quality Assessments

In order to fulfill certain requirements of the Clean Water Act, NYSDEC provides regular, periodic assessments of the quality of the water resources in the State and their ability to support specific uses. This information is compiled by the NYSDEC into an inventory database known as the Waterbody Inventory/Priority Waterbodies List (WI/PWL). WI/PWL includes waterbody Fact Sheets outlining (1) the most recent assessment of use; (2) identification of water quality problems and sources; and (3) a summary of activities to restore and protect each individual waterbody. The Fact Sheets are grouped by the 17 major drainage basins in New York State. WI/PWL is reviewed and updated as sampling results and/or other water quality information becomes available.

The most recent Mohawk River Basin WI/PWL Report was issued in July 2010 and includes an overall evaluation of water quality in the Mohawk River Basin, as well as assessments for specific waterbody segments within the basin. That report also outlines the causes (pollutants) and sources of water quality problems for those waterbodies with known or suspected impacts. Assessed waterbodies are listed as:

- Impaired Waters (Not Supporting Uses);
- Waters with Minor Impacts;
- Threatened Waterbodies;
- Waterbodies with Water Quality Impacts Needing Verification; or
- Waterbodies with No Known Impacts.

Unassessed waterbodies are also included in the Waterbody Inventory. The assessments reflect the best available water quality information at the time of publication of the list ([NYSDEC, 2014b](#)). A description of the assessments of the waterbodies in the Project vicinity from the WI/PWL is described briefly below.

Hinckley Reservoir

Hinckley Reservoir is listed in the WI/PWL as “Waters with Minor Impacts” ([NYSDEC, 2010](#)). This classification is applied to “waterbodies where less severe water quality impacts are apparent but uses are still considered fully supported. These segments correspond to waters listed as having stressed uses” ([NYSDEC, 2014b](#)). Impacted water uses in Hinckley Reservoir include water supply, recreation, and habitat/hydrology. The severity of impact for the three uses is threatened, stressed, and stressed, respectively. The waterbody inventory indicates that the reservoir is stressed due to seasonal water level fluctuations and other impacts resulting from multiple uses of the reservoir, which affect its natural resources habitat and hydrology. Low nutrient levels and sandy substrate, while not water quality problems, combine with the fluctuating water levels and high flushing rates to limit the fishery resource. Acid rain impacts are also listed as a concern. The described segment includes the entire reservoir from the Hinckley Dam at the mouth of the reservoir upstream to the Harvey Road Bridge ([NYSDEC, 2014b](#)).

Tributaries Upstream of Hinckley Reservoir

The West Canada Creek, from Hinckley Reservoir near the McIntosh Bridge (at Harvey Road) upstream to Nobleboro, NY, is classified as an “Impaired Segment” with regard to aquatic life. The impairment is attributed to low pH due to atmospheric deposition (acid rain). A macroinvertebrate survey of West Canada Creek was conducted in 2006; samples taken at the McIntosh Bridge were assessed as having non-impacted water quality. Samples at the Nobleboro site were found to be just into the range of slightly impacted due to nutrient enrichment. This was attributed to elevated nitrate levels from acid rain causing increased algae growth in the stream ([NYSDEC, 2010](#)). More minor tributaries to Hinckley Reservoir, including Kreskern Creek, Black Creek, Beaver Meadow Creek, and Taynter Brook, are all listed in the WI/PWL as “Waterbodies with No Known Impacts” ([NYSDEC, 2010](#)). NYSDEC defines these waterbodies as “segments where monitoring data and information indicate that there are no restrictions to overall uses, although minor impacts to component indicators (such as biological assessments) may be present” ([NYSDEC, 2014b](#)). Biological (macroinvertebrate) assessments performed by NYSDEC of Kreskern Creek in Northwood, NY and Black Creek in Pardee Corners, NY indicated good water quality at both locations. Kreskern Creek sampling results indicated slightly impacted conditions, wherein the community is slightly altered from natural conditions. However, this results in relatively insignificant effects on the fauna, and aquatic life is considered to be fully supported in the stream. The samples taken at Kreskern Creek were considered by NYSDEC to be representative of water quality in Beaver Meadow Creek and Taynter Brook as well. Sampling results at Black Creek indicated non-impacted water quality conditions ([NYSDEC, 2010](#)).

West Canada Creek Downstream of Hinckley Dam

The middle mainstem of West Canada Creek (from Hinckley Dam downstream to the Prospect Development) was categorized as an “Impaired Segment” with regard to aquatic life and habitat/hydrology. The source of impairment is attributed to fluctuating stream flow and hydrologic modifications resulting from hydro generation ([NYSDEC, 2010](#)).

4.3.2.4 Water Quality Studies and Data

Available Water Quality Data

Water quality data were collected by the MVWA from 2000 – 2016 at the water supply intake in Hinckley Reservoir and for the tributaries from 2001-2016. Parameters determined from the intake samples included: alkalinity, calcium hardness, total hardness, ortho-phosphate, nitrate, temperature, percent oxygen saturation, dissolved oxygen, specific conductance, turbidity, pH, oxidation reduction potential, total organic carbon, organic content (UV-254), and SUVA analysis. Data were typically collected on a monthly basis from April through October of each year. Complete sample results are included in [Table C-1](#) in [Appendix C](#) and are summarized below. The tributary water quality data is discussed later in this section.

In addition to the MVWA water quality data, the NYSDEC has also collected data in the Project area. The NYSDEC Fisheries Department performed vertical profile measurements of the reservoir from sample years 1989, 1994, 2009, and 2010, which included water temperature and dissolved oxygen measurements. Sample results from these years are included in [Table C-2](#) in [Appendix C](#). The NYSDEC also has a five-year rotating basin schedule, whereby every five years a different waterbody for a major drainage basin is sampled and a Lake Classification and Inventory (LCI) survey summary is prepared. The most recent LCI Lake Water Quality Summary for Hinckley Reservoir was prepared in 2011. Vertical profile measurements were collected and various chemical analyses were performed from samples collected from the surface

and bottom of the reservoir. The reservoir was accessed from the Power Authority's public launch site during the 2011 study, and samples were taken in the southern portion of the reservoir. Vertical profile sample results are included in [Table C-3](#) in [Appendix C](#). Discussion of the NYSDEC samples is also included below.

Hinckley Reservoir

DO and Temperature

MVWA - 2000-2016

All water samples collected by the MVWA were taken at an elevation of approximately 1199 feet (note this is 33 feet [10.1 meters] below the floor of the MVWA intake tower, which is at El. 1232.25). These samples are collected at a depth of 26.0 feet (7.9 meters) when the reservoir is at normal pool (El. 1225); however, reservoir water levels and hence the depth of the MVWA water samples varied across the period of record. Sampling occurred from late April/early May through mid-October of each year. No data was available from MVWA for 2001 or 2005, and dissolved oxygen readings were not recorded for 2012, 2014, 2015, or 2016. [Table 4.3.2.4-1](#) summarizes yearly minimum, maximum, and average values for temperature, percent oxygen saturation, dissolved oxygen, specific conductance, turbidity, and pH from the MVWA data.

At the start of each sampling year (typically late April), water temperatures ranged from 4.37 to 7.77°C (low to mid 40's °F). Corresponding dissolved oxygen levels were high with the cool water temperatures, and averaged from 10.9 to 14.6 mg/L. Similar cool water temperatures and high dissolved oxygen levels (9.0 mg/L or greater) occurred at the end of each sampling year, typically in mid to late October. Dissolved oxygen levels dropped each sampling period, with July and August showing the lowest recordings, reflective of warmer water temperatures and drier summer months. As indicated in [Table 4.3.2.2-2](#), the State's minimum daily average dissolved oxygen levels "shall not be less than 6.0 mg/L for trout waters, and at no time shall the concentration be less than 5.0 mg/L" ([State of New York, 2016c](#)). The MVWA samples were above 5.0 mg/L. The two lowest dissolved oxygen readings of 5.55 mg/L and 5.2 mg/L occurred on July 11, 2011 and July 29, 2013, respectively. Daily average levels were not recorded. Subsequent readings for those years returned to normal levels (8.56 mg/L on July 25, 2011 and 7.9 mg/L on August 12, 2013), indicating the low dissolved oxygen levels recovered ([MVWA, 2016](#)).

NYSDEC - 1989, 1994, 2009, 2010, and 2011

Vertical profile measurements collected by the NYSDEC Fisheries' Department for 1989, 1994, 2009 and 2010 are listed in [Table C-2](#) and presented in [Figure 4.3.2.4-1](#). More comprehensive vertical profile measurements were collected by NYSDEC during the summer of 2011 for the LCI survey; results are listed in [Table C-3](#) and presented in [Figure 4.3.2.4-2](#). Various chemical analyses were performed on samples collected in 2011 from the surface and bottom of the reservoir. The results of the chemical analyses are presented in [Table 4.3.2.4-2](#) for surface samples, and [Table 4.3.2.4-3](#) for bottom samples.

The August 1989 NYSDEC data only included two samples; one taken at the surface and the second taken at a depth of 45.0 feet (13.7 meters). The surface sample had a water temperature of 21.1°C (70°F) and a dissolved oxygen level of 7.0 mg/L, while the sample at depth of 45 feet had a dissolved oxygen level of 6.0 mg/L. A temperature measurement was not taken of the 45-foot deep sample.

The June 1994 data includes temperatures taken at 5-foot (1.5 meter) intervals from the surface down to a depth of 70.0 feet (21.3 meters). The water temperature at the surface was 22.2°C (72°F). Water

temperatures remained at 21.1°C (70°F) from 5.0 to 15.0 feet (1.5-4.6 meters) below the water surface, then steadily decreased down to 13.9°C (57°F) at a depth of 60.0 feet (18.3 meters). The temperature remained constant at 13.9°C (57°F) from 60.0 feet down to 70.0 feet (18.3 to 21.3 meters). This indicates a weak thermal stratification of the reservoir with an epilimnion layer (warm water at the surface of the lake at a consistent temperature) down to 15.0 feet deep (4.6 meters), a thermocline (horizontal layer of water with a steep temperature gradient) from 15.0 feet deep to 60.0 feet deep (4.6 to 18.3 meters), and a hypolimnion (deep water region in a lake below the thermocline) from approximately 60.0 to 70.0 feet deep (18.3 to 21.3 meters). This weak stratification can be seen in [Figure 4.3.2.4-1](#). Dissolved oxygen levels were 10.0 mg/L at the surface and 8.0 mg/L at the bottom. No dissolved oxygen readings were taken for intermediate depths between the surface and bottom.

Data collected in August 2009 included temperature and dissolved oxygen readings from the surface down to a depth of 78.7 feet (24.0 meters). As shown in [Figure 4.3.2.4-1](#), samples from the top 53 feet (16.2 meters) of the reservoir were above the State's 5.0 mg/L threshold for dissolved oxygen levels. The remaining samples, taken at depths of 59.0 feet to 78.7 feet (18.0 to 24.0 meters), were below the State threshold and ranged from 4.40 mg/L at 59.0 feet deep (18.0 meters) to 0.4 mg/L at 78.7 feet deep (24.0 meters). The water temperature steadily decreased from surface to bottom waters, ranging from 22.1°C (72°F) to 17.3°C (63°F).

The March 2010 data indicates cooler temperatures typical for the time of year (ranging from 1.7°C [35°F] at the surface to 2.3°C [36°F] at a depth of 26.2 feet [8.0 meters]). The maximum sample depth during this period was 26.2 feet (8.0 meters). Dissolved oxygen levels ranged from 11.7 mg/L at the surface to 8.4 mg/L at the lowest sample depth.

Data collected by NYSDEC during the summer of 2011 included temperature and dissolved oxygen readings at approximately 3.28-foot (1.0 meter) intervals from the water surface down to a depth of at least 40.0 feet (12 meters). Dissolved oxygen levels remained above the dissolved oxygen standard of 5 mg/L in the top 13 feet (4.0 meters) of the reservoir in June 2011, but dropped to 4.5 mg/L and below for the remaining measurements down to a depth of 55.8 feet (17.0 meters). Water temperatures remained at or near 19.7°C (68°F) from 3 to 30-foot depths (1.0 to 9.0 meters) below the water surface, then continued to become cooler with increasing depth. This would indicate an overall weak thermal stratification of the reservoir with an epilimnion layer down to 32.8 feet deep (10.0 meters), a thermocline from 32.8 feet deep to 49.2 feet deep (10.0 to 15.0 meters), and a hypolimnion from approximately 52.5 to 55.8 feet deep (16.0 to 17.0 meters). This weak stratification can be seen in [Figure 4.3.2.4-2](#).

In July 2011, samples were taken down to a depth of 39.36 feet (12 meters). Dissolved oxygen levels remained above 5.0 mg/L in the top 38 feet (11.6 meters) of the reservoir, with the last measurement at a depth of 39.4 feet (12.0 meters) having a dissolved oxygen level of 4.9 mg/L. Water temperatures steadily decreased from 23.6°C (74°F) at the surface to 17.3°C (63°F) at 39.4 feet deep (12.0 meters).

In August 2011, the maximum sample depth was at 42.6 feet (13.0 meters). Dissolved oxygen levels ranged from 6.2 mg/L at the surface down to 5 mg/L at 9.0 feet deep (2.7 meters). Dissolved oxygen levels continued to drop below the State standard of 5.0 mg/L, and ranged from 4.7 mg/L at 10.7 feet (3.3 meters) below the water surface down to 2.8 mg/L at the bottom sample depth at 42.6 feet (13.0 meters). Water temperatures in August exhibited little change from the surface to the bottom, ranging from 23.0°C (73°F) at the surface to 20.6°C (69°F) at the bottom. Due to the minimal change in water temperature between the surface and bottom waters, no thermal stratification was apparent for this month.

Finally, in September 2011, temperature and dissolved oxygen levels dropped slowly between the surface and bottom of the reservoir. Temperatures ranged from 20.0°C (68°F) at the surface to 15.9°C (61°F) at the bottom sample depth at 55.8 feet (17.0 meters). Dissolved oxygen levels were 5.8 mg/L or greater for all depths down to 55.8 feet (17.0 meters) in September ([Figure 4.3.2.4-2](#)).

During the 2011 sampling period, reservoir water levels remained at or near the top of the spillway for June, July and September. In August, the water level was down approximately 9.0 feet (2.7 meters) from the crest of the spillway. Based on the 2011 sample data, NYSDEC summarized that the reservoir exhibited weak thermal stratification in June with hypoxic (low oxygen) conditions near the bottom of the reservoir. The thermal stratification present in June was lost by July and did not reappear throughout the remainder of the sample period. NYSDEC concluded that, as the majority of water used from the reservoir is removed from the bottom third of the waterbody, the withdrawal of cold water from low depths in the reservoir reduces the reservoir's ability to maintain thermally stratified layers ([NYSDEC, 2011a](#)).

NYSDEC's 2011 Lake Classification and Inventory (LCI) survey summary states that, based on data from the sampling from June 2011 to September 2011, Hinckley Reservoir can generally be characterized as mesotrophic, or moderately productive. The LCI report also notes that aquatic life may be stressed by the low dissolved oxygen levels found in the bottom waters of the reservoir, as indicated by the 2011 sample data. Per NYSDEC's summary, "The oxygen deficit in the bottom waters is not consistently seen throughout the summer and is related to water level in the reservoir and water withdrawals. Like many reservoirs, Hinckley experiences large changes in water level throughout the year which may also stress aquatic life" ([NYSDEC, 2011a](#)).

Turbidity

Turbidity values measured by MVWA remained low for all sampling dates from 2000 through 2015, as shown in [Table C-1](#). Levels were often below 2.0 Nephelometric Turbidity Units (NTU, with a maximum of 2.51 NTU in 2015).

Secchi-disk measurements taken by NYSDEC in conjunction with their 2011 sampling at Hinckley Reservoir indicate average visibility of 9.7 feet (2.9 meters) at the surface ([Table C-3](#)). Readings exhibited little variability, and ranged from a minimum of 9.2 to 10.5 feet (2.8 to 3.2 meters).

pH

Sampling performed by MVWA indicate pH values generally within the State's standard range of 6.5 to 8.5. Six values drop below the State standard during the sampling period from 2000 - 2016: readings of 5.69, 5.87, 5.74, 6.16, 6.49, and 6.47 taken on 9/25/2002, 10/24/2002, 4/28/2003, 10/15/2003, 4/19/2004, and 5/23/2011, respectively. pH readings taken by the NYSDEC in 2011 were below 6.5 in June. July levels were at or above 6.5 for depths down to 16.0 feet (4.9 meters); August levels were above 6.5 for depths down to 10.5 feet (3.2 meters); and September levels were above 6.5 for depths down to 20.0 feet (6.1 meters). Overall the pH readings indicate weakly acidic waters ([NYSDEC, 2011a](#)). As discussed in [Section 4.3.2.3](#), low pH values are attributed to atmospheric deposition (acid rain). Acid precipitation is very problematic for the Adirondack region, with typical pH values for rainfall less than 5.0 (EPA, 2001).

Tributary Data

In 2001, the Environmental Protection Agency (EPA) evaluated samples from eight primary tributaries to Hinckley Reservoir and presented their findings in a report titled *Effective Source Protection for Large Rural*

Watersheds ([EPA, 2001](#)). Water quality data was collected at the eight sites and evaluated for alkalinity, total hardness, calcium hardness, turbidity, ortho-phosphate, nitrate, total organic carbon, UV-254 and SUVA analysis, pH, specific conductance, dissolved oxygen, percent oxygen saturation, and temperature for sample dates in 1999 and 2000. Data collected for the eight sites is discussed below and presented in [Appendix C](#):

- [Table C-4](#): West Canada Creek, Site 1
- [Table C-5](#): Kreskern Creek, Site 2
- [Table C-6](#): Thomas Pond Outlet, Site 3
- [Table C-7](#): Beaver Meadow Creek, Site 4
- [Table C-8](#): Buttermilk Brook, Site 5
- [Table C-9](#): Taynter Brook, Site 6
- [Table C-10](#): Remus Brook, Site 7
- [Table C-11](#): Black Creek, Site 8

Overall, there were no significant problems regarding dissolved oxygen levels at any tributary site. The lowest annual average dissolved oxygen concentration was 7.6 mg/L at Remus Brook in 2000. Water temperatures were lower in 2000 than in 1999 at all eight sites, however, annual average water temperatures ranged between 10-20°C (50-68°F) for both 1999 and 2000.

pH values ranged between 5.3 and 8.3 at the eight sites across the span of the study. The lowest recorded values occurred at Remus Brook in both 1999 and 2000, with yearly averages of 6.7 and 5.3, respectively. The EPA acknowledges in their report that acid precipitation in the Adirondack region has typical pH values less than 5.0. This, combined with low buffering capacity at the tributaries, could be the primary contributing factor to the slightly acidic pH levels ([EPA, 2001](#)).

The MVWA has continued water sampling at these eight sites through 2016; this data is included in the tables provided in [Appendix C](#). From 2001 through 2013, the lowest annual average dissolved oxygen concentration was 5.4 mg/L at Remus Brook in 2001 (note that dissolved oxygen data is not available for the tributary sites for 2005, 2012, 2014, 2015, or 2016). Annual averages since 2001 at Remus Brook have been at 7.8 mg/L or above. The peak annual average dissolved oxygen of 12.16 mg/L occurred at West Canada Creek in 2007, although this was a dry year. From 2001 through 2016, pH values ranged between an annual average low of 5.12 mg/L at Remus Brook in 2004, and a high of 8.20 mg/L at Beaver Meadow in 2003.

Summary of Water Quality Monitoring

While the reservoir exhibited weak thermal stratification during the June 2011 sampling period, water used for Project operations and the MVWA water supply likely interrupt stratification by withdrawing cold water from low depths in the reservoir and mixing the water column.

Dissolved oxygen levels remained above State standards for the majority of the time throughout the sampling periods. Instances when dissolved oxygen levels were low (primarily in the bottom waters) were attributed to natural hydrologic conditions. Similar to dissolved oxygen, the periodically low pH levels observed, which indicate weak acidity in the reservoir, were also attributed to natural hydrologic conditions

coupled with acid precipitation and the poor buffering capacity of the tributaries. Turbidity levels are low and reflect the natural conditions of the reservoir and do not appear to be influenced by Project operations. In conclusion, the low pH levels are explained by natural phenomena, and dissolved oxygen levels in the upper portion of the reservoir (depths down to at least 10 feet deep [3.0 meters] for all sampling periods) are within the constraints imposed by the New York State Surface Water Quality Standards.

Table 4.3.1.1-1: Median Monthly and Annual Reservoir Water Surface Elevations (1938-2016)

Month	Elevation (ft)
January	1211.9
February	1203.3
March	1198.7
April	1222.4
May	1225.0
June	1223.6
July	1220.2
August	1215.7
September	1211.4
October	1210.0
November	1213.4
December	1215.5
Annual	1215.9

Table 4.3.1.2-1: Daily Inflow (cfs) Statistics for Hinckley Reservoir

Period of Record July 2001 – December 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
min	249	202	219	253	177	95	88	58	55	102	294	278
max	10191	7049	10191	26884	13676	23914	8800	11035	12395	15943	11051	7002
mean	918	643	1426	3051	1304	1030	585	507	462	1253	1223	1215
median	531	406	825	2243	960	594	317	277	250	774	865	832

Table 4.3.1.2-2: Daily Outflow (cfs) Statistics for Hinckley Reservoir

Period of Record July 2001 – December 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
min	298	106	104	246	298	298	178	236	119	120	298	223
max	6504	2304	3776	15014	7912	13351	7520	1883	3648	5168	6397	4156
mean	1100	871	972	1985	1161	837	702	579	584	821	1065	1056
median	1034	897	922	1576	992	602	566	500	579	717	956	975

Table 4.3.1.2-3: Comparison of Monthly and Annual Inflow to Outflow for Hinckley Reservoir

Month	Median Flow (cfs)		Percent of Time Daily Outflow Greater than Daily Inflow (%)		
	Inflow	Outflow	160 cfs	200 cfs	300 cfs
Jan	531	1034	0	0	2
Feb	406	897	0	0	8
Mar	825	922	0	0	4
Apr	2243	1576	0	0	0
May	960	992	0	0	5
Jun	594	602	3	8	25
Jul	317	566	18	28	46
Aug	277	500	31	39	53
Sep	250	579	27	37	58
Oct	774	717	3	8	16
Nov	865	956	0	0	0
Dec	832	975	0	0	0
Annual	619	811	7	10	19

Table 4.3.2.2-1: NYSDEC Classifications for Project Waterbodies

Waterbody	Classification	Standards
Hinckley Reservoir	AA	AA(T)
West Canada Creek (Upstream of Hinckley Reservoir: McIntosh Bridge to Nobleboro Dam)	A	A(T)
Kreskern Creek	AA	AA(T)
Thomas Pond Outlet	AA	AA(T)
Beaver Meadow Creek	AA	AA(T)
Buttermilk Brook	AA	AA(T)
Taynter Brook	AA	AA(T)
Remus Brook	A	A
Black Creek	AA	AA
West Canada Creek (Downstream of Hinckley Reservoir: Prospect Dam to Hinckley Dam)	B	B(T)

[State of New York, 2016b](#)

Table 4.3.2.2-2: NYSDEC Water Quality Standards

Parameter	Standard*
Taste-, color-, and odor producing, toxic and other deleterious substances	None in amounts that will adversely affect the taste, color or odor thereof, or impair the waters for their best usages.
Turbidity	No increase that will cause a substantial visible contrast to natural conditions.
Suspended, colloidal and settleable solids	None from sewage, industrial wastes or other wastes that will cause deposition or impair the waters for their best usages.
Oil and floating substances	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
Phosphorus and nitrogen	None in amounts that will result in growths of algae, weeds and slimes that will impair the waters for their best usages.
Flow	No alteration that will impair the waters for their best usages.
pH	Shall not be less than 6.5 nor more than 8.5.
Dissolved Oxygen	For trout waters (T), the minimum daily average shall not be less than 6.0 mg/L, and at no time shall the concentration be less than 5.0 mg/L. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/L, and at no time shall the DO concentration be less than 4.0 mg/L.
Dissolved Solids	Shall be kept as low as practicable to maintain the best usage of waters but in no case shall it exceed 500 mg/L.
Total Coliform (per 100mL) (Applies to Class AA waterbodies)	The monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 50 and 240, respectively.
Total Coliform (per 100mL) (Applies to Class A waterbodies)	The monthly median value and more than 20 percent of the samples, from a minimum of five examinations, shall not exceed 2,400 and 5,000, respectively.
Fecal Coliforms (per 100mL)	The monthly geometric mean, from a minimum of five examinations, shall not exceed 200

*Standards applicable to both Class AA and A, unless otherwise noted.

[State of New York, 2016c](#)

Table 4.3.2.4-1: Annual Min, Max, and Averages of Certain Parameters from MVWA Water Quality Data Collected Between 2000 and 2016

Year		Temp (°C)	DO %sat	DO (mg/L)	SpC (uS/cm)	Turbidity (NTU)	pH
2000	Min	18.80	65.4	6.03	16	0.78	6.63
	Max	18.80	71.3	9.5	111	2.29	7.89
	Year Average	18.80	68.4	7.22	56.7	1.33	7.12
2002	Min	10.50	83.4	7.05	42	0.76	5.69
	Max	23.93	99.5	10.85	63	2.19	7.33
	Year Average	17.82	93.0	9.01	52.4	1.67	6.60
2003	Min	7.77	91.7	8.09	36	0.80	5.74
	Max	22.16	112.2	13.35	52	1.56	9.33
	Year Average	17.12	98.4	9.66	44.8	1.18	6.96
2004	Min	6.07	93.40	8.62	32	0.90	6.49
	Max	22.0	119.50	12.49	51	1.30	7.55
	Year Average	17.58	100.8	9.73	41.2	1.10	7.29
2006	Min	8.12	85.2	7.42	33	0.65	6.64
	Max	22.18	97.8	11.54	47	2.45	7.77
	Year Average	15.97	93.5	9.44	39.7	1.60	7.19
2007	Min	4.37	91	8.18	0.074	1.1	6.67
	Max	21.23	124.9	13.36	46	2.06	7.7
	Year Average	13.99	108.4	10.76	30.02	1.6	7.35
2008	Min	6.01	91.2	8.13	0.023	0.69	6.81
	Max	21.42	103.6	11.42	0.06	1.1	7.54
	Year Average	16.46	95.4	9.43	0.043	0.85	7.15
2009	Min	3.67	72.9	6.55	0.015	0.56	6.84
	Max	20.65	110.4	14.6	0.053	1.34	7.44
	Year Average	14.88	88.7	9.17	0.037	0.92	7.14
2010	Min	13.41	82.3	7.51	0.031	0.66	6.81
	Max	21.55	95.6	9.93	0.045	1.29	7.33
	Year Average	17.69	90.46	8.79	0.041	0.93	7.14
2011	Min	15.32	61.3	5.55	0.026	0.58	6.47
	Max	24.52	102.7	10.62	0.042	1.88	7.61
	Year Average	18.86	86.7	8.23	0.036	1.05	7.01
2012	Min	10.9	-	-	42.8	1.06	7.1
	Max	24.7	-	-	68	3.2	7.75
	Year Average	20.7	-	-	58.0	1.95	7.38

Year		Temp (°C)	DO %sat	DO (mg/L)	SpC (uS/cm)	Turbidity (NTU)	pH
2013	Min	14.9	-	5.2	28.7	0.85	6.87
	Max	22.3	-	9.9	95.4	1.89	7.41
	Year Average	18.7	-	8.0	46.0	1.15	7.13
2014	Min	11.7	-	-	23	1.01	6.64
	Max	20.2	-	-	48.1	2.25	7.2
	Year Average	17.1	-	-	35.2	1.58	6.96
2015	Min	6.5	-	-	21.67	1.12	6.6
	Max	21.5	-	-	56.7	2.51	7.42
	Year Average	15.9	-	-	42.9	1.81	6.98
2016	Min	10.5	-	-	34	1.02	6.63
	Max	22.1	-	-	48.9	2.37	7.37
	Year Average	17.0	-	-	43.0	1.56	7.10

[MVWA, 2016](#)

Table 4.3.2.4-2: NYSDEC LCI Water Quality Sampling Results from Hinckley Reservoir– 2011 Surface Samples

Chemical/Test	Units	N	Min	Avg.	Max	Scientific Classification	Regulatory Comments
SECCHI	meters	3	2.8	2.97	3.2	Mesotrophic	No readings violate DOH guidance value
TSI-Secchi			45.2	44.3	43.2	Mesotrophic	No pertinent water quality standards
TP	mg/l	4	0.0089	0.01	0.0098	Mesotrophic	No readings violate water quality standards
TSI-TP			35.7	37.3	37.0	Oligotrophic	No pertinent water quality standards
TSP	mg/l	4	0.0057	0.0398	0.0773	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	4	0.0357	0.077275	0.156	Potentially high nitrate	No readings violate water quality standards
NH4	mg/l	4	ND	0.024	0.039	Low ammonia	No readings violate water quality standards
TKN	mg/l	4	0.23	0.34	0.4	Low organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	4	71.59	97.58	110.69	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	4	ND	3.78	6.4	Mesotrophic	No pertinent water quality standards
TSI-CHLA			ND	41.8	48.8	Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	4	8	12.1	15.3	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	4	33	37.3	42	Highly Colored	No pertinent water quality standards
TOC	mg/l	4	4.4	5.3	5.9		No pertinent water quality standards
Ca	mg/l	4	4.13	5.5	6.88	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	4	0.111	0.155	0.2		No readings violate water quality standards
Mn	mg/l	4	0.0057	0.015	0.0257		No readings violate water quality standards
Mg	mg/l	4	0.668	0.81	1		No readings violate water quality standards
K	mg/l	4	0.256	0.28	0.315		No pertinent water quality standards
Na	mg/l	4	1.78	2.06	2.31		No readings violate water quality standards
Cl	mg/l	4	ND	0.4	3.2	Minor road salt runoff	No readings violate water quality standards
SO4	mg/l	4	2.4	2.73	3.2		No readings violate water quality standards

[NYSDEC, 2011a](#)

Table 4.3.2.4-3: NYSDEC LCI Water Quality Sampling Results from Hinckley Reservoir – 2011 Bottom Samples

Chemical/Test	Units	N	Min	Avg.	Max	Scientific Classification	Regulatory Comments
TP	mg/l	3	0.009	0.01	0.011		No pertinent water quality standards
TSP	mg/l	3	0.004	0.08	0.243	High % soluble phosphorus	No pertinent water quality standards
Nox	mg/l	3	0.074	0.13	0.200	No evidence of DO depletion	No readings violate water quality standards
NH4	mg/l	3	0.044	0.09	0.143	No evidence of DO depletion	No readings violate water quality standards
TKN	mg/l	3	0.210	0.34	0.450		No pertinent water quality standards
Alk	mg/l	3	6.300	8.50	12.100	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	3	40.000	43.70	47.000	Highly Colored	No pertinent water quality standards
TOC	mg/l	3	5.000	5.80	6.700		No pertinent water quality standards
Ca	mg/l	3	3.450	4.00	4.840	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	3	0.212	0.41	0.715	Taste or odor likely	67% of readings violate water quality standards
Mn	mg/l	3	0.074	0.13	0.236		No readings violate water quality standards
Mg	mg/l	3	0.516	0.60	0.727		No readings violate water quality standards
K	mg/l	3	0.167	0.23	0.258		No pertinent water quality standards
Na	mg/l	3	1.260	1.50	1.750		No readings violate water quality standards
Cl	mg/l	3	ND	ND	ND		No readings violate water quality standards
SO4	mg/l	3	2.200	2.50	3.000		No readings violate water quality standards
As	mg/l	2	ND	ND	ND	No evidence of potable water threats	No readings violate guidance values

[NYSDEC, 2011a](#)

Figure 4.3.1.1-1: Hinckley Reservoir Water Surface Elevation Annual Duration Curve

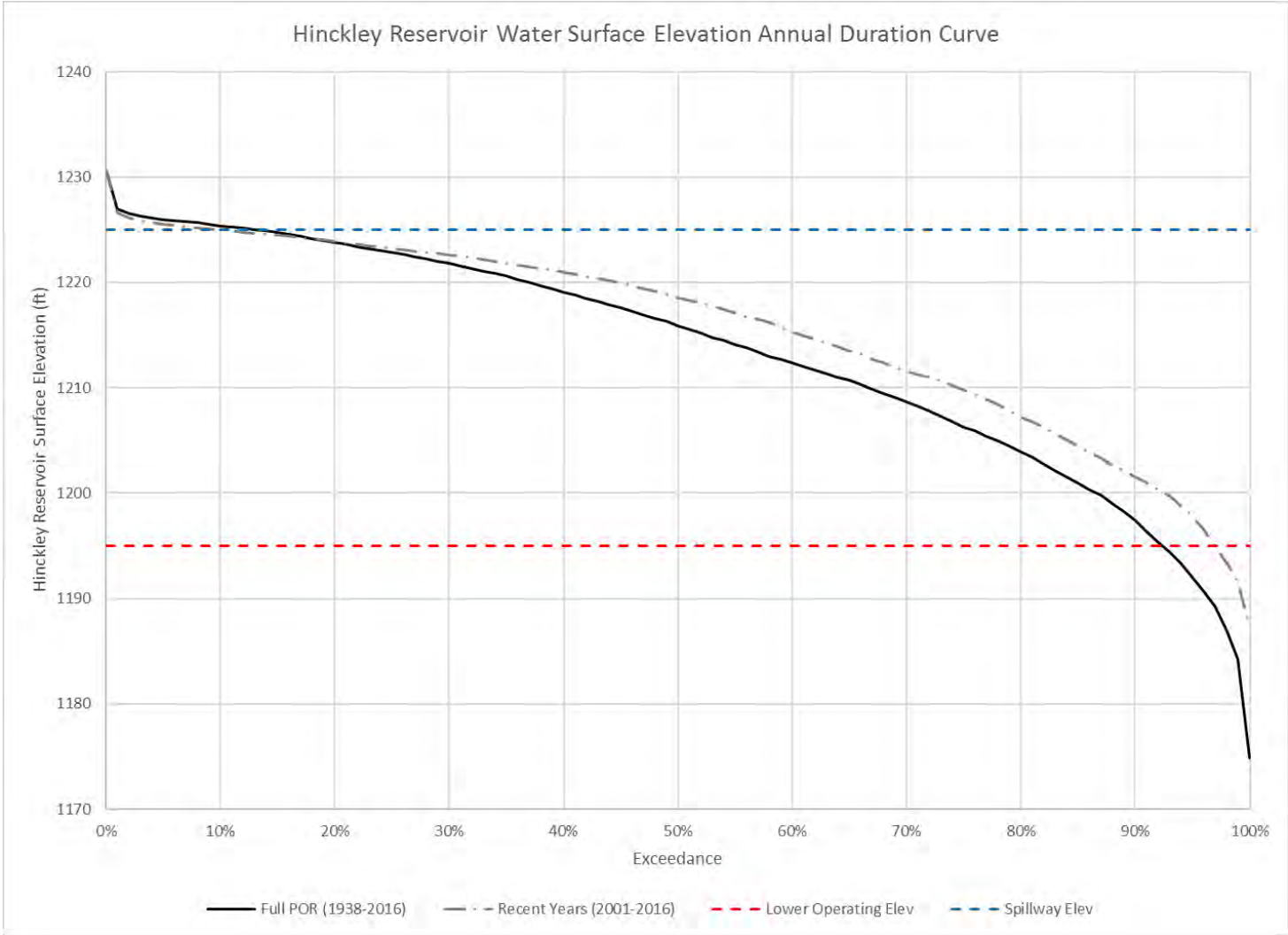


Figure 4.3.1.1-2: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – January

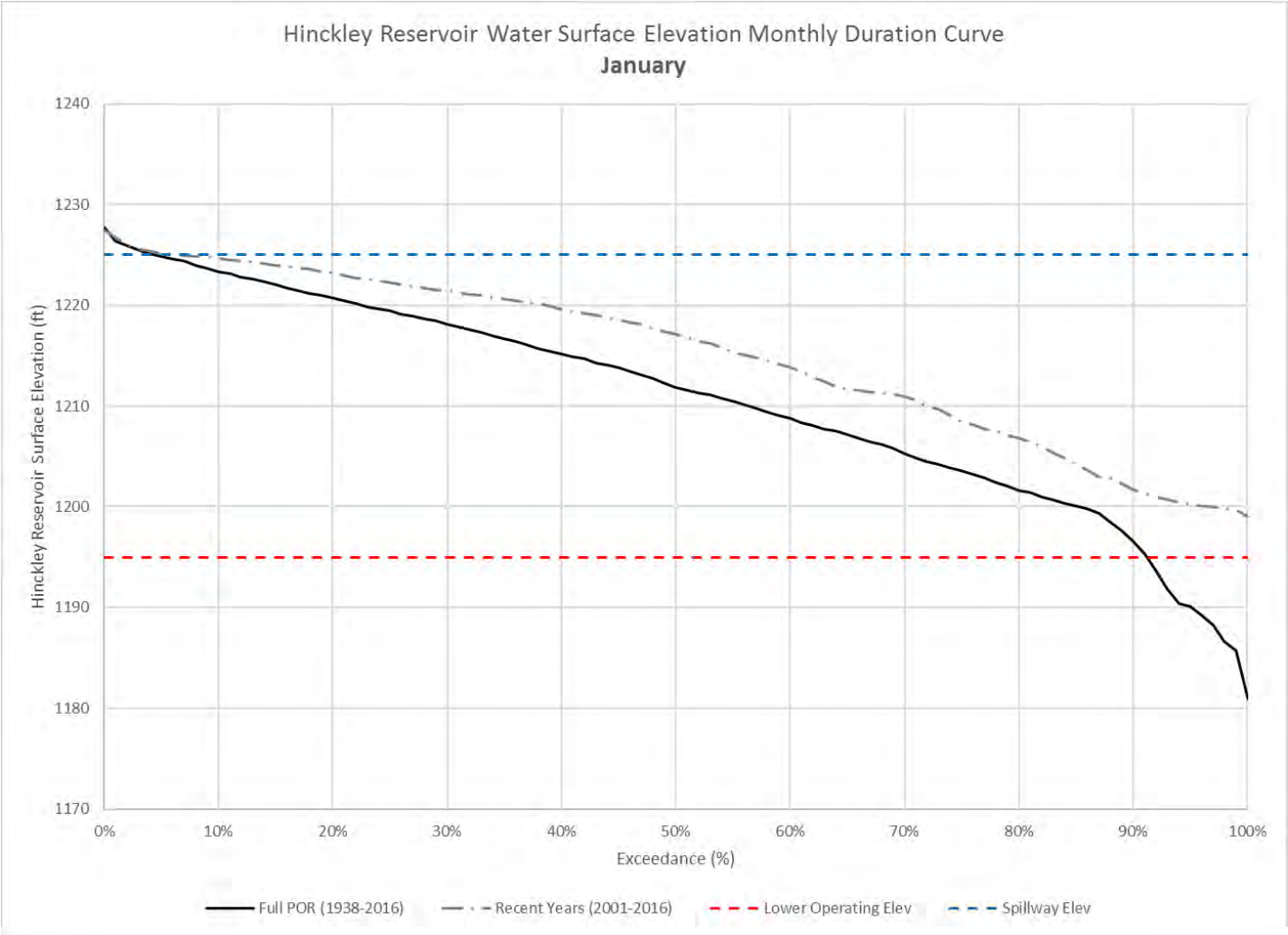


Figure 4.3.1.1-3: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – February

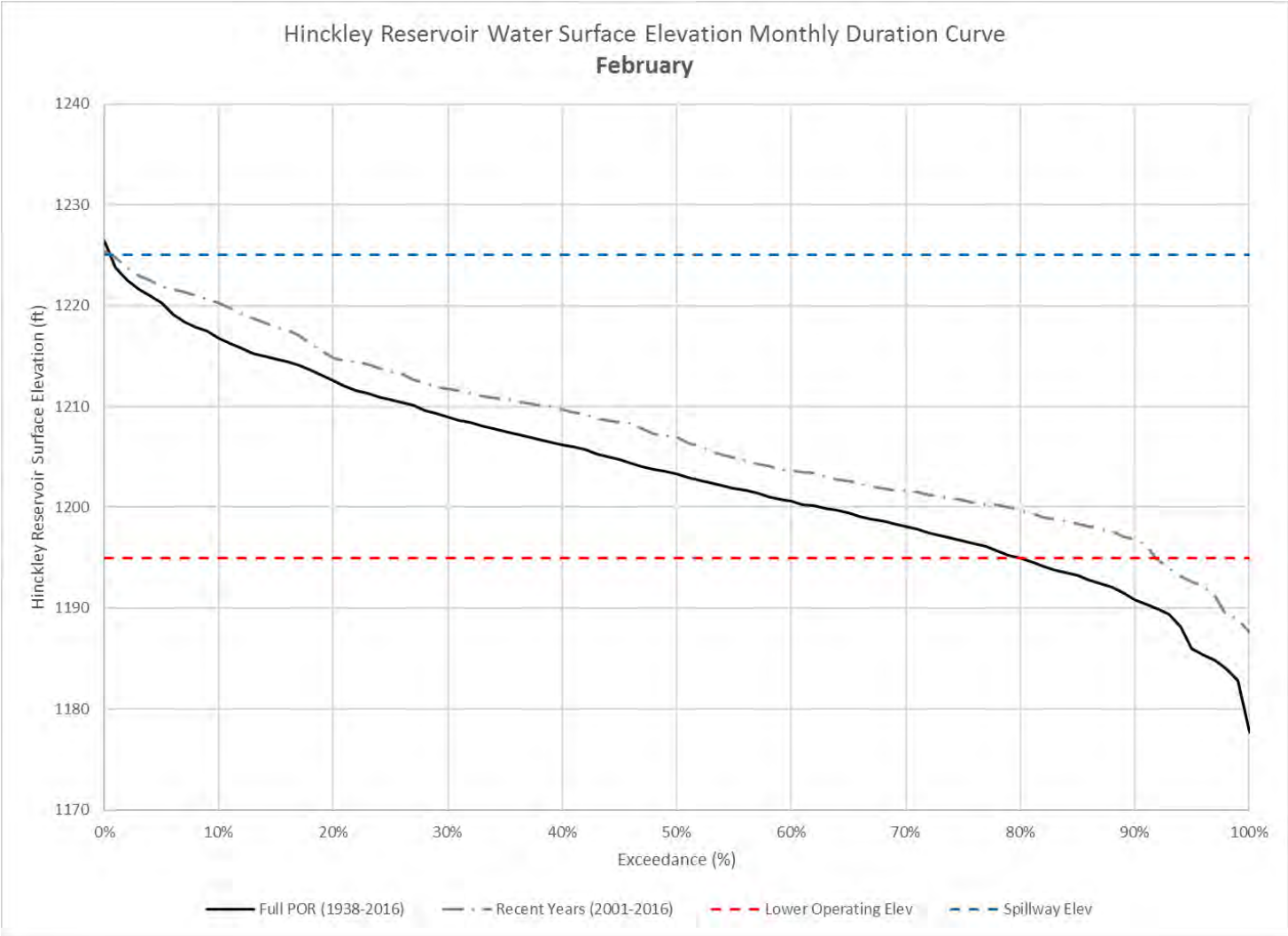


Figure 4.3.1.1-4: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – March

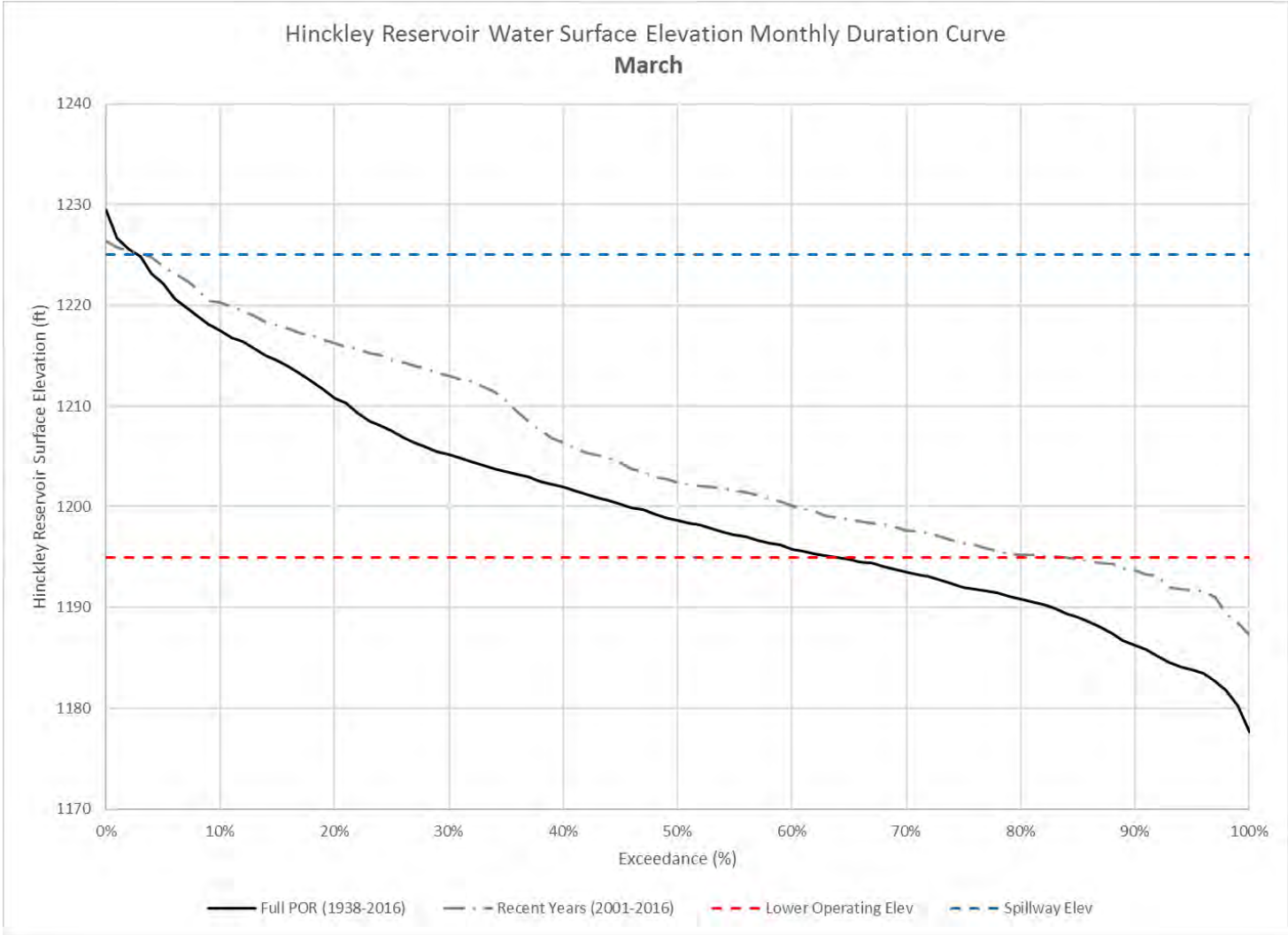


Figure 4.3.1.1-5: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – April

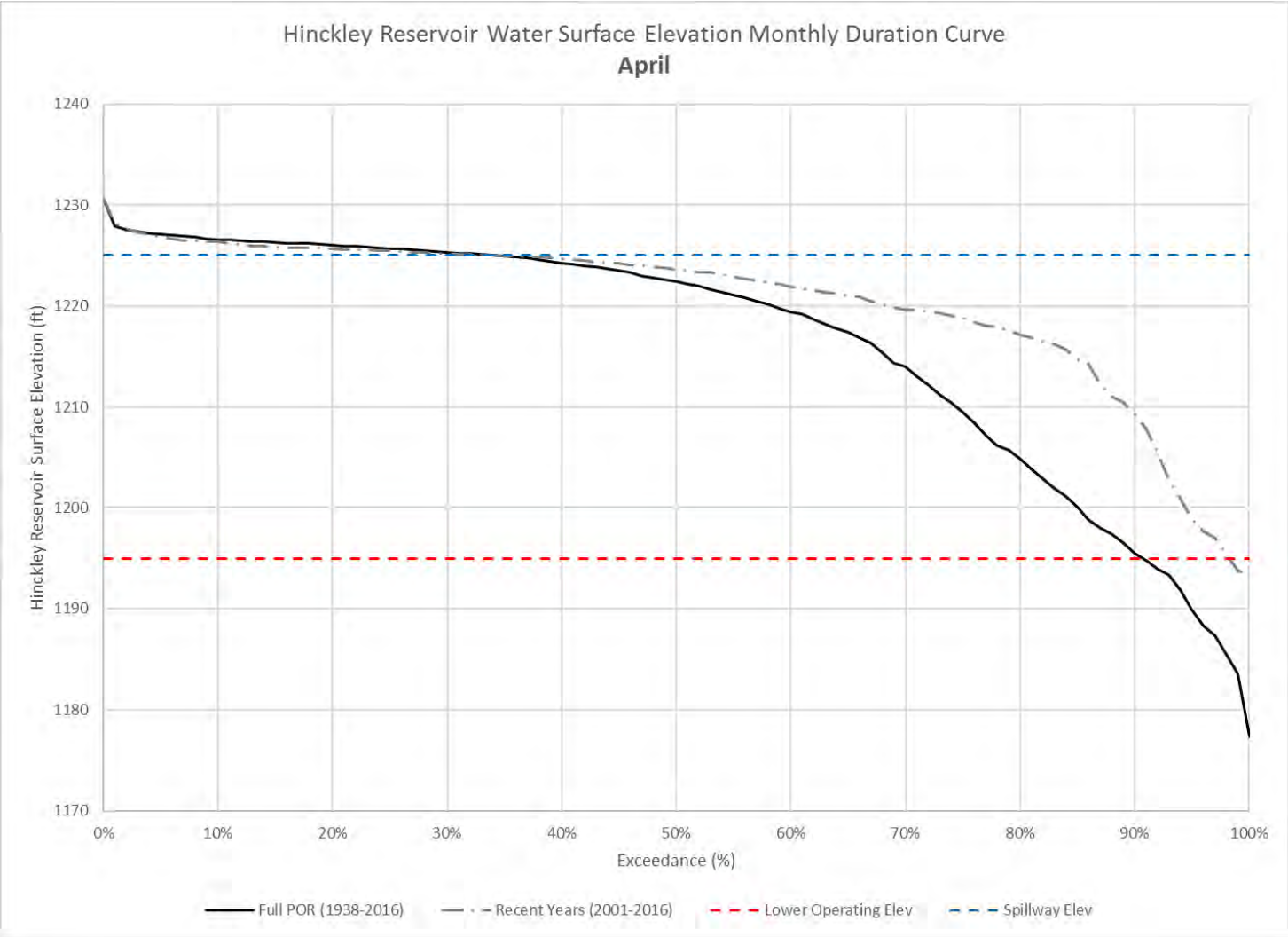


Figure 4.3.1.1-6: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – May

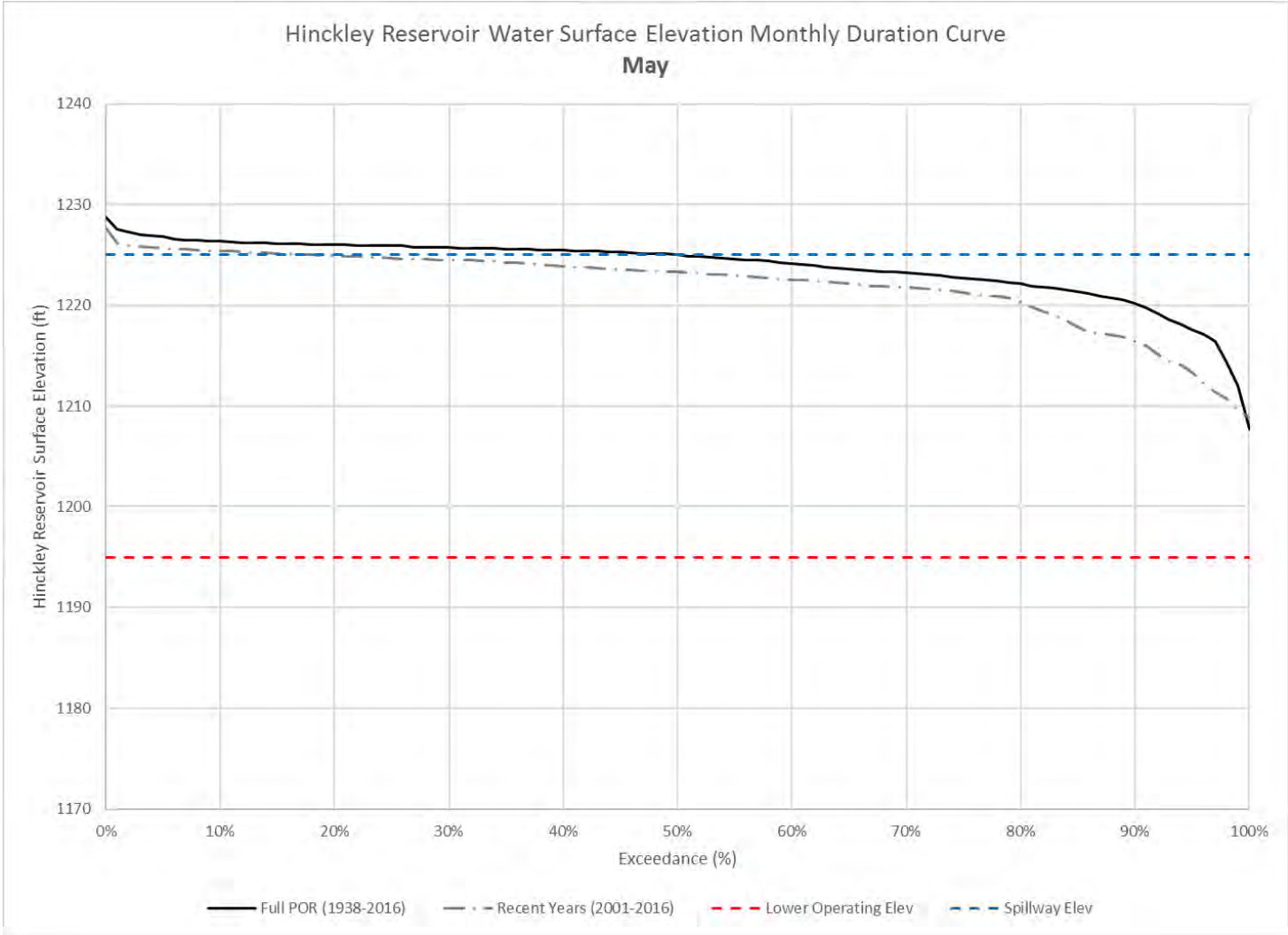


Figure 4.3.1.1-7: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – June

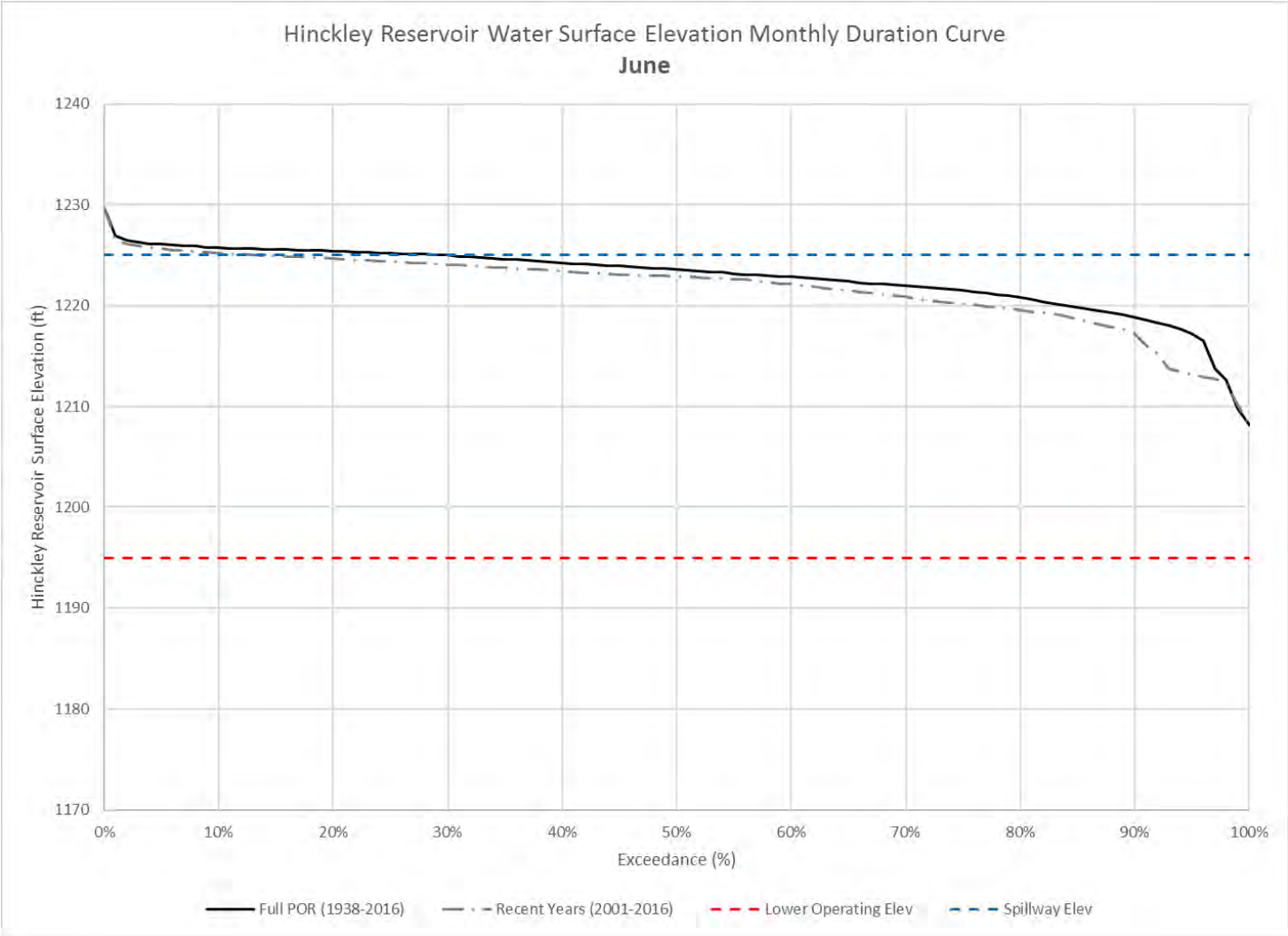


Figure 4.3.1.1-8: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – July

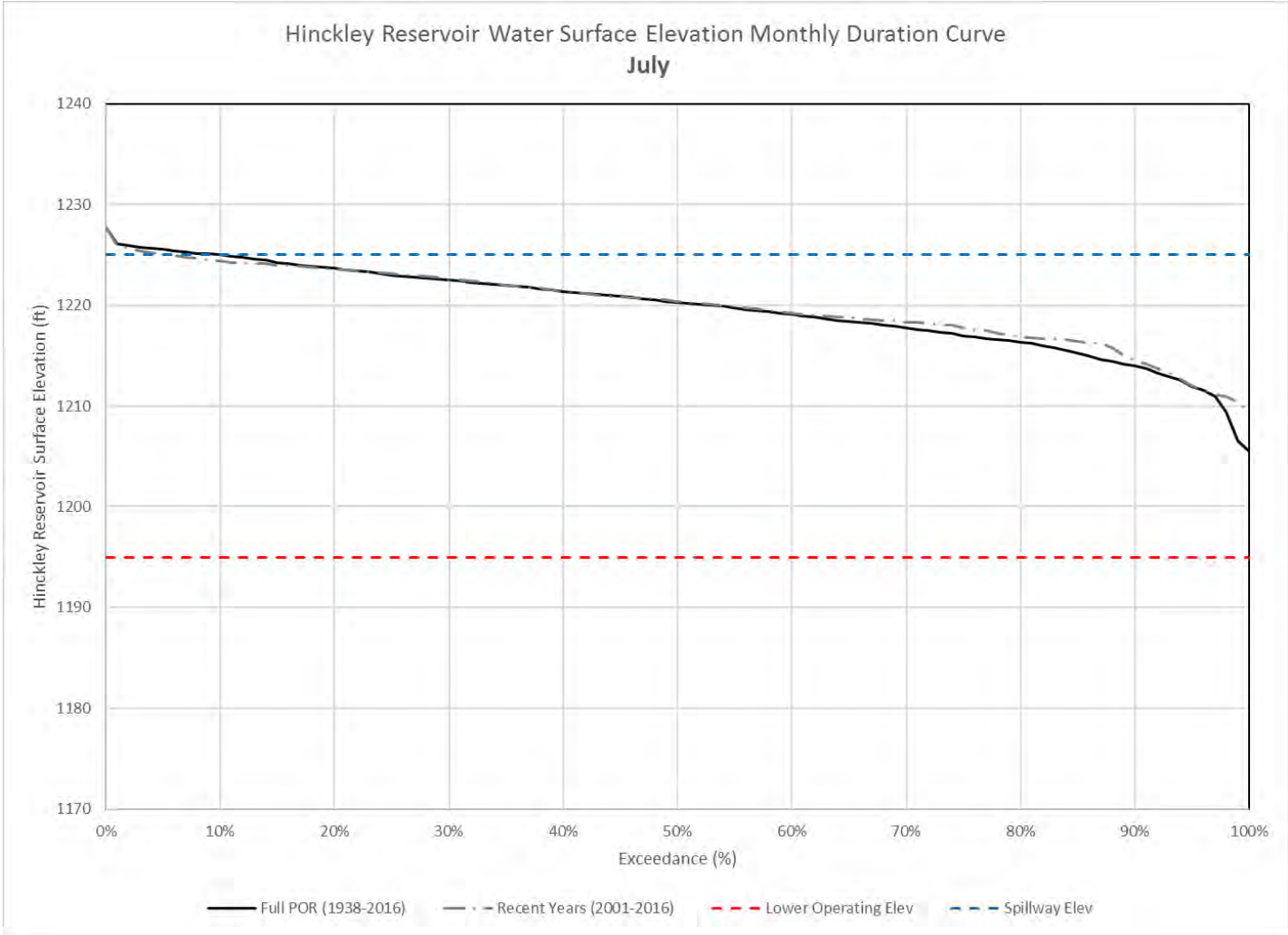


Figure 4.3.1.1-9: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – August

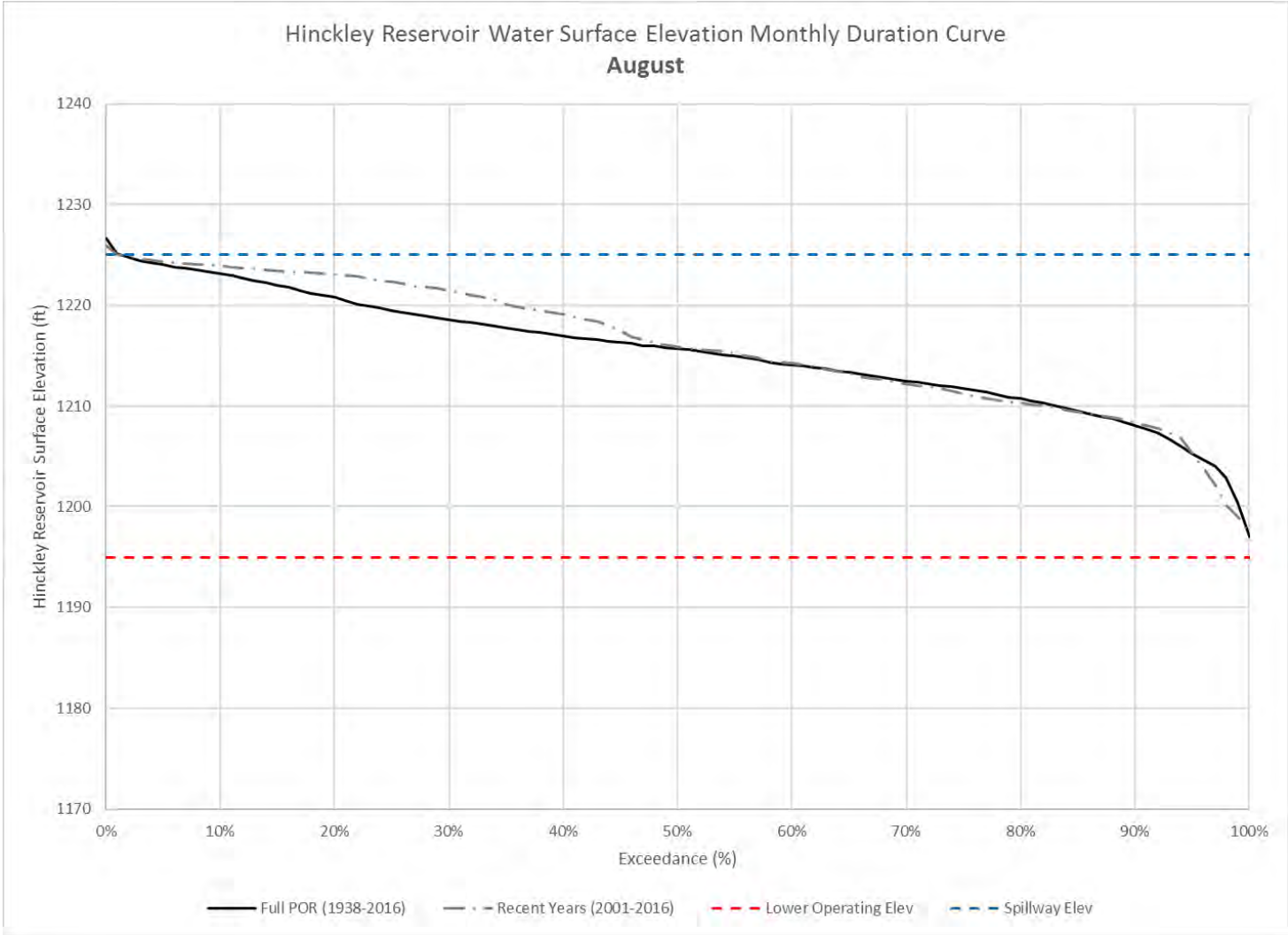


Figure 4.3.1.1-10: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – September

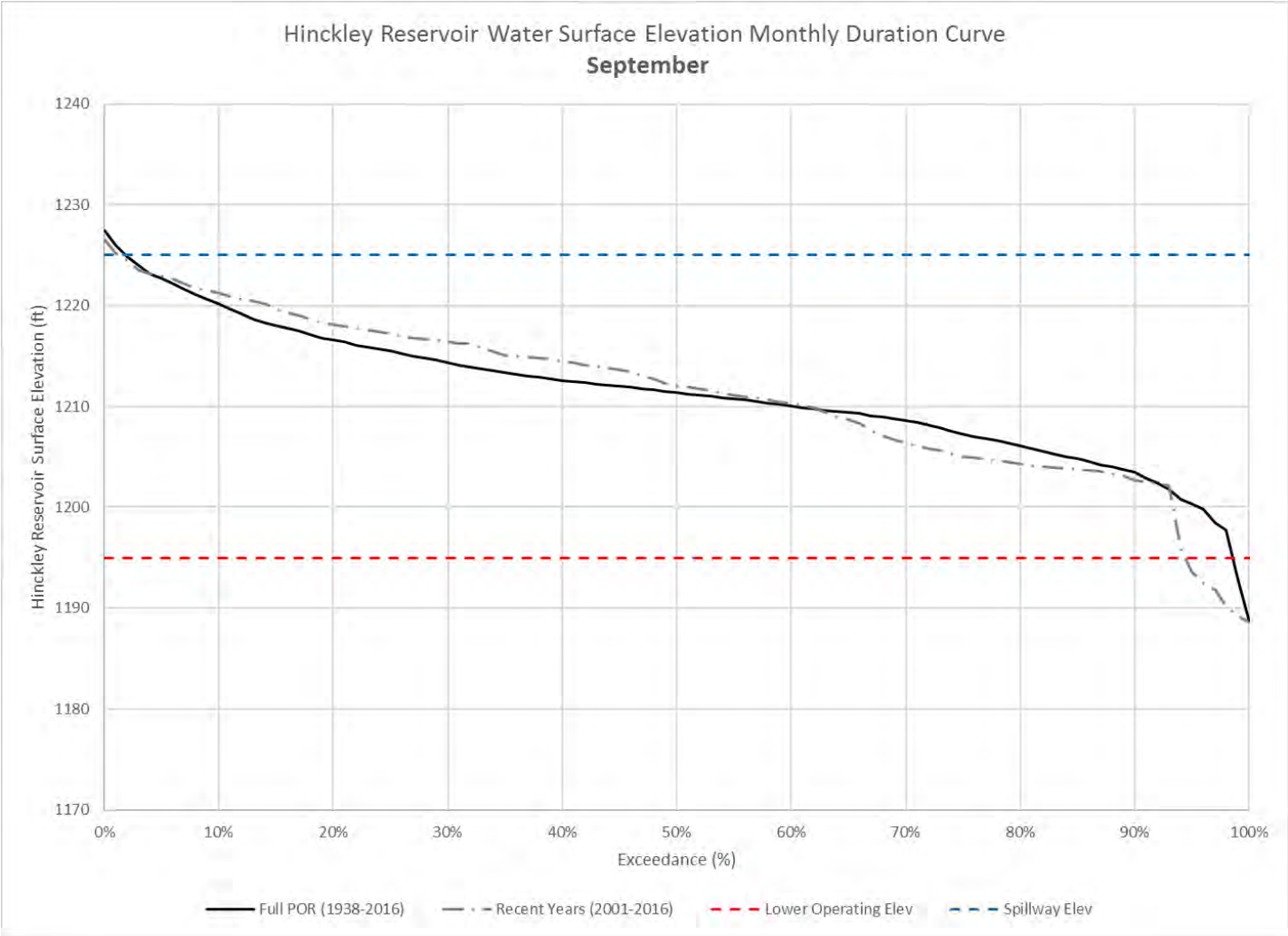


Figure 4.3.1.1-11: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – October

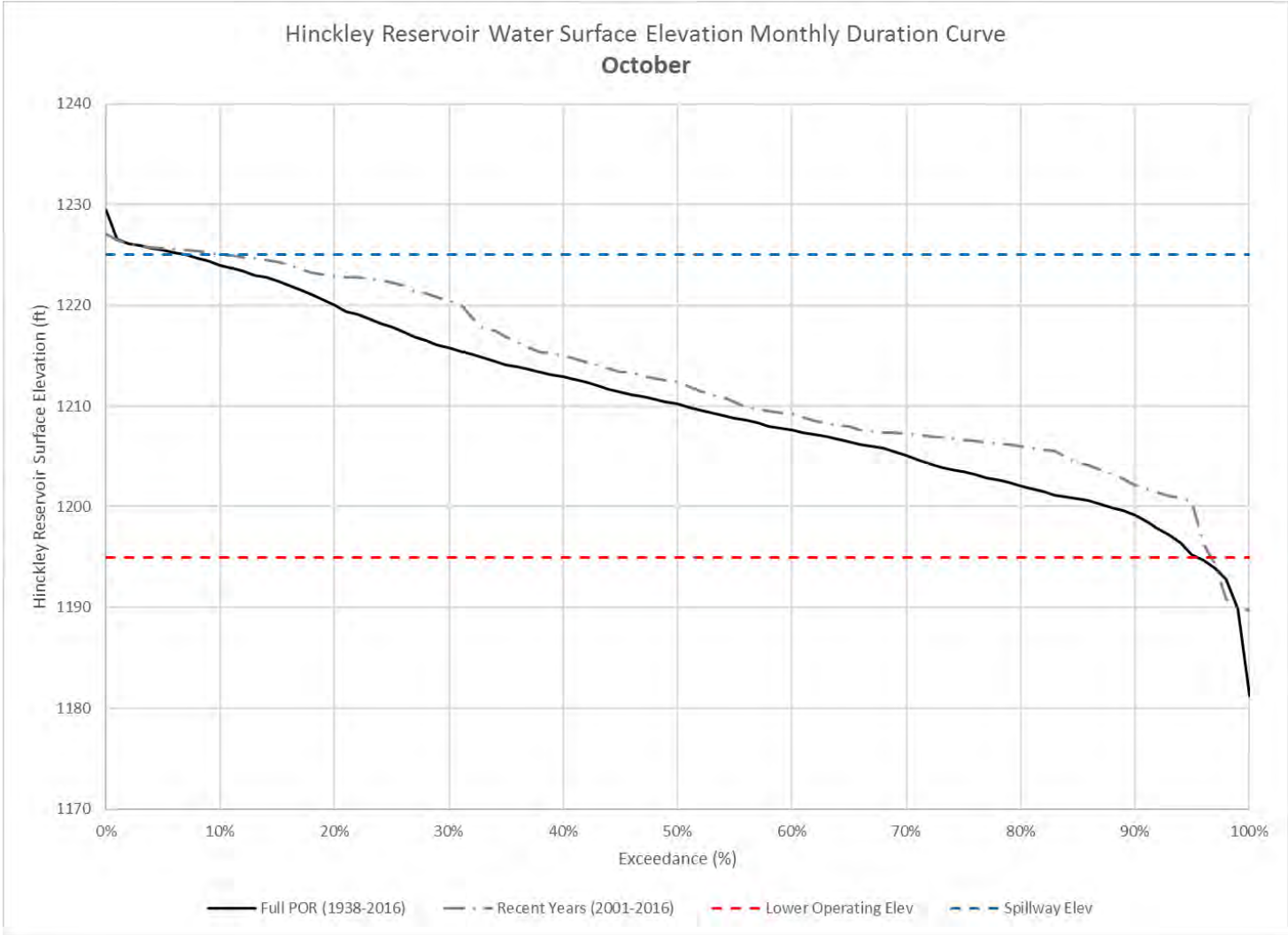


Figure 4.3.1.1-12: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – November

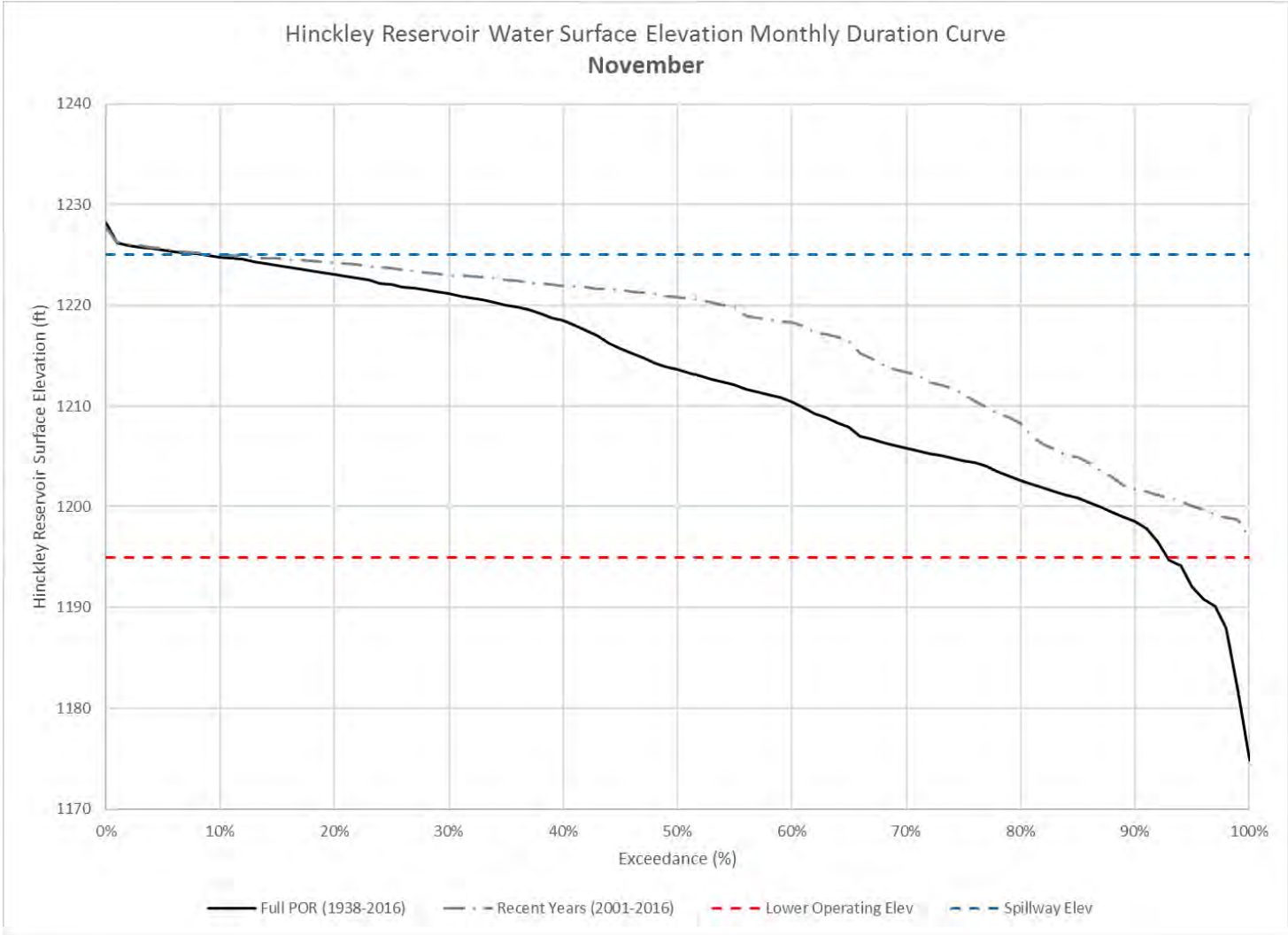


Figure 4.3.1.1-13: Hinckley Reservoir Water Surface Elevation Monthly Duration Curve – December

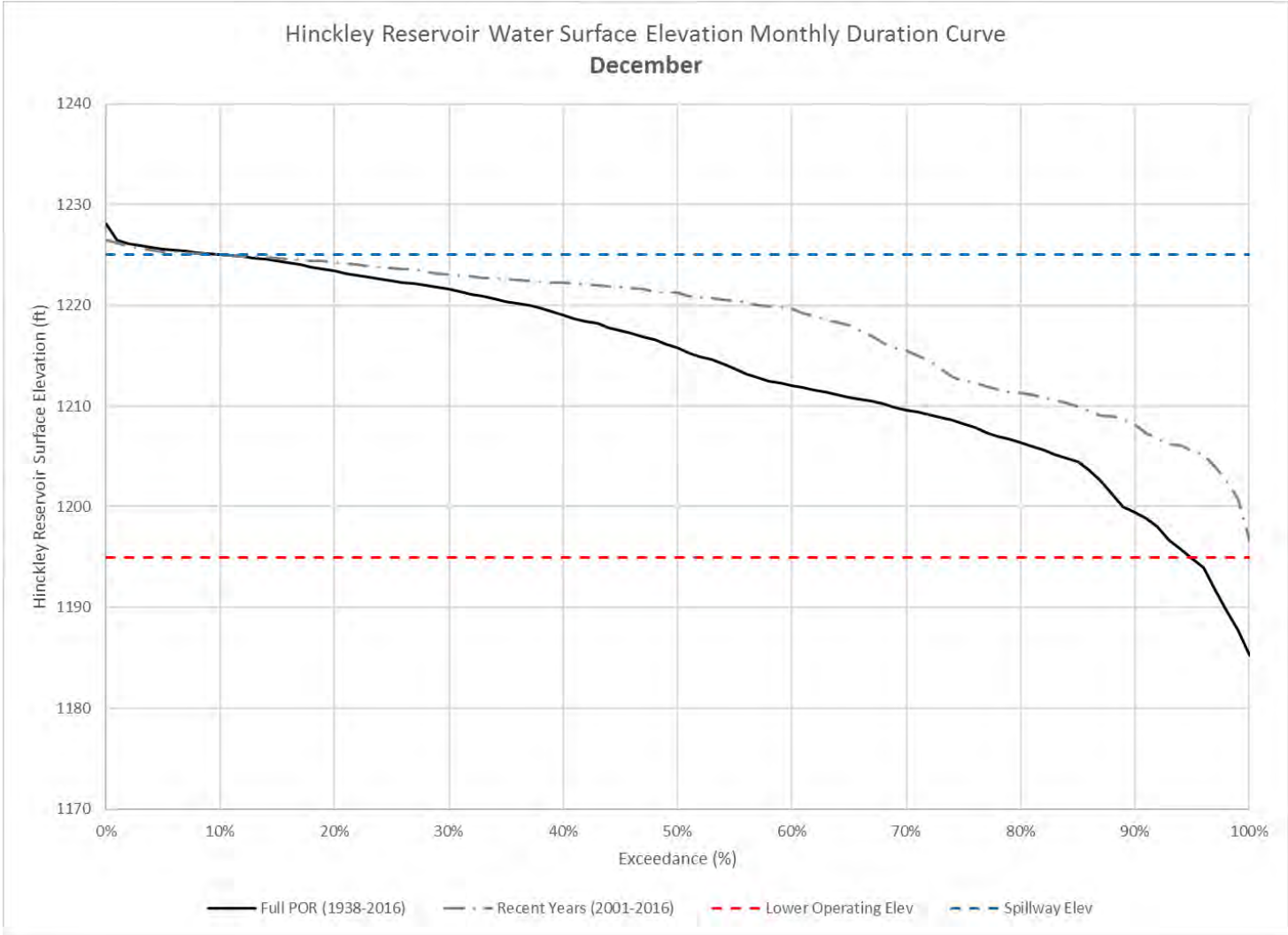


Figure 4.3.1.1-14: Hinckley Reservoir Water Surface Elevation 2001-2016

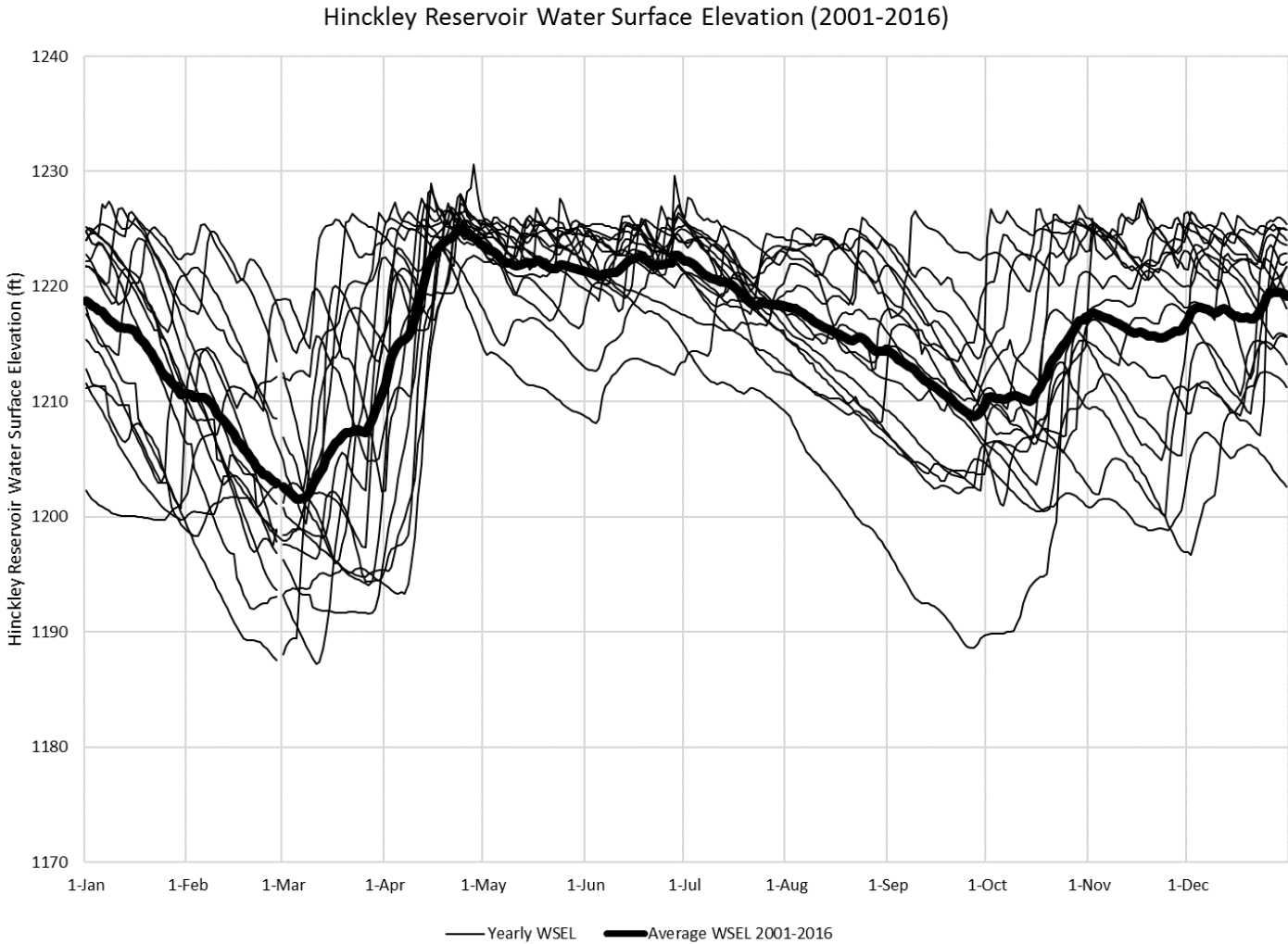


Figure 4.3.1.2-1: Annual Inflow and Outflow Duration Curves

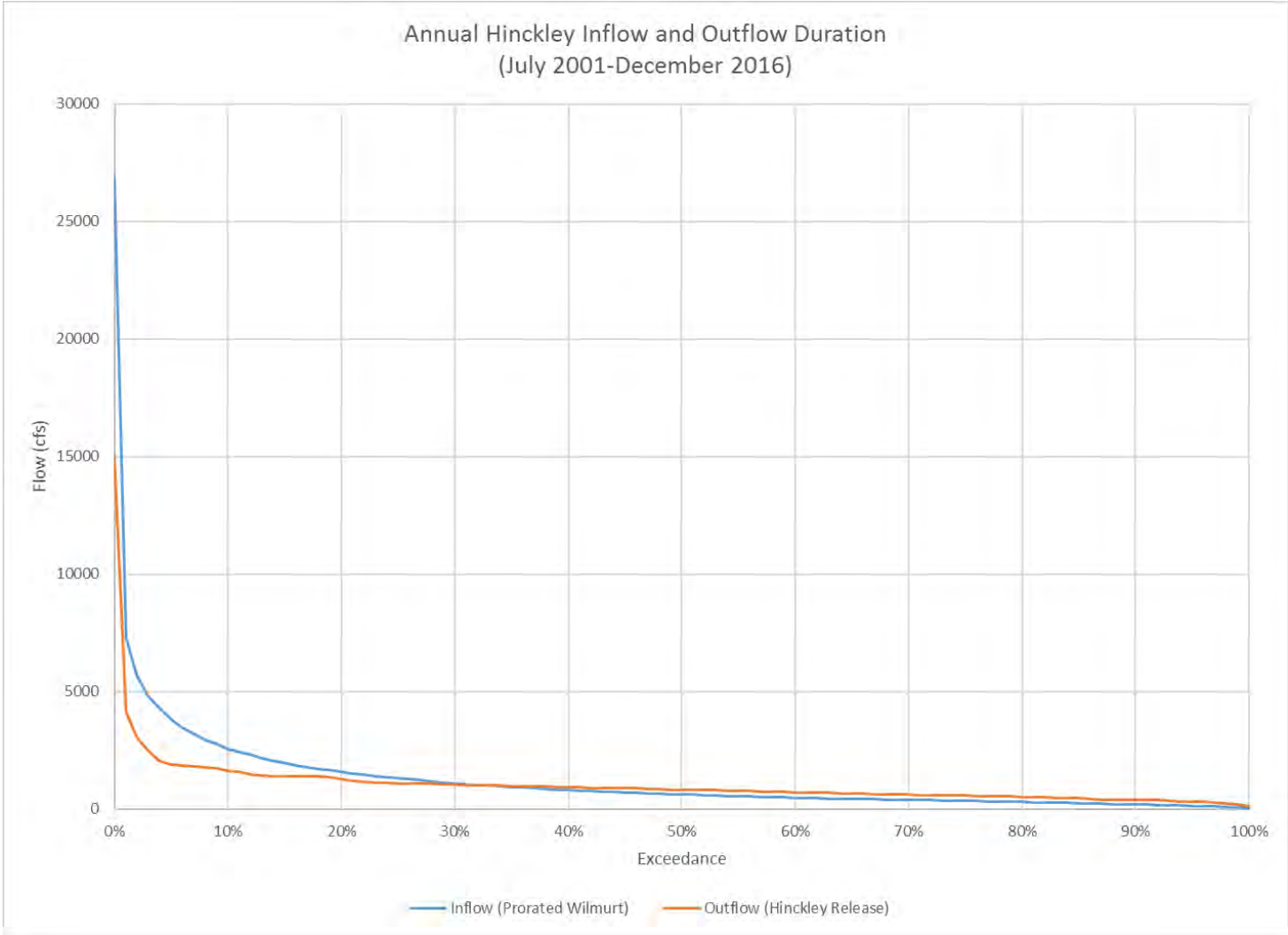


Figure 4.3.1.2-2: Monthly Inflow and Outflow Duration Curves – January

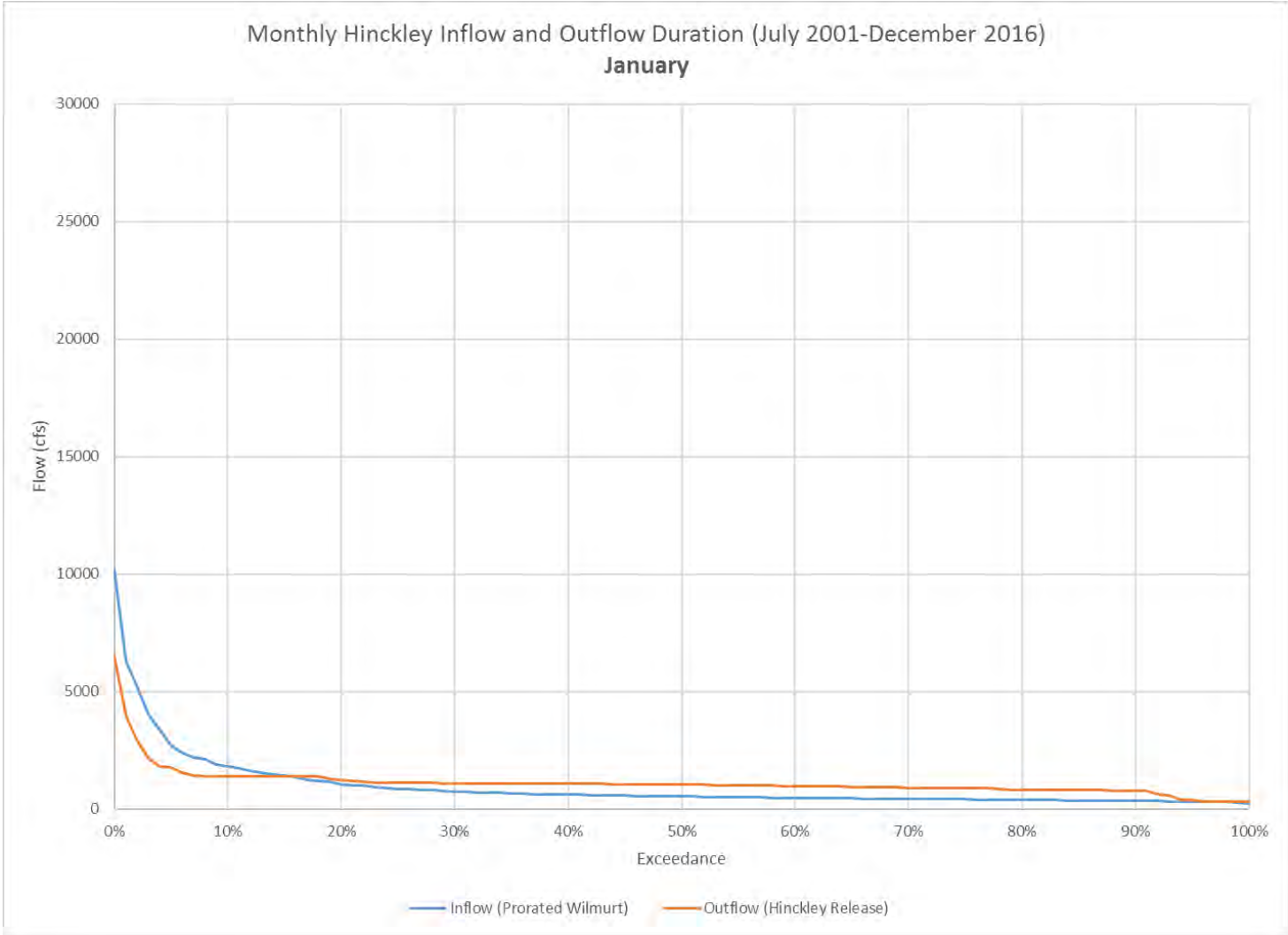


Figure 4.3.1.2-3: Monthly Inflow and Outflow Duration Curves – February

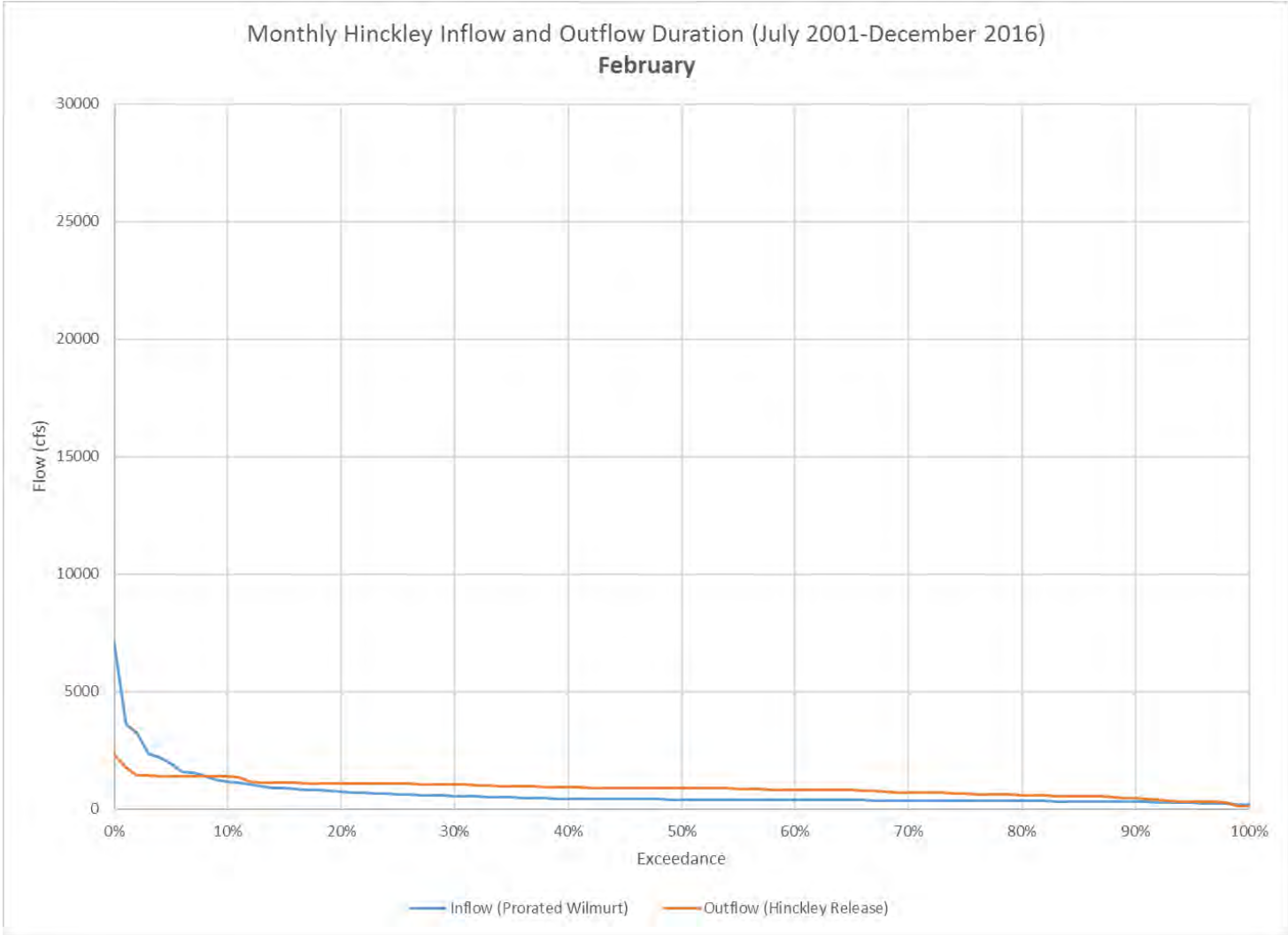


Figure 4.3.1.2-4: Monthly Inflow and Outflow Duration Curves – March

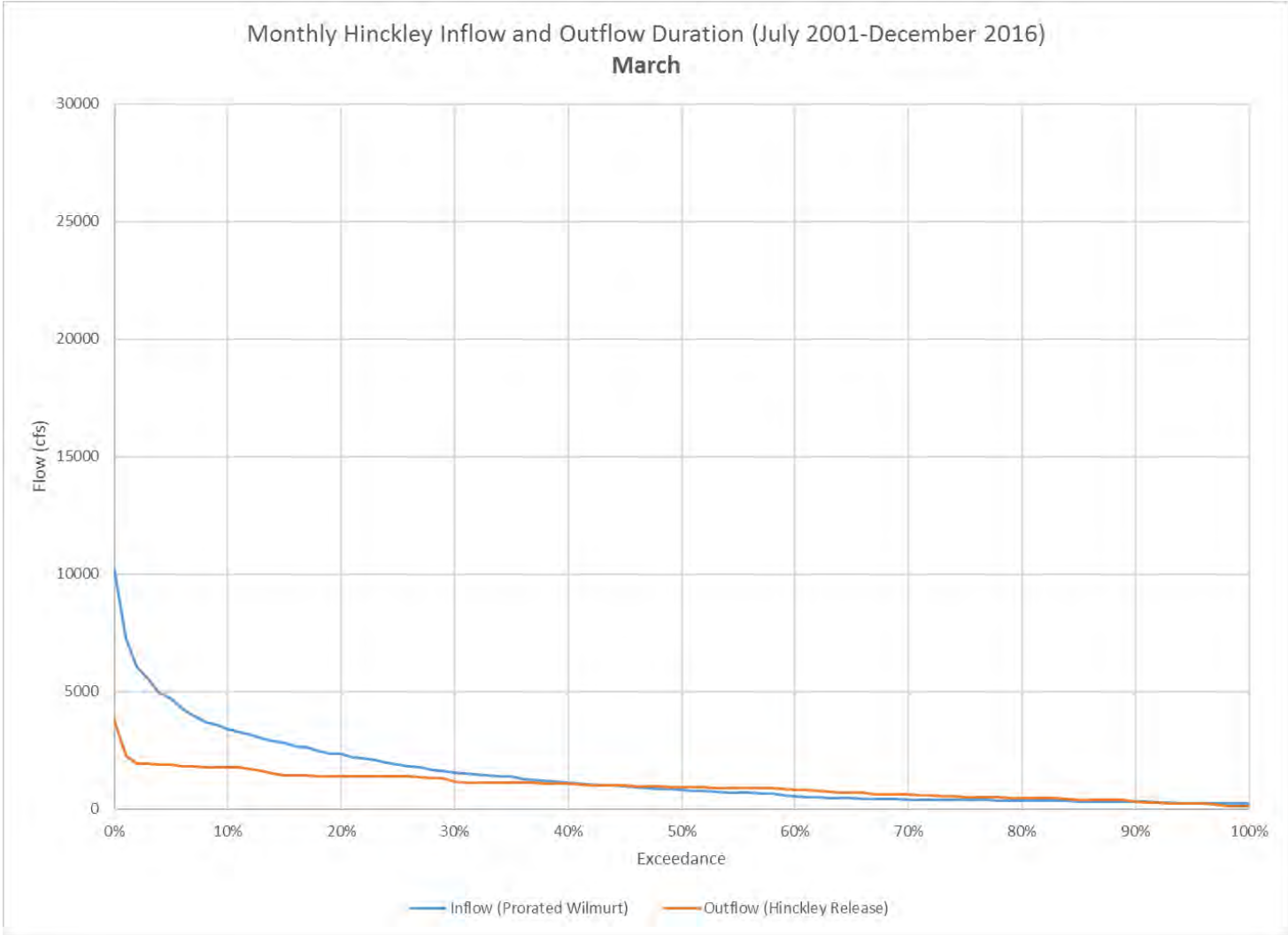


Figure 4.3.1.2-5: Monthly Inflow and Outflow Duration Curves – April

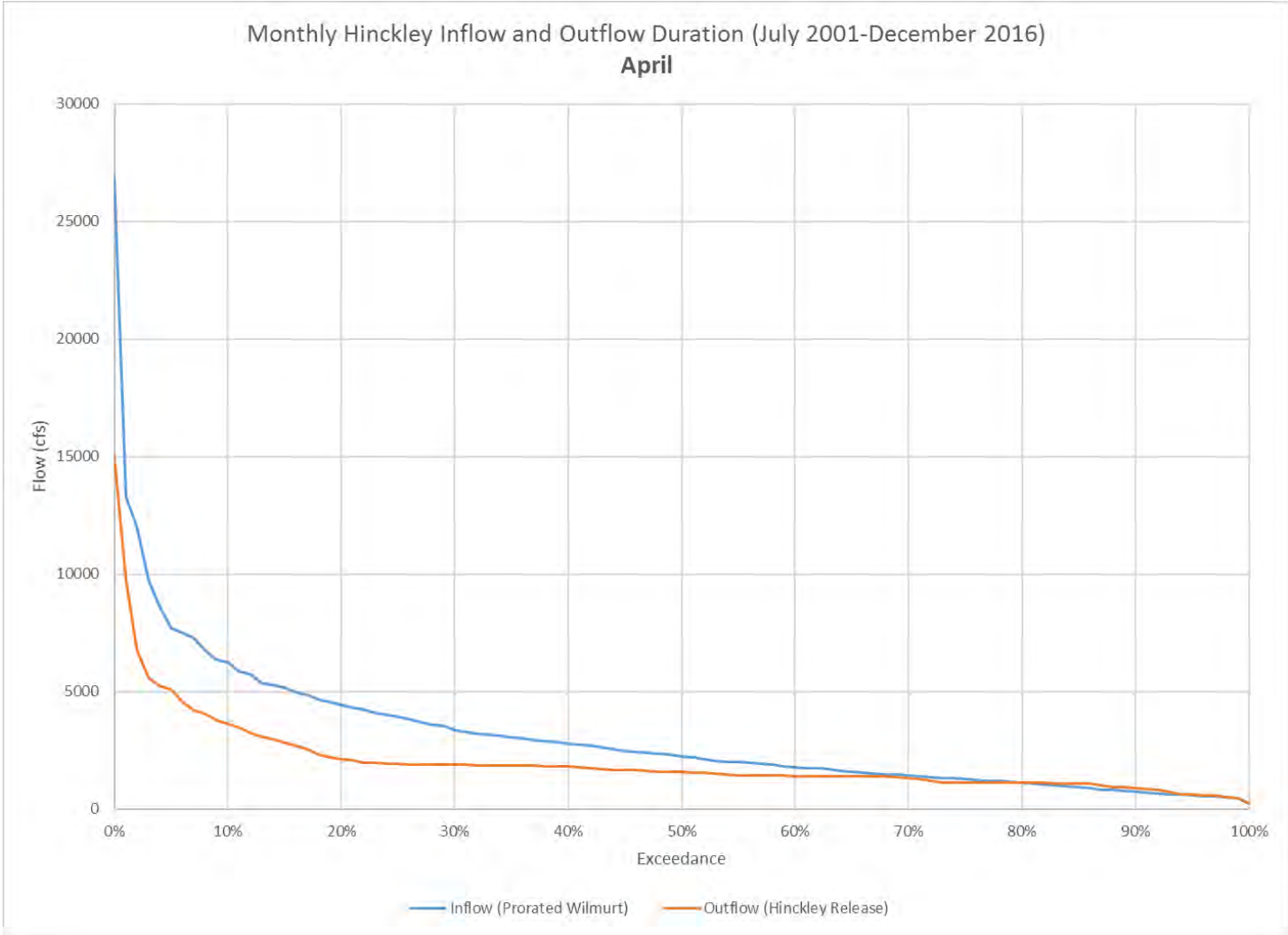


Figure 4.3.1.2-6: Monthly Inflow and Outflow Duration Curves – May

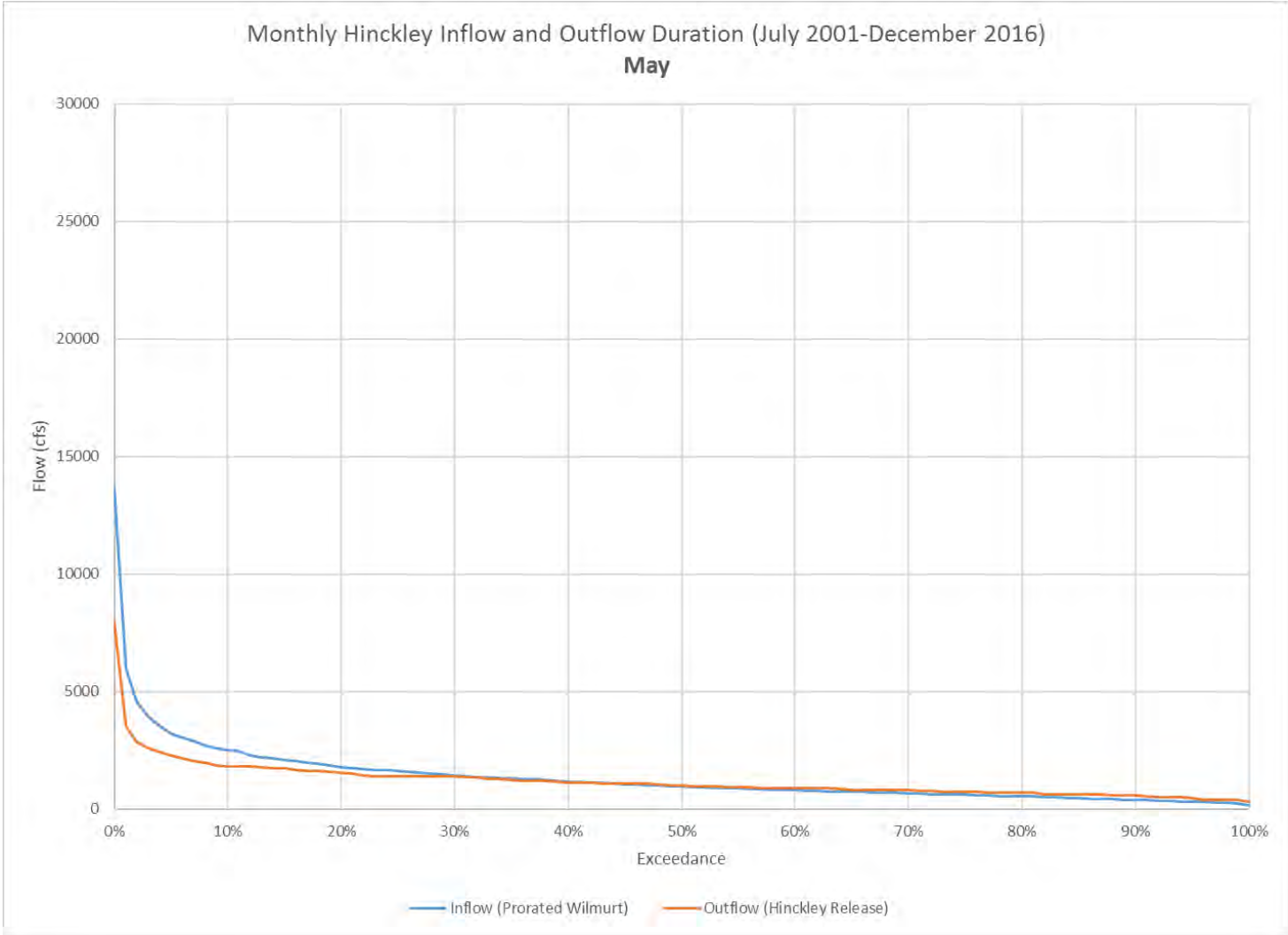


Figure 4.3.1.2-7: Monthly Inflow and Outflow Duration Curves – June

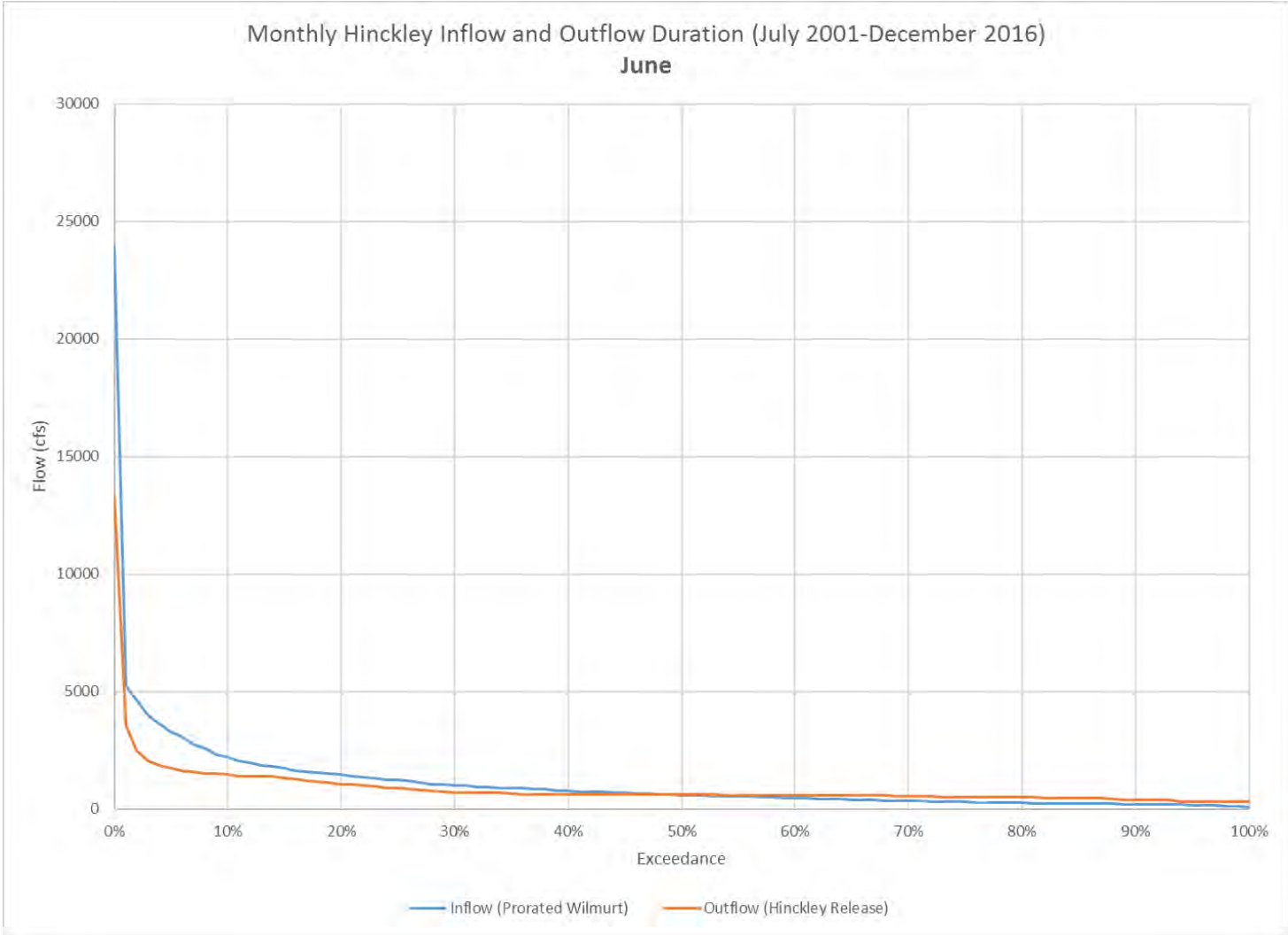


Figure 4.3.1.2-8: Monthly Inflow and Outflow Duration Curves – July

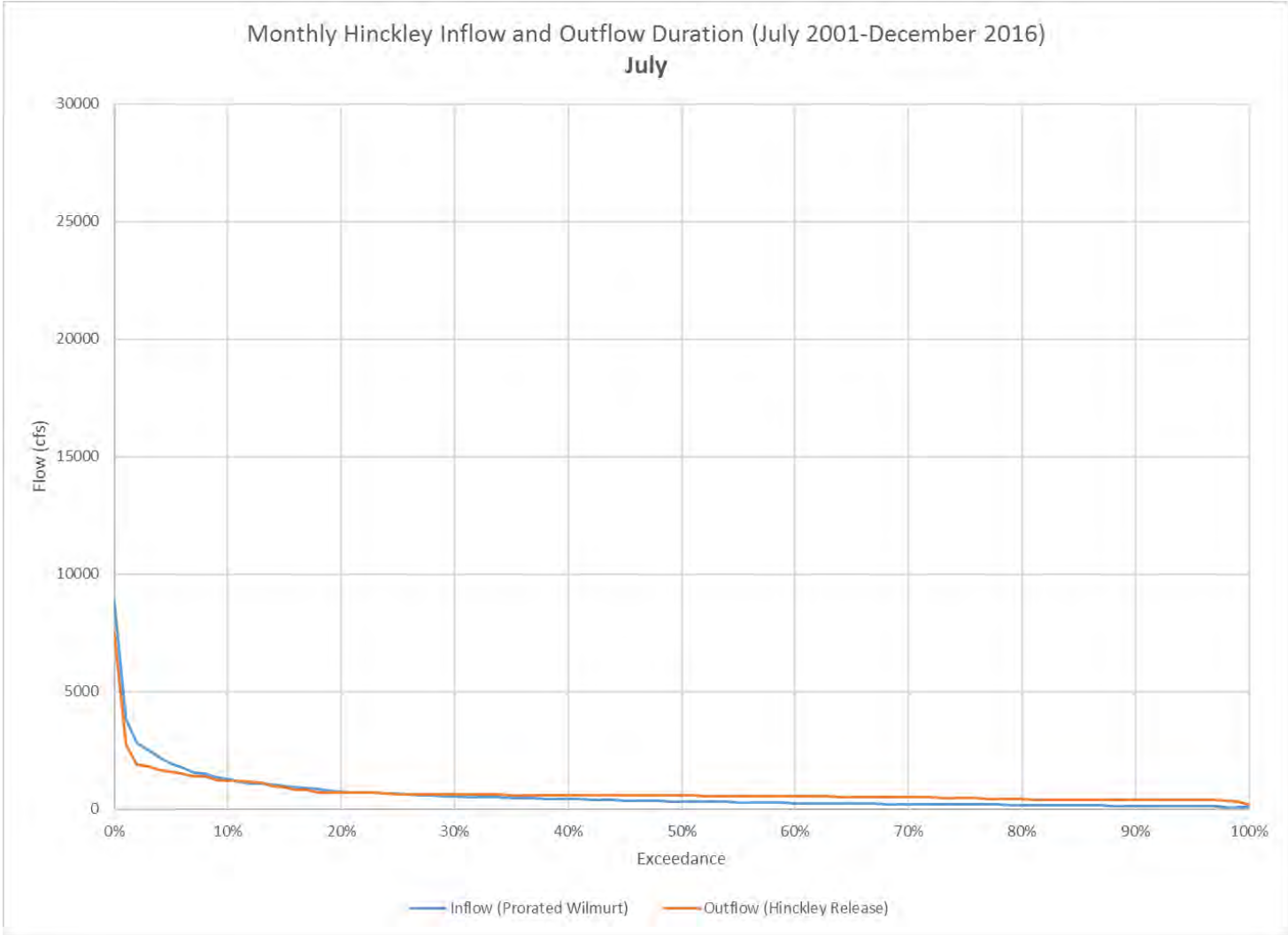


Figure 4.3.1.2-9: Monthly Inflow and Outflow Duration Curves – August

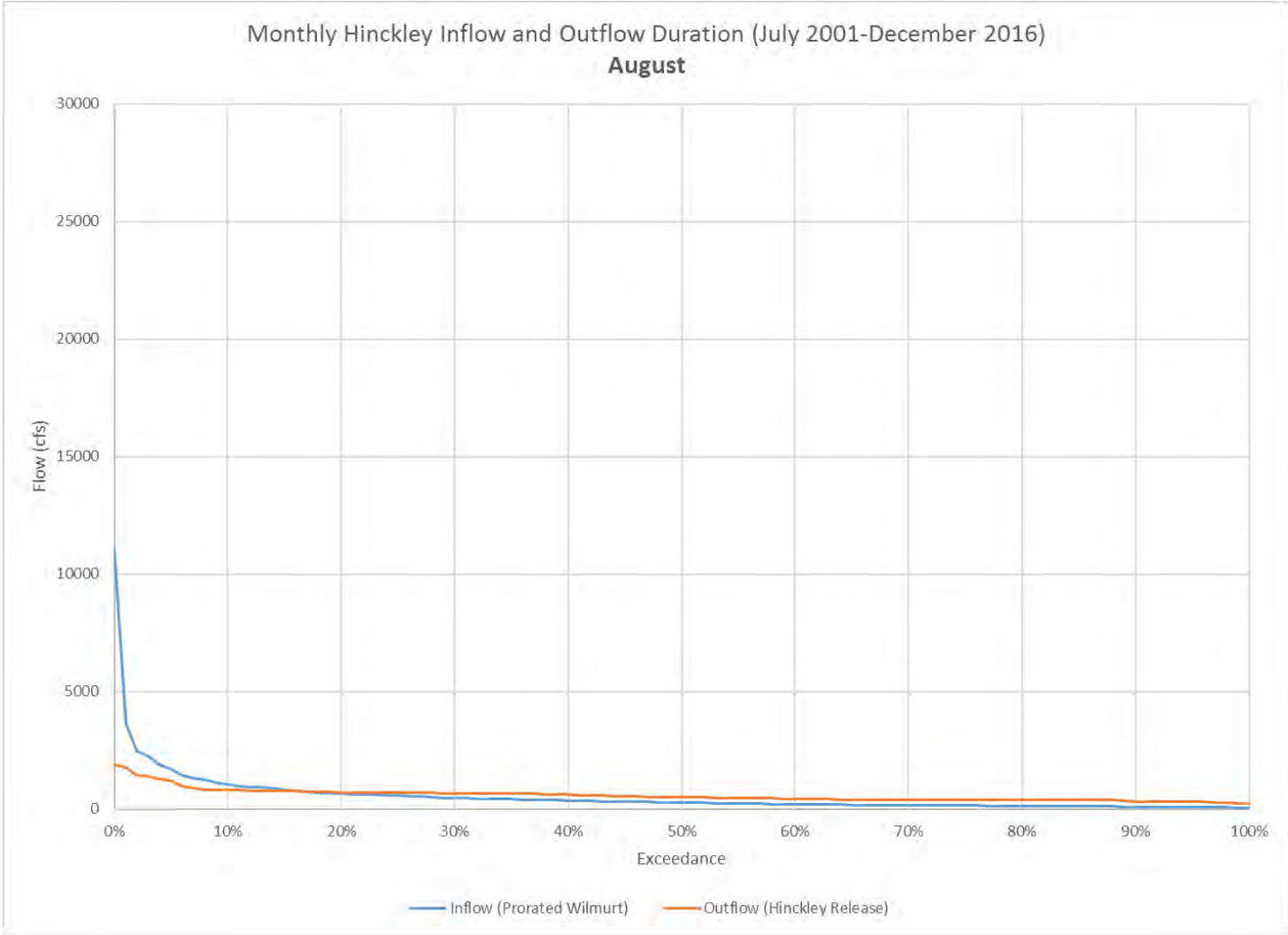


Figure 4.3.1.2-10: Monthly Inflow and Outflow Duration Curves – September

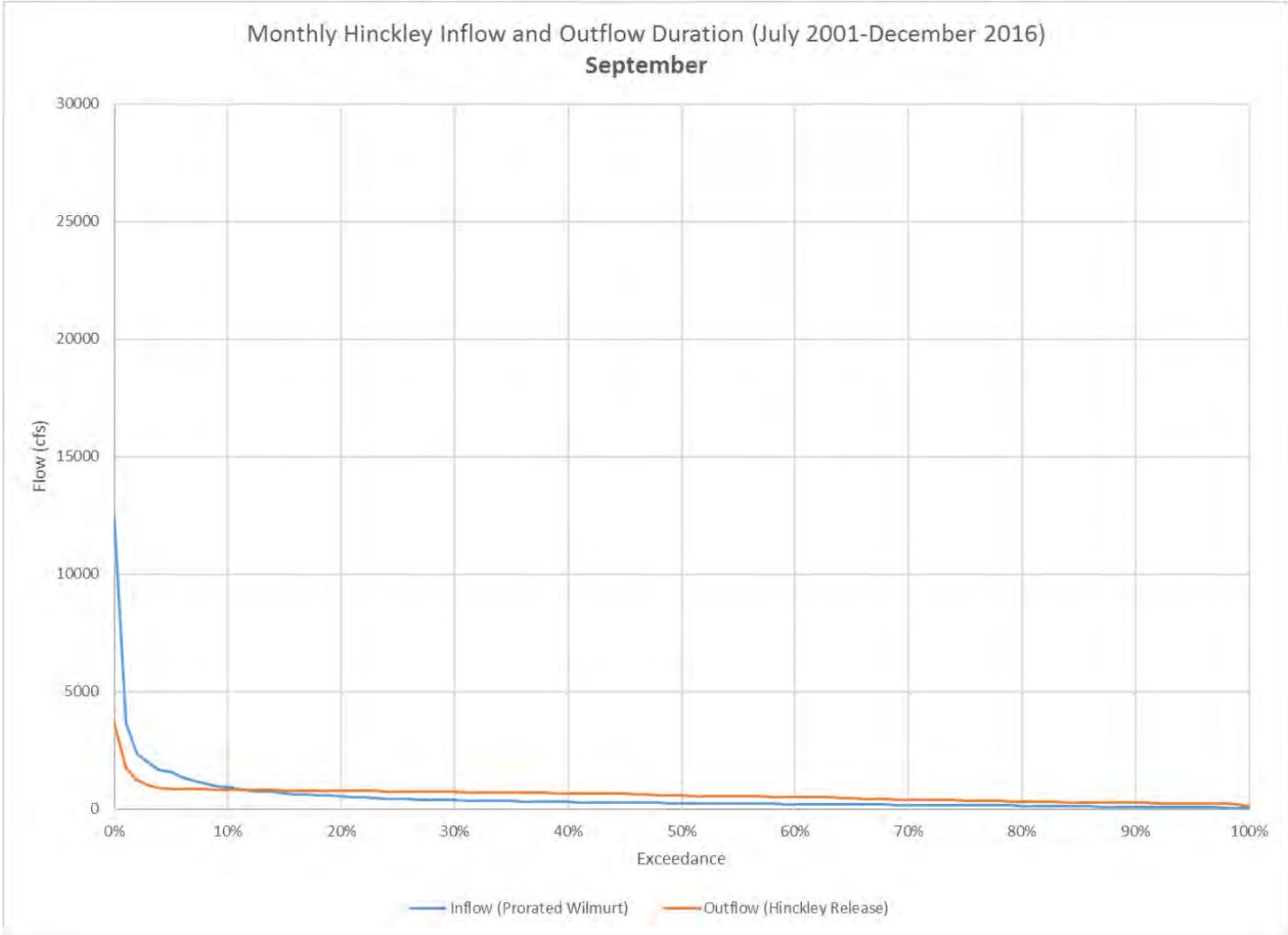


Figure 4.3.1.2-11: Monthly Inflow and Outflow Duration Curves – October

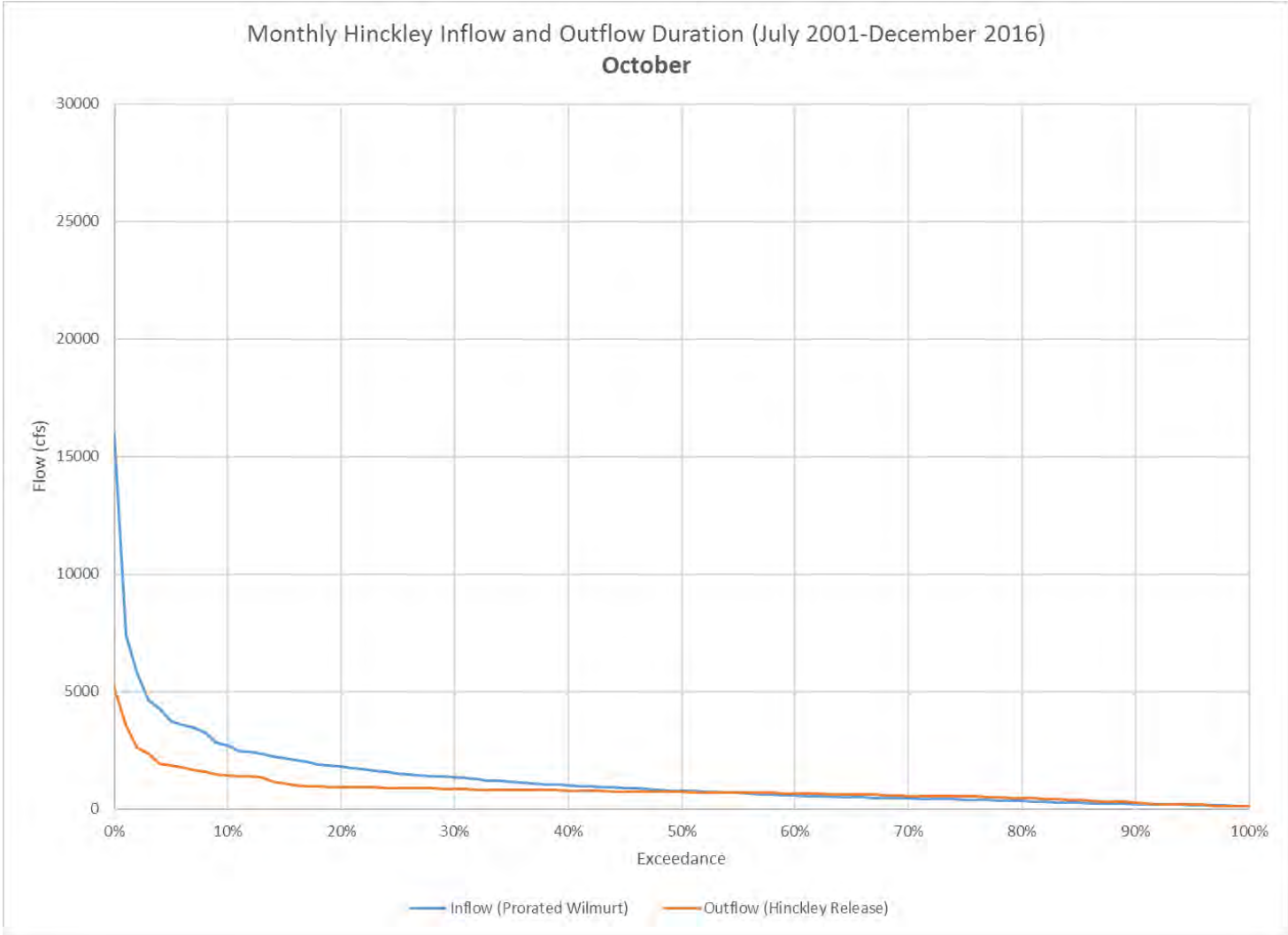


Figure 4.3.1.2-12: Monthly Inflow and Outflow Duration Curves – November

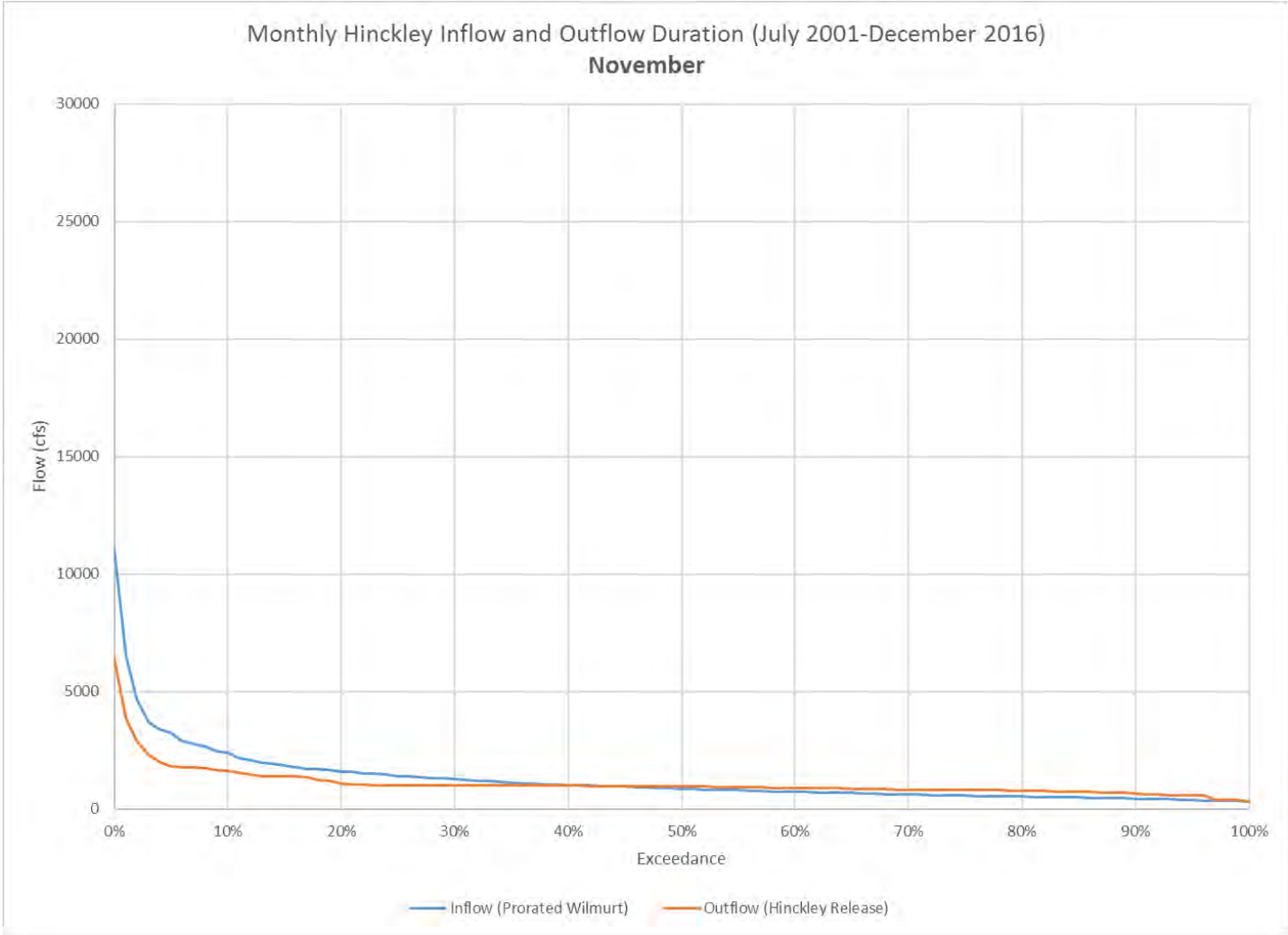


Figure 4.3.1.2-13: Monthly Inflow and Outflow Duration Curves – December

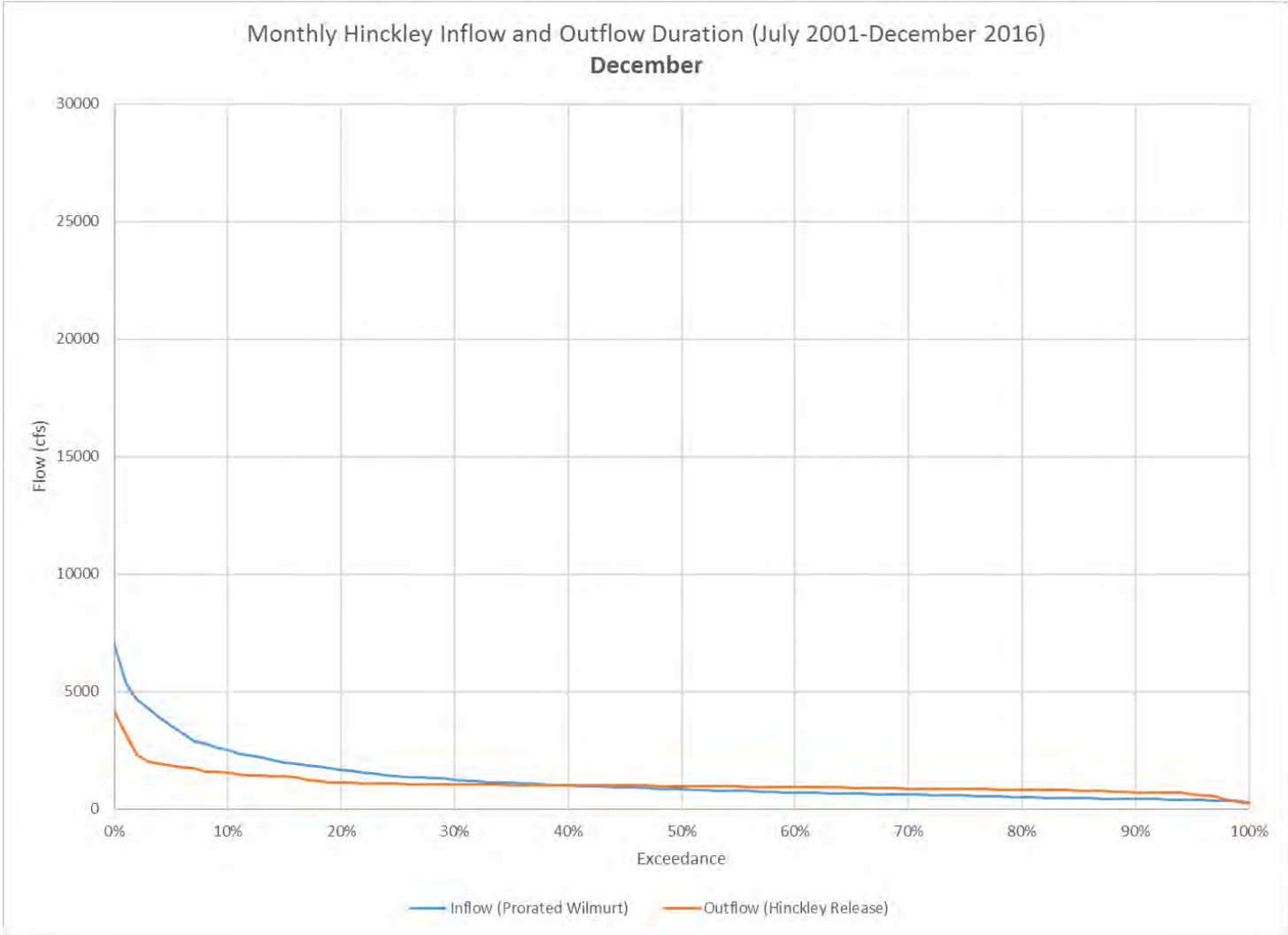


Figure 4.3.2.4-1: Vertical Profiles of NYSDEC Fisheries Department Water Samples at Hinckley Reservoir: 1989, 1994, 2009, 2010

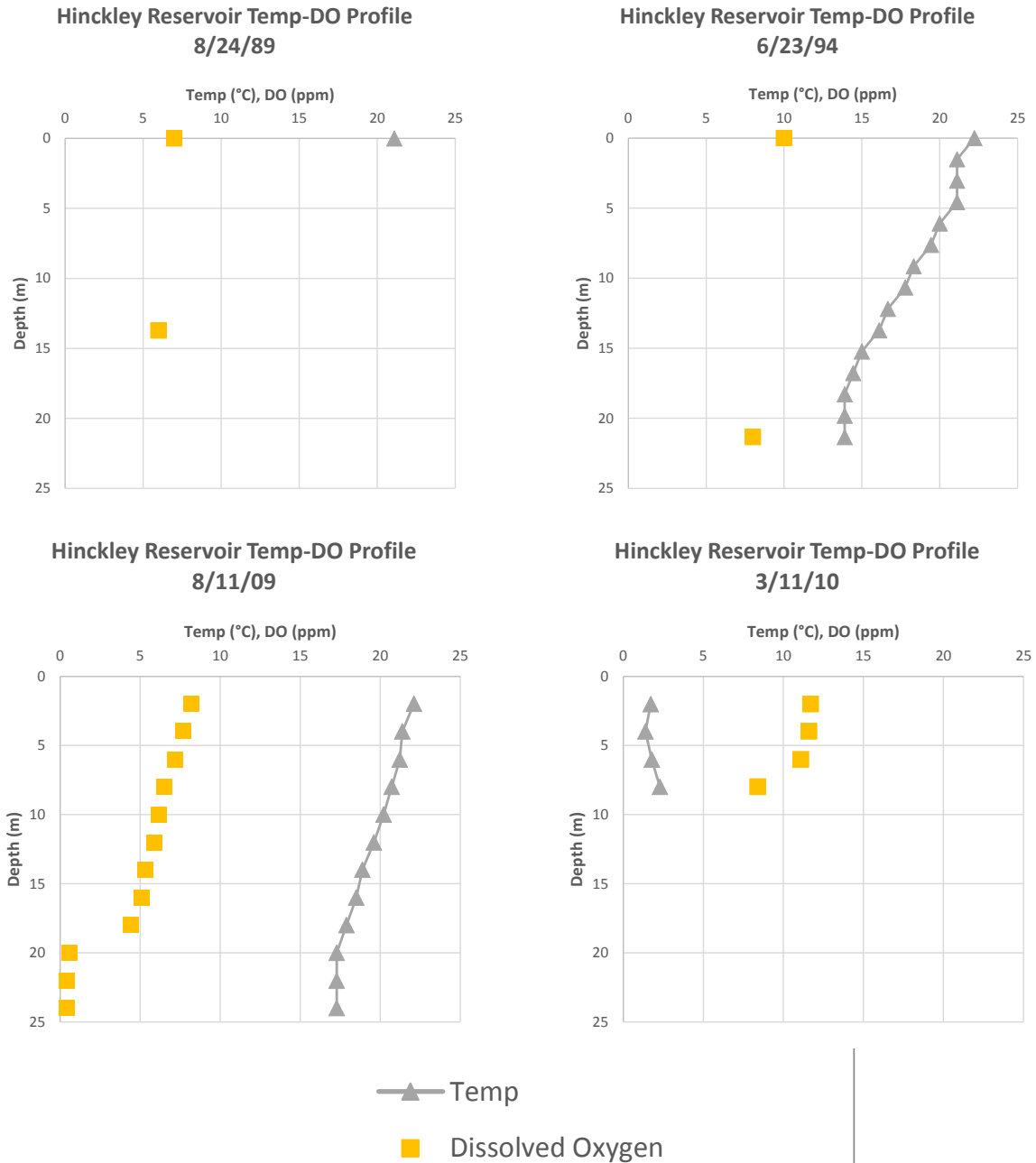
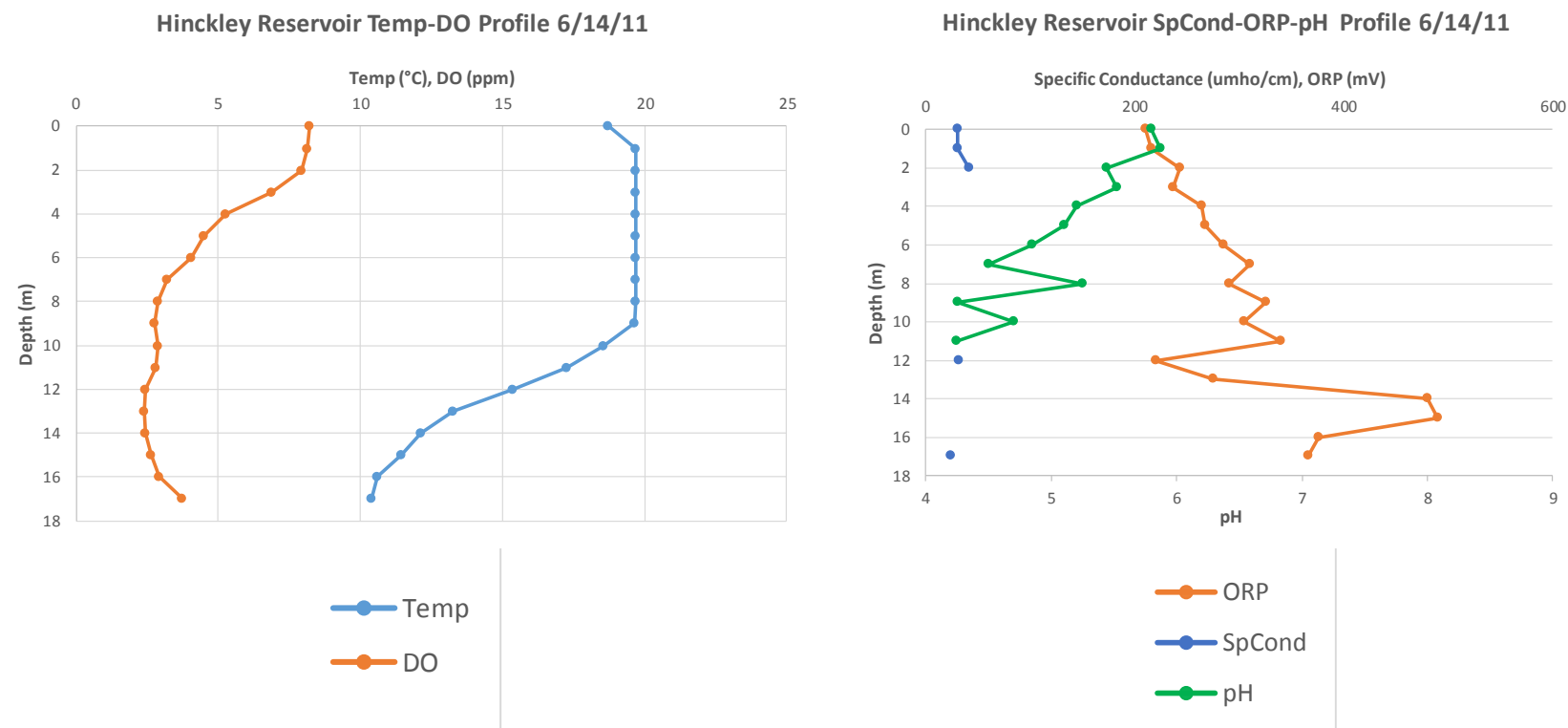
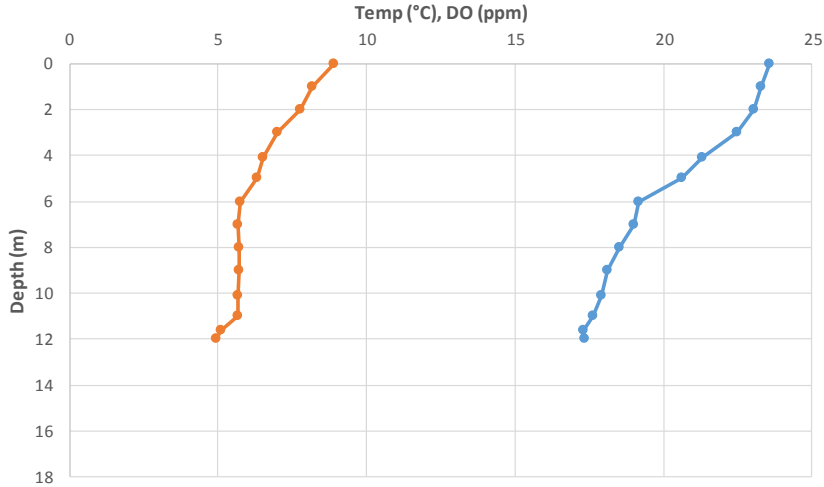


Figure 4.3.2.4-2: Vertical Profiles of NYSDEC Water Samples at Hinckley Reservoir: 2011

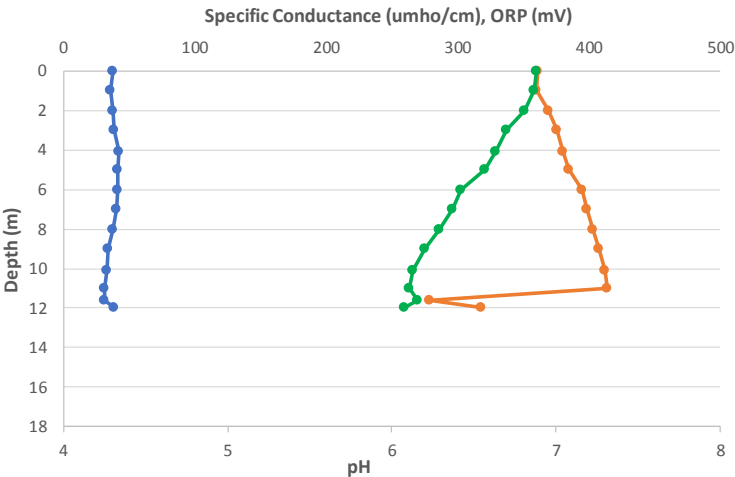


Hinckley Reservoir Temp-DO Profile 7/12/11



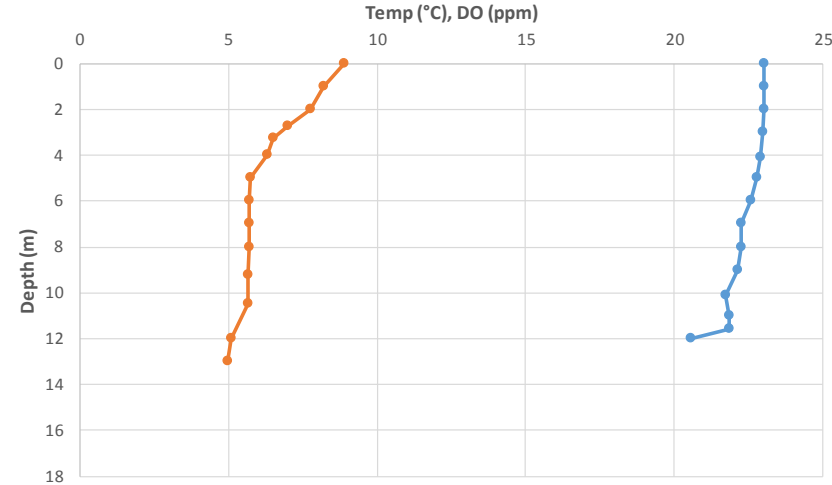
Temp
DO

Hinckley Reservoir SpCond-ORP-pH Profile 7/12/11



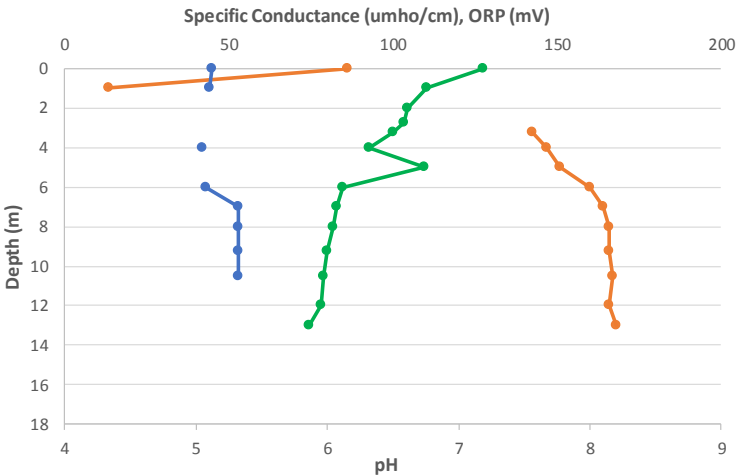
ORP
SpCond
pH

Hinckley Reservoir Temp-DO Profile 8/11/11



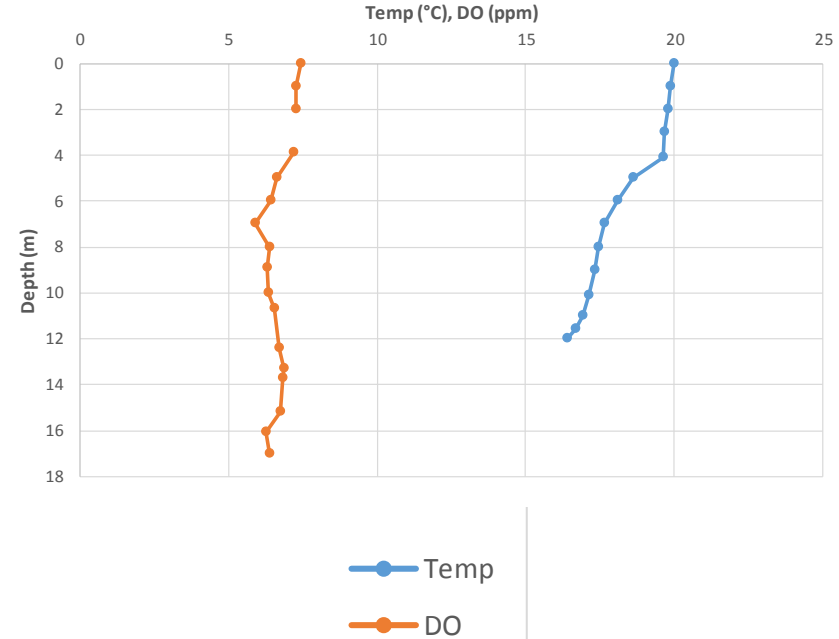
Temp
DO

Hinckley Reservoir SpCond-ORP-pH Profile 8/11/11

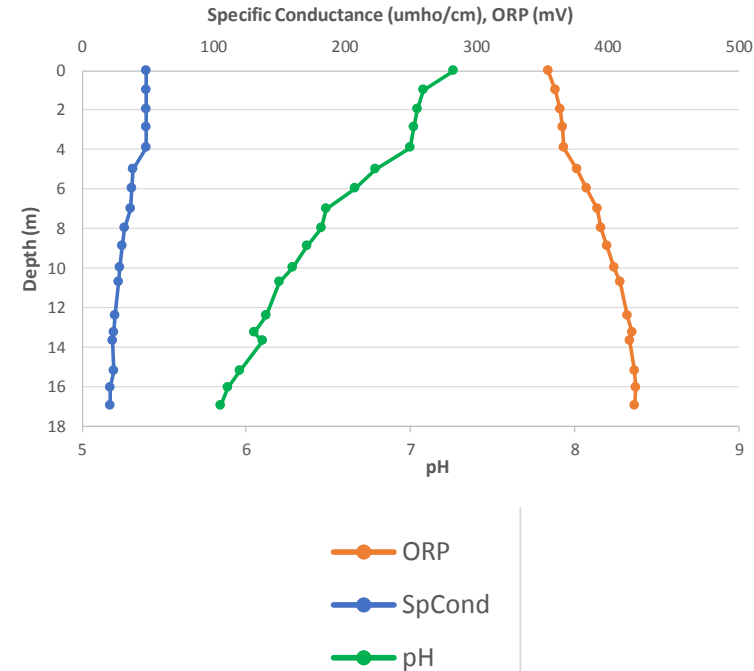


ORP
SpCond
pH

Hinckley Reservoir Temp-DO Profile 9/13/11



Hinckley Reservoir SpCond-ORP-pH Profile 9/13/11



8

9

4.4 Fish and Aquatic Resources (18 C.F.R § 5.6(d)(3)(iv))

This section reviews existing information for the fish and aquatic resources occurring within the vicinity of the Project area. Literature review and information queries conducted to support this section indicated that relatively little fisheries and aquatic resource data has been collected specific to the Project area. Inquiries of NYSDEC fisheries professionals yielded pertinent fisheries resource data, generally with regards to sport fish species (Frank Flack, NYSDEC Region 6, personal communication), while inquiries to USFWS indicated that the Service had no specific information to share regarding fisheries and aquatic resources in the Project area (Steve Patch, USFWS, New York Field Office, Cortland, personal communication).

4.4.1 Historic Fish Community Information

The Mohawk River Basin fisheries were described by NYSDEC (2012) as being in a state of transition, with previously absent or rare species, such as Freshwater Drum (*Aplodinotus grunniens*) and Northern Pike, (*Esox lucius*) having become common in the Mohawk River, and a shift in the Smallmouth Bass (*Micropterus dolomieu*) population to fewer but larger fish (NYSDEC, 2012). NYSDEC (2016a) considers West Canada Creek one of the most renowned trout streams in central New York. That designation primarily applies to the upper reaches where Brook Trout (*Salvelinus fontinalis*) stocking and natural reproduction occurs, and downstream of the Project area where Brown Trout (*Salmo trutta*) are stocked. Additionally, Smallmouth Bass and Fallfish (*Semotilus corporalis*) recreational catches were noted in the lower reaches of West Canada Creek.

In contrast, the conditions of Hinckley Reservoir have been described as not conducive to a good fishery, citing low catch to stocking ratios and the failure of past stocking of Walleye (*Sander vitreus*), Lake Trout (*Salvelinus namaycush*), Brown Trout, Brook Trout, Rainbow Trout (*Oncorhynchus mykiss*), and Tiger Muskellunge (*Esox lucius* x *Esox masquinongy*) to produce more than occasionally good fishing (HRWG, 2008, HOCCP, 1989). Contributing factors, such as seasonal water level fluctuation, sand as the dominant sediment, and low nutrient levels, hardness and conductivity resulted in fish in poor condition relative to similar northeastern waterbodies (HRWG, 2008). Similarly, the Herkimer-Oneida Counties Comprehensive Planning Program (HOCCP) (1989), citing NYSDEC fisheries surveys and anecdotal information, suggested that the quality of Hinckley Reservoir fisheries resources was poor. Referencing a 1935 study (no citation given), HOCCP (1989) noted that, since its creation, Hinckley Reservoir did not have a reputation as a productive fishery and that fish there were stunted due to a lack of food organisms ("snails, aquatic insects and shore inhabiting crustacea are practically absent"). However, their investigation did suggest that, historically, some Brown Trout and Brook Trout were caught near tributaries to Hinckley Reservoir. Other species caught included Chain Pickerel (*Esox niger*), Brown Bullhead (*Ameiurus nebulosus*), Yellow Perch (*Perca flavescens*), and sunfish (*Lepomis* spp).

Reaches of West Canada Creek downstream of the Project area to its mouth appear to be more productive. Prospect Reservoir, located immediately below the Hinckley Dam, was thought to support a more robust fishery than Hinckley Reservoir, with high quality fishing for Chain Pickerel, Brown Trout, and Rainbow Trout reported (HOCCP, 1989). Additionally, in contrast to Hinckley Reservoir, trout stocking was demonstrated through NYSDEC surveys to be successful there. The reasons cited for the contrast between Hinckley Reservoir and Prospect Reservoir included less dramatic water surface elevation fluctuation and the existence of suitable (cobble and stone) substrate.

Twenty-five fish species were identified in a 1976 NYSDEC survey (Hasse, 1977 as cited in [Ichthyological Associates, 1980](#)), supplemented by collections made by Ichthyological Associates (1980) in conjunction

with their incremental instream flow study below the Trenton Hydroelectric Station. The species assemblage was similar to that identified by NYSDEC in surveys conducted from 1988-2010 (see [Section 4.4.3](#)), but with the addition of White Perch (*Morone americana*) and Walleye - species that, along with Common Carp (*Cyprinus carpio*), Logperch (*Percina caprodes*), and Yellow Perch, were attributed to origination in the Mohawk River rather than West Canada Creek.

Ichthyological Associates' ([1980](#)) assessment of instream flow evaluated weighted usable stream width at three reaches, 0.3, 1.6, and 23.3 mi below the Trenton Hydroelectric Station, in response to six levels of discharge (160-D, 160, 200, 250, 300, and 350 cfs). Note that 160-D indicates a discharge of 160 cfs less approximately 75 cfs diverted to the NYS Barge Canal. Target species were three life stages (adult, juvenile, fry) of both Brown Trout and Smallmouth Bass. It was estimated that a minimum release of 160 cfs provided optimum or near optimum flow for each life stage of brown trout examined, and that the minimum flow required to sustain short-term survival habitat for all life stages of brown trout was below the lowest flow studied (160-D). Similarly, minimum flows of 160 cfs provided optimum flow for juveniles, and near optimum flow for fry and adult Smallmouth Bass. Thus, the minimum flow of 160 cfs established for the Jarvis Project in the 1980s is considered important to the maintenance of fisheries in the lower reaches of West Canada Creek ([HRWG, 2008](#)).

With regards to endangered species, in issuing the 1982 license for the Jarvis Hydroelectric Project, FERC ([1982](#)) noted that "USFWS has stated that except for occasional transient species, no Federally-listed or proposed threatened or endangered species are known to exist in the project impact area".

4.4.2 Hinckley Reservoir Fisheries Resources

Over the past 27 years, NYSDEC⁸ has conducted six fisheries surveys in Hinckley Reservoir ([Table 4.4.2-1](#), [Figure 4.4.2-1](#)). Mean total length of fish species collected in Hinckley Reservoir by NYSDEC are included in [Table 4.4.2-2](#). Those surveys generally targeted game fish species and primarily used gillnet techniques, including experimental gillnets with a wide range of mesh sizes, as appropriate for the habitat and objectives. Although boat electrofishing was conducted at four stations during a 2009 survey, it is not clear whether the fish community was fully represented in those collections. Some of the studies were directed toward specific fisheries management activities, but resulted in valuable general fisheries data. For example, the survey conducted in 1994 was reportedly done to document the presence of Tiger Muskellunge, a usually sterile hybrid of Northern Pike and Muskellunge (*Esox masquinongy*) stocked to Hinckley Reservoir during the late 1980's. No Tiger Muskellunge were captured, but species assemblage data was collected that suggested no appreciable change to the fish community relative to previous surveys.

A survey conducted in 2009 was completed to collect fish for the USFWS National Wild Fish Health Survey. From those collections, 60 Yellow Perch and 28 Smallmouth Bass were contributed by NYSDEC to the fish health survey. Pathogens which were tested for included three bacteria: *Aeromonas salmonicida*, the cause of furunculosis; *Edwardsiella ictaluri*, the cause of enteric septicemia; *Yersinia ruckeri*, the cause of enteric redmouth disease; and five viruses: infectious pancreatic necrosis virus (IPNV), infectious hematopoietic necrosis (IHNV), viral hemorrhagic septicemia (VHSV), Largemouth Bass virus (LMBV), and spring viremia of carp virus (SVCV), Largemouth Bass only, ([Heil, 2009](#), William Quartz, USFWS, personal

⁸ NYSDEC fisheries survey data provided by Frank Flack, NYSDEC, Region 6.

communication). A query of the National Wild Fish Health Survey database revealed that none of those samples tested positive for any of the pathogens tested ([USFWS, 2009](#)).

In addition to naturally reproducing fish populations, considerable effort has been exerted by NYSDEC to establish and enhance the trout fishery in Hinckley Reservoir. From 2011 through 2015, a reported 43,685 trout were stocked in Hinckley Reservoir, including 41,500 Rainbow Trout, 1,790 Brown Trout, and 395 Brook Trout ([Table 4.4.2-3](#)). In comparison, 72,220 trout were stocked during the same period in the upper West Canada Creek watershed upstream of the Project area.

Several surveys were conducted in West Canada Creek in reaches immediately upstream of (in the vicinity of the town of Ohio, NY) ([Figure 4.4.2-2](#)) and downstream of the Project area (to the mouth of West Canada Creek), including one survey conducted in Prospect Reservoir in 2009 ([Figure 4.4.2-3](#)). Those studies were conducted for various purposes, including general species assemblage data collection, and purposive studies, such as informing the trout stocking program (catch rate oriented trout stocking, CROTS). In contrast to Hinckley Reservoir surveys, studies conducted in other reaches of West Canada Creek used multiple techniques, including electrofishing and seine netting ([Table 4.4.2-4](#)). As a result, direct comparison between Hinckley Reservoir and other reaches of West Canada Creek would not be valid. However, species occurrences in those surveys are included here to provide background and include the best available data. Within Hinckley Reservoir, 14 species representing 7 families were collected. Upstream of the Project area, 13 species representing 6 families were collected, and downstream of the Project area, 32 species representing 9 families were collected ([Table 4.4.2-5](#)).

4.4.3 Fisheries Resources Downstream of Hinckley Dam

No specific information is known to be available concerning fisheries resources in the Project area below Jarvis Station, which extends only 0.3 mi to the Prospect Reservoir boundary. The NYSDEC Division of Water ([NYSDEC, 2016f](#)) categorized the middle mainstem of West Canada Creek (from Prospect to Hinckley Reservoir) as an impaired segment with regards to aquatic life and habitat/hydrology. A known source of impairment was identified as hydro modification or alteration to the natural flow regime, and suspected sources were identified from atmospheric deposition. Fisheries resources were reportedly affected by, among other factors, the effect of multiple dams on the stream restricting fish migration. Only one recent fishery survey has been conducted within Prospect Reservoir, and it was limited to four sites sampled with gillnets (Frank Flack, NYSDEC, personal communication, [Table 4.4.2-4](#), [Figure 4.4.3-1](#)). In it, only one each of three species - Golden Shiner (*Notemigonus crysoleucas*), White Sucker (*Castostomus commersonii*), and Smallmouth Bass - was collected.

Prospect Reservoir is stocked with brown trout by NYSDEC to sustain the trout fishery there ([HRWG, 2008](#), [Table 4.4.2-3](#)). In West Canada Creek from Trenton Falls to Herkimer, NYSDEC spends about \$75,000 annually to stock 50,520 Brown Trout, providing fishing opportunities for approximately 52,000 anglers ([HRWG, 2008](#)). More information is available regarding further downstream reaches, with emphasis on the reaches below Trenton Hydroelectric Station. Surveys conducted by NYSDEC in downstream reaches (from Prospect Reservoir to the mouth of West Canada Creek) between 1988 and 2009 resulted in collections of 30 species representing 9 families ([Table 4.4.2-5](#)).

4.4.4 Aquatic Habitat

Data regarding aquatic habitat within the Project area was limited. HOCCP ([1989](#)), referencing Hinckley Reservoir substrate composition, concluded that the unstable sand-dominant substrate, coupled with

shallow reservoir depths, was susceptible to constant shifting resulting in inadequate fish and aquatic plant habitat. The middle mainstem of West Canada Creek downstream of Hinckley Dam was categorized as an impaired segment with regards to aquatic life and habitat/hydrology, indicating the known sources of impairment to be hydro modification and suspected sources from atmospheric deposition ([NYSDEC, 2016a](#)).

4.4.5 Rare, Threatened, and Endangered Fish Species

The list of documented species occurring in the Project area and in West Canada Creek above and below the Project area ([Table 4.4.2-5](#)) was cross-checked against the list of endangered, threatened and special concern fish and wildlife species of New York State ([NYSDEC, 2016a](#)), the New York Natural Heritage Program's Rare Animal Status List ([NYNHP 2014](#)), the USFWS Environmental Conservation Online System ([USFWS, 2016a](#)), and NatureServe ([2016](#)). No fish species listed as endangered, threatened, or of special concern are known to occur within the study area or adjacent reaches.

4.4.6 Recreational Fishery

Recreational fisheries within the Project area fall within the jurisdiction of NYSDEC's Region 6. Open water and ice fishing is permitted on Hinckley Reservoir ([NYSDEC, 2016c](#)), with a special-regulation trout season that is open all year with a bag limit of three trout that are at least 12 inches long. Little information was found regarding the popularity of recreational fisheries specifically within the Project area, though the first annual ice fishing derby was held on Hinckley Reservoir in February 2015 by the Adirondack Foothills Rotary.

Statewide angler surveys conducted during 2007 found that NYSDEC Region 6 received more than 2.6 million angler days overall ([Connelly & Brown, 2009a](#)). The estimated number of angler days invested in West Canada Creek was 97,873 (95% confidence interval, CI = $\pm 25,946$). Angler at-location expenditures were \$3,340,667 (CI = $\pm 1,655,644$) in Herkimer County and \$5,963,461 (CI = $\pm 1,454,153$) in Oneida County. Trout (Brook, Brown, Rainbow trout), black bass (Largemouth, *Micropterus salmoides*, and Smallmouth bass), Lake Trout, Bluegill (*Lepomis macrochirus*), sunfish, Walleye, and Yellow Perch were the most sought-after species by anglers in Herkimer and Oneida Counties, collectively ([Connelly & Brown, 2009b](#)). Angler effort and expenditures attributable to the Project area could not be differentiated from West Canada Creek and the counties through which it runs as a whole. However, the presence of black bass, trout, Yellow Perch, and sunfish in Hinckley Reservoir, as evidenced by the NYSDEC survey data, suggests the potential for those fisheries there, and therefore some proportion was presumably attributable to the Project area.

A recreational fishery survey was conducted between April 1 and October 4, 2007 on West Canada Creek between Trenton Falls and Herkimer ([Erway, 2012](#)). In it, angler effort was estimated to be 14,942 hours overall, which translated to 20 angler-hours/acre. The reaches from Trenton Falls to Newport were found to experience the greatest angling pressure. Angler perception that more trout are available in and around a catch and release managed section of the stream was presented as a likely contributing factor. Between April 14 and June 6, 2007, 42,770 Brown Trout were stocked in the study area of West Canada Creek. The estimated catch was 7,639 trout with an overall catch rate of 0.47 fish/hour. Estimated overall catch was 17.9% of the number of trout stocked.

4.4.7 Benthic Macroinvertebrates

There are no known studies of the benthic macroinvertebrate community in the Project area. However, the Hinckley Reservoir Working Group noted that on September 26, 2007, NYSDEC biologists found thousands of stranded and dehydrated snails that had died in Hinckley Reservoir as the result of low water levels. They concluded that snail mortality may impact the ecosystem by impacting the food source for fish, crayfish, and birds, etc. that may prey upon the snails, and by reducing the snail population's capacity to control algae growth through grazing ([HRWG, 2008](#)). It should be noted, however, that no evaluations of these hypothesized ecological effects were found.

Beginning in 1972, NYSDEC Division of Water has based their statewide water quality analyses on macroinvertebrate community monitoring ([Bode et al., 2004](#)). Although their sampling did not include stations within the Project area, they sampled at sites within West Canada Creek, including just upstream of Hinckley Reservoir at Harvey Bridge Road and downstream of Trenton Falls at Poland in 2000. In terms of water quality, those sites were listed as non-impacted based on macroinvertebrate communities, with no prior data for change assessment. The non-impacted designation reflects very good water quality with a diverse macroinvertebrate community and, among other indices, usually at least 27 species in riffle habitats; mayflies, stoneflies, and caddisflies well represented; and EPT⁹ (index values greater than 10).

In 2006, a biological (macroinvertebrate) survey of West Canada Creek was conducted at multiple sites from the mouth in Herkimer to Nobleboro as part of the RIBS (rotating integrated basin studies) Intensive Network monitoring. Sampling results indicated non-impacted conditions at all sites except the most upstream site in Nobleboro, where indices fell to slightly impacted. Survey sites included Harvey Bridge Road, which, as in 2000, was assessed as having non-impacted water quality ([NYSDEC, 2016b](#)).

4.4.8 Mussels

In the Mohawk River Basin Action Agenda, freshwater mussels were recognized as one of the most imperiled groups of species in the Mohawk River watershed ([NYSDEC, 2012](#)). Specifically, they noted that "West Canada Creek was historically home to mussel species that are currently in decline", though no species or sources were referenced. Unionid mussels are sedentary organisms that are relatively immobile. They spend most of their lives living in the sediments of streams, rivers, ponds, and lakes ([Allen & Vaughn, 2010](#)). Unionids require a fish host to complete their life cycle. Many species of unionids are sex-differentiated, but some are hermaphroditic and may self-fertilize ([Dunn, 2000](#)). Once fertilized, the female adults release tiny parasitic larvae, known as glochidia, into the water column. The parasitic larvae require a specific host (typically fish) to attach to and continue development. The larvae attach to gills and/or fins of the host fish where they become blood parasites for a period before transforming into juveniles that then release from the host fish and fall onto the substrate where they grow into adults. The intermediate fish host is integral to the dispersal and survival of unionids in the systems in which they live.

There are no known records on file of unionid collections or observations listed in the NYSDEC Natural Heritage database for the West Canada Creek drainage basin and Hinckley Reservoir (personal communication, Lisa Holst, NYSDEC, via telephone call from Joe Snively, Normandeau Associates, November 8, 2016). Review of a NYSDEC spatial database confirmed that there are no mussel records for the West Canada Creek basin (personal communication, Matthew D. Schlesinger, New York Natural Heritage Program, via email to Joe Snively, Normandeau Associates, November 14, 2016), suggesting

⁹ EPT stands for Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies), three taxa of aquatic macroinvertebrates that are intolerant to pollution and poor water quality.

that no surveys have been conducted. Additionally, a review of existing literature did not indicate any unionid records from the West Canada Creek drainage basin or Hinckley Reservoir ([Strayer & Jirka, 1997](#)). However, 10 species were recorded from the Erie Canal and Mohawk River drainages including one species, Eastern Floater (*Pyganodon cataracta*), in close proximity to the Hinckley Reservoir ([Table 4.4.8-1](#)).

Based on unionid records in adjacent basins and the presence of an appropriate fish host species within the West Canada Creek drainage, it is possible that unionids are present within the West Canada Creek, including Hinckley Reservoir, but have not been documented to date. Eastern Elliptio (*Elliptio complanata*) and Eastern Floater are the two species that are most common and for which fish host species have been identified in fishery surveys of Hinckley Reservoir (see [Section 4.4.2](#)), therefore making them most likely to occur in West Canada Creek. Eastern Elliptio habitat includes lotic systems, tidewater systems, ponds, and lakes. Substrate preference of Eastern Elliptio includes sand, clay, gravel, and cobble. The only habitat this species seems not to prefer is deep unconsolidated (liquid) silt and boulder/bedrock ([Lellis et al., 2013](#); [Nedean et al., 2000](#)). Eastern Elliptio is a short-term brooder in early spring and releases its glochidia later in the summer. Fish hosts are reported to be American Eel (*Anguilla rostrata*), Brook Trout, Lake Trout, and Sculpins (*Cottus* spp.). The Eastern Floater is also a habitat generalist found in a variety of habitats in fine substrates that include sand, clay, and mud. It usually inhabits slow-moving water bodies including eddies, ponds and lakes. This species is able to tolerate deeper silt; however, unconsolidated silts of significant depths can be limiting. Eastern Floater is a long-term brooder that becomes fertilized in the late summer and releases its glochidia the following spring. Fish hosts are reported to be White Suckers, Common Carp, Threespine Stickleback (*Gasterostus aculeatus*), sunfish (*Lepomis* spp.), and Yellow Perch ([Lellis et al., 2013](#); [NatureServe, 2016](#)).

4.4.9 Ichthyoplankton and Zooplankton

There are no known studies assessing ichthyoplankton / zooplankton communities in the Project area. HOCCP ([1989](#)) noted that Hinckley Reservoir fisheries were not productive, and that fish there were stunted due to lack of food organisms. They attributed this to seasonal reservoir water level fluctuations and short reservoir retention time, suggesting that flushing prevents nutrient accumulation and acts as a bottom-up trophic control.

Table 4.4.2-1: Summary of New York State Department of Environmental Conservation Fisheries Surveys Conducted in Hinckley Reservoir 1989-2014¹⁰

Survey No.	Date	Purpose	Sites (N)	Gear	Avg. Effort (hr/100 ft.) ¹¹	Comment
689213	8/24/89	general biological survey	3	gillnet: 150x6 ft., multifilament, experimental, 6 panel (1.0, 1.5, 2.0, 2.5, 3.0, 3.5 in. mesh)	29.21	site coordinates presented as a single point in the approximate centroid of lake
691101	5/16/91	experimental Brown Trout stocking evaluation	5	gillnet: 100 ft., multifilament, (2.0, 2.5, 3.0 in. mesh)	23.17	site coordinates presented as a single point in the approximate centroid of lake
691117	9/10/91	experimental Brown Trout stocking evaluation	5	gillnet: 100 ft., multifilament, (1.5 and 2.0 in. mesh)	21.37	site coordinates presented as a single point in the approximate centroid of lake; reservoir elevation down ~20 ft.
694203	6/20/94-6/23/94	general biological survey	20	gillnet: 150x6 ft., multifilament, experimental, 6 panel (1.0, 1.5, 2.0, 2.5, 3.0, 3.5 in. mesh)	30.76	attempt to document presence of Tiger Muskies from surplus stocking during late 1980's
609001	6/1/09-6/2/09	fish disease sampling	5	gillnet: 150x6 ft., monofilament, 6 panel (1.5, 2.0, 2.5, 3.0, 3.5 in. mesh);	22.40	60 Yellow Perch and 28 Smallmouth Bass sent to USFWS Northeast Fish Health Center, Lamar, PA for National Wild Fish Health survey
			4	150x6 ft., multifilament, experimental, 6 panel (1.0, 1.5, 2.0, 2.5, 3.0, and 3.5 in. mesh); boat electrofisher	0.25	
614202	6/27/14	TSMP1/Contaminant collection	5	gillnet: 150x6 ft., monofilament, 6 panel (1.5, 2.0, 2.5, 3.0, and 3.5 inch mesh)	29.63	

¹⁰ Timeframe listed indicates the period for which data was available from NYSDEC

¹¹ gillnet lengths were 100 or 150 ft; effort is standardized here to hours of set per 100 ft of net

Table 4.4.2-2: Summary of Catch (N) with Mean and Range of Total Length (mm) by Year (Survey) and Species Collected in NYSDEC Fisheries Surveys Conducted in Hinckley Reservoir, 1989-2014

Fish Species	Survey/Year					
	1989	1991, Spring	1991, Summer	1994	2009	2014
Golden Shiner	3 404.7 186-550	0	26 246 (1 measured)	103 170.5 102-296	10 160.3 72-203	0
Fallfish	0	2 255.5 245-266	2 243.5 233-254	17 165.5 120-191	30 219.9 126-414	0
White Sucker	6 254.8 213-305	30 316 280-395	23 295.6 233-380	123 320.3 178-425	43 350.9 163-430	13 305 161-417
Brown Bullhead	0	3 224 219-228	36 181 140-220	28 192.5 146-240	7 275.1 254-312	0
Stonecat	0	0	0	2 131 114-148	0	0
Chain Pickerel	3 404.7 186-550	0	0	1 572 -	3 578 526-612	0
Brown Trout	0	1 360 -	0	0	0	0
Brook Trout	0	0	0	2 519 418-620	0	1 216 -
Rock Bass	0	6 210.5 173-242	14 168 102-245	15 153.9 116-211	7 195 161-221	0
Pumpkinseed	0	0	17 144.7 102-191	10 157 118-196	0	0
Smallmouth Bass	0	0	2 195 180-210	0	13 341.7 237-442	4 350.5 272-406
Largemouth Bass	0	0	0	1 362 -	0	0

Fish Species	Survey/Year					
	1989	1991, Spring	1991, Summer	1994	2009	2014
Black Crappie	0	0	0	0	0	7 156.3 150-166
Yellow Perch	2 130 128-132	5 196.6 174-230	160 205.4 150-230	281 156 95-284	61 132.5 56-204	7 195.1 157-243

Table 4.4.2-3: NYSDEC Fish Stocking Summary (including regular and surplus fish stocking) for West Canada Creek above Hinckley Reservoir, Hinckley Reservoir, and Prospect Reservoir, 2011-2016

Reach	Species	2011	2012	2013	2014	2015	Totals
Above Hinckley Reservoir	Brook Trout	9,820	20,180	10,500	10,500	6,900	57,900
	Brown Trout	2,880	6,040	2,470	2,930		14,320
	Totals	12,700	26,220	12,970	13,430	6,900	72,220
Hinckley Reservoir	Brook Trout	230	0	165	0	0	395
	Brown Trout	490	0	300	1,000	0	1,790
	Rainbow Trout	14,000	13,500	5,000	4,000	5,000	41,500
	Totals	14,720	13,500	5,465	5,000	5,000	43,685
Prospect Reservoir	Brook Trout	0	0	0	0	0	0
	Brown Trout	2,870	3,020	2,470	2,930	2,910	14,200
	Rainbow Trout	0	0	0	0	6,760	6,760
	Totals	2,870	3,020	2,470	2,930	9,670	20,960

Table 4.4.2-4: Summary of NYSDEC Fisheries Surveys Conducted in West Canada Creek Upstream and Downstream of the Jarvis Station Project Area, 1988-2010

Reach	Survey No.	Date	Purpose	Sites (N)	Location	Gear	Avg. Effort
Upstream of Project Area	606958	7/6/2006	General biological survey	1	Ohio	Electrofish: 2 repetitions	0.40 hr
	606958	7/6/2006	General biological survey	1	Ohio	Seine: 7 repetitions	0.17 hr
	608916	7/1/2008	General biological survey	1	Ohio ¹²	Electrofish	0.25 hr
	608932	9/3/2008	General biological survey	1	Ohio	Electrofish: 2 repetitions	0.04 hr
	608932	9/22/2008	General biological survey	2	Ohio	Electrofish: 3 repetitions (at 1 of 2 sites)	0.33 hr
	608932	9/22/2008	General biological survey	1	Ohio	Seine: 1 repetition	0.25 hr
	609207	10/21/2009	General biological survey	4	Prospect Reservoir	Gill Net: 150 ft x 6 ft; 5 ft panels, 1.5, 2.0, 2.5, 3, 3.5, 4.0 in. mesh	25.55 hr/100 ft.
Downstream of Project Area	688202	7/28/1988	Stream protection	1	Newport	Electrofish: 3 repetitions	0.30 hr
	690212	8/21/1990	Stream protection	1	Newport	Electrofish: 3 repetitions	0.38 hr
	696511	7/26/1996	CROTS survey	1	Newport	Electrofish:	0.27 hr
	696510	7/26/1996	CROTS survey	1	Newport	Electrofish: 2 repetitions	0.28 hr
	604909	5/19/2004	General biological survey	1	Herkimer	Electrofish:	0.29 hr
	608932	9/25/2008	General biological survey	1	Newport	Electrofish: 2 repetitions	0.25 hr
	610204	6/7/2010	General biological survey	3	Russia ¹³	Electrofish:	0.50 hr

¹² survey conducted in Fourmile Brook within 200 m of West Canada Creek

¹³ survey conducted in Mill Creek within 200 m of West Canada Creek

Table 4.4.2-5: Occurrence of fish species in NYSDEC Fisheries Surveys, 1988-2014 in West Canada Creek (including two tributary surveys in close proximity) Upstream of the Project Area, within the Project Area (Hinckley Reservoir), and Downstream of the Project Area

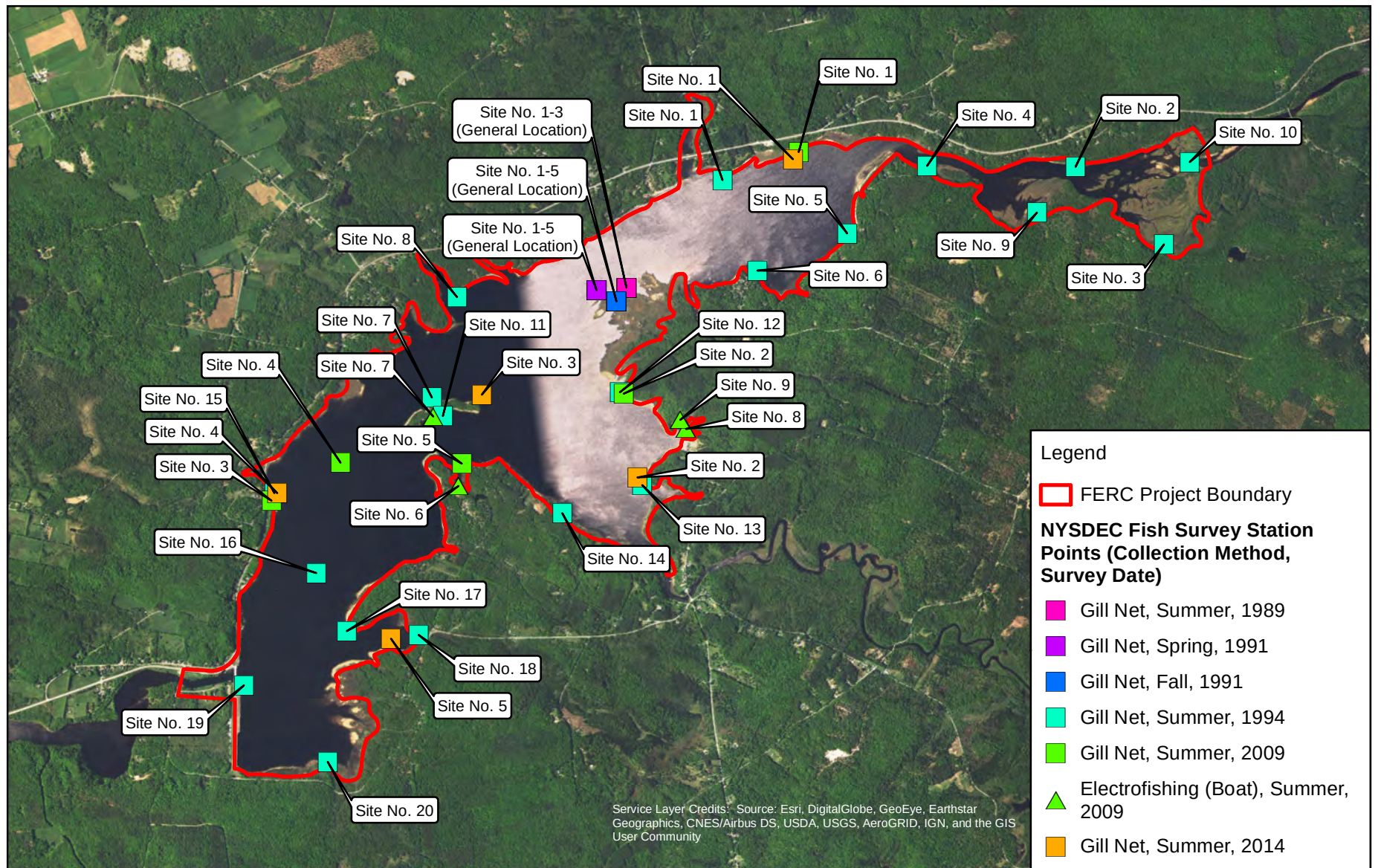
Common Name	Family	Genus and Species	Authority	Upstream of Project Area	In Project Area	Downstream of Project Area
American Eel	Anguillidae	<i>Anguilla rostrata</i>	Lesueur, 1817			X
Central Stoneroller	Cyprinidae	<i>Campostoma anomalum</i>	Rafinesque, 1820			X
Common Carp	Cyprinidae	<i>Cyprinus carpio</i>	Linnaeus, 1758			X
Cutlip Minnow	Cyprinidae	<i>Exoglossum maxillingua</i>	Lesueur, 1817	X		X
Common Shiner	Cyprinidae	<i>Luxilus cornutus</i>	Mitchill, 1817	X		X
Golden Shiner	Cyprinidae	<i>Notemigonus crysoleucas</i>	Mitchill, 1814	X	X	X
Emerald Shiner	Cyprinidae	<i>Notropis atherinoides</i>	Rafinesque, 1818			X
Spottail Shiner	Cypinidae	<i>Notropis hudsonius</i>	Clinton, 1824			X
Rosyface Shiner	Cyprinidae	<i>Notropis rubellus</i>	Agassiz, 1850			X
Bluntnose Minnow	Cyprinidae	<i>Pimephales notatus</i>	Rafinesque, 1820			X
Eastern Blacknose Dace	Cyprinidae	<i>Rhinichthys atratulus</i>	Hermann, 1804	X		X
Longnose Dace	Cyprinidae	<i>Rhinichthys cataractae</i>	Valenciennes, 1842	X		X
Creek Chub	Cyprinidae	<i>Semotilus atromaculatus</i>	Mitchill, 1818	X		X
Fallfish	Cyprinidae	<i>Semotilus corporalis</i>	Mitchill, 1817		X	X
Longnose Sucker	Catostomidae	<i>Catostomus catostomus</i>	Forster, 1773			X
White Sucker	Catostomidae	<i>Castostomus commersonii</i>	Lacepède, 1803	X	X	X
Northern Hogsucker	Catostomidae	<i>Hypentelium nigricans</i>	Lesueur, 1817	X		X
Brown Bullhead	Ictaluridae	<i>Ameiurus nebulosus</i>	Lesueur, 1819	X	X	X
Stonecat	Ictaluridae	<i>Noturus flavus</i>	Rafinesque, 1818		X	X
Margined Madtom	Ictaluridae	<i>Noturus insignis</i>	Richardson, 1836			X
Chain Pickerel	Esocidae	<i>Esox niger</i>	Lesueur, 1818		X	
Brown Trout	Salmonidae	<i>Salmo trutta</i>	Linnaeus, 1758	X	X	X
Brook Trout	Salmonidae	<i>Salvelinus fontinalis</i>	Mitchill, 1814	X	X	X
Trout-Perch	Percopsidae	<i>Percopsis omiscomaycus</i>	Walbaum, 1792			X
Brook Stickleback	Gasterosteidae	<i>Culaea inconstans</i>	Kirtland, 1840	X		

Common Name	Family	Genus and Species	Authority	Upstream of Project Area	In Project Area	Downstream of Project Area
Slimy Sculpin	Cottidae	<i>Cottus cognatus</i>	Richardson, 1836			X
Rock Bass	Centrarchidae	<i>Ambloplites rupestris</i>	Rafinesque, 1817		X	X
Pumpkinseed	Centrarchidae	<i>Lepomis gibbosus</i>	Linnaeus, 1758		X	X
Bluegill	Centrarchidae	<i>Lepomis macrochirus</i>	Rafinesque, 1819			X
Smallmouth Bass	Centrarchidae	<i>Micropterus dolomieu</i>	Lacepède, 1802		X	X
Largemouth Bass	Centrarchidae	<i>Micropterus salmoides</i>	Lacepède, 1802		X	X
Black Crappie	Centrarchidae	<i>Pomoxis nigromaculatus</i>	Lesueur, 1829		X	
Yellow Perch	Percidae	<i>Perca flavescens</i>	Mitchill, 1814		X	
Fantail Darter	Percidae	<i>Etheostoma flabellare</i>	Rafinesque, 1819			X
Tessellated Darter	Percidae	<i>Etheostoma olmstedii</i>	Storer, 1842	X		X
Logperch	Percidae	<i>Percina caprodes</i>	Rafinesque, 1818			X

Table 4.4.8-1: Unionid mussel records for Erie Canal and Mohawk River drainage, New York

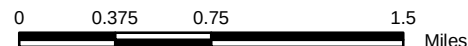
Species	Common Name	Federal Status	NY Status ¹⁴
Subfamily Ambleminae			
Elliptio complanata	Eastern Elliptio	-	-
Subfamily Anodontinae			
Alasmidonta marginata	Elktoe	-	-
Alasmidonta undulata	Triangle Floater	-	T
Anodontoides ferrussacianus	Cylindrical Papershell	-	-
Lasmigona compressa	Creek Heelsplitter	-	-
Lasmigona subviridis	Green Floater	-	T
Pyganodon cataracta	Eastern Floater	-	-
Pyganodon grandis	Giant Floater	-	-
Strophitus undulatus	Creeper	-	-
Subfamily Ambleminae			
Fusconia flava	Wabash Pigtoe	-	T
Total	10	0	3

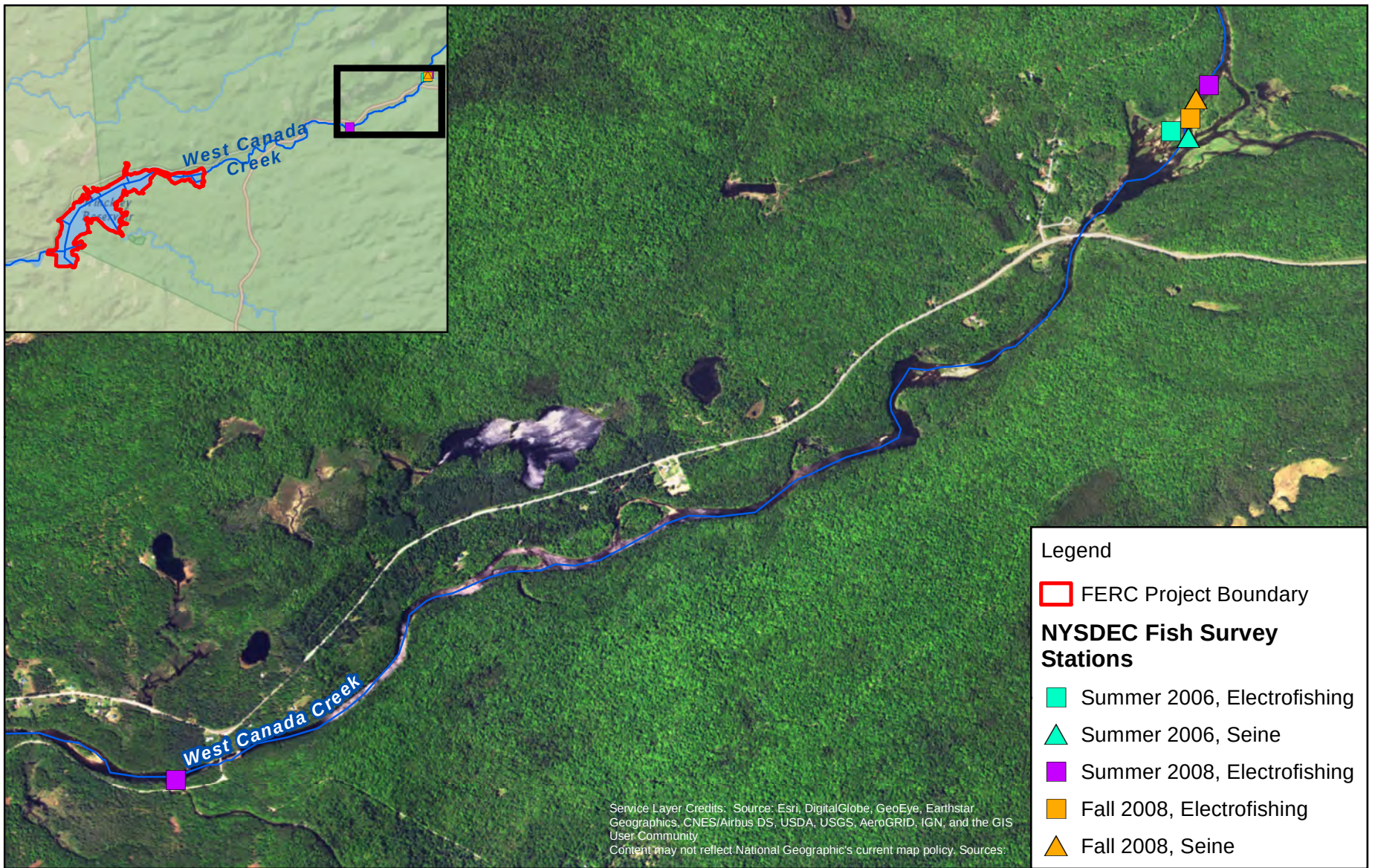
¹⁴ source: (Stayer, 1997), E = endangered; T = threatened; PT = proposed threatened



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.4.2-1:
New York State Department of
Environmental Conservation
Fishery Survey Sites, Hinckley Reservoir
1989 - 2014





Legend

FERC Project Boundary

NYSDEC Fish Survey Stations

Summer 2006, Electrofishing

Summer 2006, Seine

Summer 2008, Electrofishing

Fall 2008, Electrofishing

Fall 2008, Seine

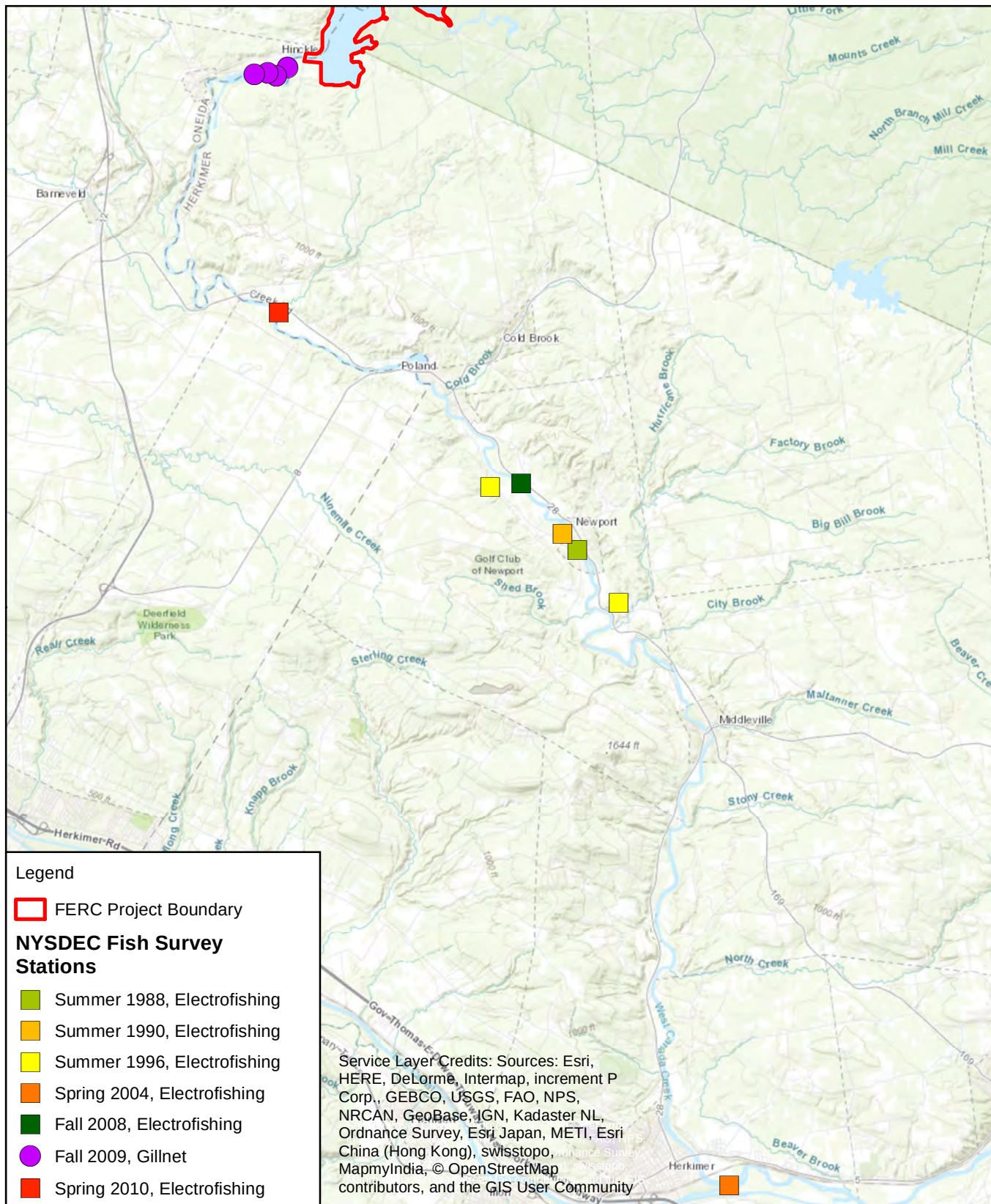


Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document



0 1,000 2,000 4,000
Feet

Figure 4.4.2-2:
New York State Department of Environmental
Conservation Fishery Survey Site Locations,
West Canada Creek Upstream
of the Jarvis Project area, 1988-2010.



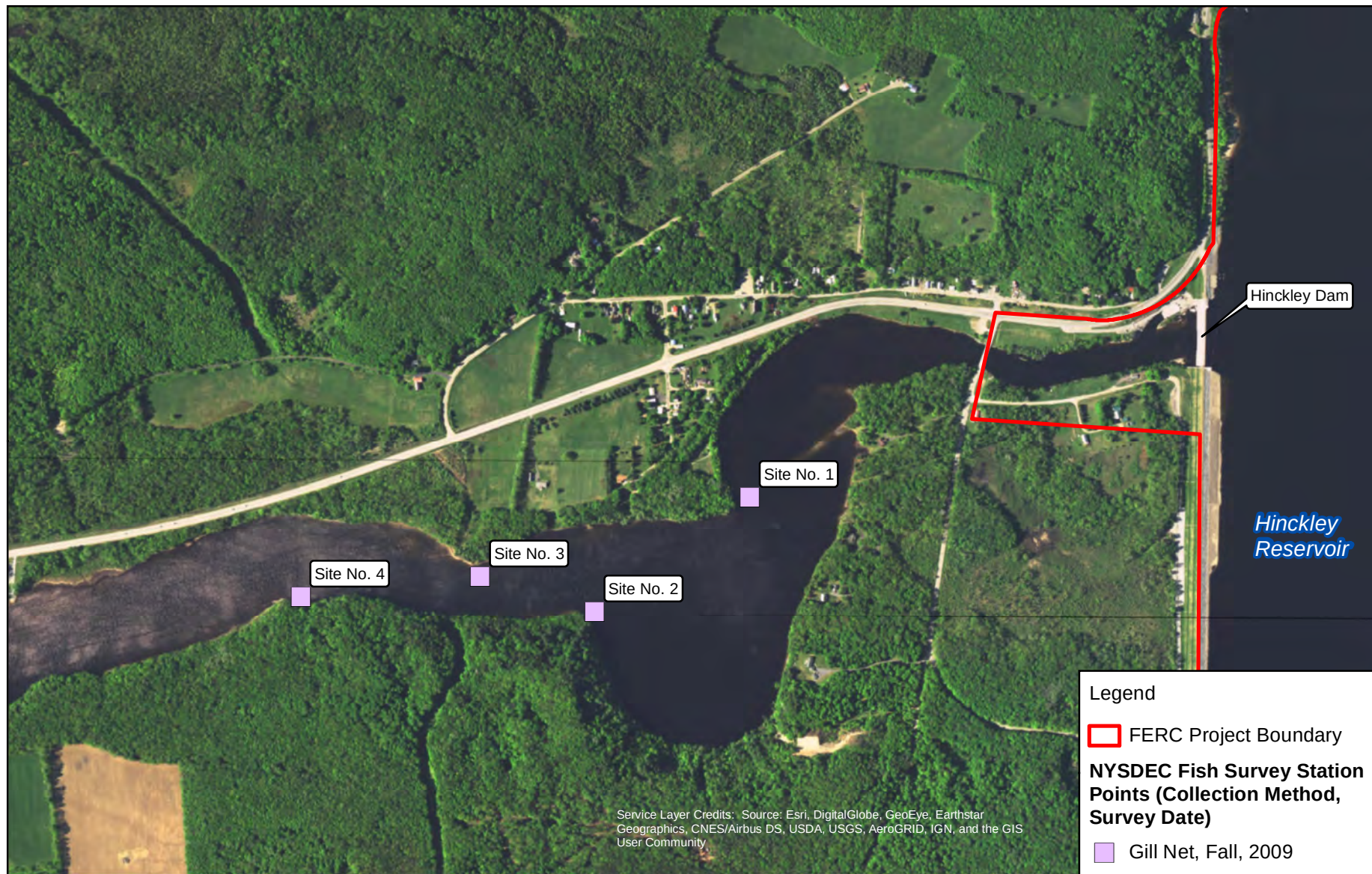
©Copyright 2017
New York Power Authority. All Rights Reserved

Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

0 1.25 2.5 5
Miles



Figure 4.4.2-3:
New York State Department of
Environmental Conservation Fishery
Survey Site Locations, West Canada
Creek Downstream of the Jarvis
Project area, 1988-2010.



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

0 500 1,000 2,000 Feet

Figure 4.4.3-1:
New York State Department of
Environmental Conservation
Fishery Survey Sites, Prospect Reservoir
2009

4.5 Wildlife and Botanical Resources (18 C.F.R § 5.6(d)(3)(v))

4.5.1 Regional Setting

The Jarvis Project is located in the southwestern foothills of the Adirondack Mountains. From a regional perspective, the Project is located at the transition of ecoregions, which are defined as areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar ([Bryce, et al., 2010](#)). To its north and east, the Project is located in the U.S. EPA Level IV ecoregion Northern and Western Adirondack Foothills. This area marks the change from more erodible shale and limestone in the Mohawk, Black, and St. Lawrence River valleys to the more resistant rocks of the Adirondack Mountains. The northern foothills rise slowly from 1000 to 1600 feet over 20 to 25 miles before meeting the higher hills and mountains of the Central Adirondacks. The water table is high, and many wetlands fill depressions in the outwash channels. In the west and southwest, the band of foothills is narrow, and elevations decline more quickly into the Black and Mohawk River valleys. Spruce was a dominant tree species in this region, but it was favored by early loggers, and most of the region is covered with second growth hardwood forests today. Natural vegetation in this ecoregion is described as being dominated by second growth northern hardwoods such as sugar maple, beech, black cherry, and yellow birch, with significant amounts of white pine in western foothills and in northern outwash areas.

The southwest areas of the Project are located in the Mohawk Valley ecoregion. The valley is underlain by limestone and shale dipping somewhat to the south away from the Adirondack Mountains. The Mohawk Valley, although broad, is irregular and hilly, and the flat Mohawk River floodplain is quite narrow in places. Canal building, channelization, and highway and railroad construction have affected the pattern and structure of the river's natural meanders and wetlands. Natural vegetation in this ecoregion includes sugar maple and beech-dominated forests on moist, fine-textured soils. Hemlock may be present in low numbers. Common shrubs include witch-hazel and hobblebush.

4.5.2 Upland Botanical Resources

As shown in [Figure 3.2-1](#), the Project Boundary follows the shoreline of Hinckley Reservoir at the normal pool elevation of 1225 feet. Downstream of the dam, the Project Boundary generally only encompasses the Project facilities and river before terminating approximately 0.3 miles downstream of the dam at the Hinckley Road Bridge. Given that the Project Boundary encircles the Hinckley Reservoir, there is limited upland habitat for botanical resources or terrestrial wildlife within the Project Boundary. Upland botanical resources are described based on the dominant vegetative community types adjacent to the reservoir.

Upland habitats adjacent to the Hinckley Reservoir were determined based on the Northeast Terrestrial Habitat Map ([Ferree and Anderson, 2013](#)), which is a continuous, GIS coverage that maps upland wildlife habitats and ecological systems for the Northeast. The ecological systems represented in this data coverage are mosaics of plant community types that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients.

The dominant terrestrial habitat adjacent to the Hinckley Reservoir is the Laurentian-Acadian Northern Hardwood Forest. This habitat is described as a hardwood forest dominated by sugar maple, American beech, and yellow birch. Hemlock and red spruce are frequent but minor canopy associates. Paper birch, red maple, poplar, and white pine are common in successional stands. In NY, this natural community is referred to as a Beech-Maple Mesic Forest and is described as occurring on moist, well drained, usually acid soils. There are many spring ephemerals that bloom before the canopy trees leaf out. A few red spruce may also be present in the Adirondacks.

Another common terrestrial habitat adjacent to the reservoir includes Pine-Hemlock-Hardwood Forest, a coniferous/mixed forest widespread in the glaciated Northeast. Tree species include white pine, hemlock, and red oak as typical canopy dominants. Red maple is common, and other hardwoods like sugar maple, beech, and birch also occur. In NY, the natural community is referred to as a Pine-Northern Hardwood Forest. Pine-Northern Hardwood Forests in New York are often characterized by an emergent canopy of white pines that overtop a mixed forest of white and/or red pine with northern hardwood species such as red maple, red oak, paper birch, and yellow birch. Blueberries are characteristic shrubs, bracken fern is a common herb, and mosses and lichens may be common. Botanical resources commonly found in these forests are listed in [Table 4.5.2-1](#).

There are also terrestrial land areas adjacent to the Hinckley Reservoir comprised of anthropogenic habitats, including developed land, roads and park areas. Adjacent wetlands are discussed in [Section 4.6](#).

Invasive Plant Species

Invasive species are defined by NYSDEC as non-native species that can cause harm to the environment, the economy, or to human health. The Project is located at the intersection of three New York State regional invasive species management partnership areas, including the Capital Mohawk, the St. Lawrence & Eastern Lake Ontario, and the Adirondack Park Invasive Plant Program (APIPP). These partnerships, known as PRISMs (Partnerships for Regional Invasive Species Management), maintain databases and maps of the distribution of target aquatic and terrestrial invasive species in their regions. This map (<http://www.nyimainvasives.org/>) was searched for the occurrence of invasive plant species within the vicinity of the Hinckley Reservoir.

There are four invasive plant species that have been identified by the PRISMs that were found in the vicinity of the Project area ([Table 4.5.2-2](#)); all occurrences were found along adjacent roads. The species found include common reed, purple loosestrife, and garlic mustard which are fairly common and established in New York State. Also found was giant hogweed (*Heracleum mantegazzianum*), which was confirmed in 2013 along Route 365 north of the Hinckley Reservoir. Giant hogweed is a biennial herb that has a dangerous sap, which can displace native plants and worsen erosion problems. The sap causes severe skin blistering and scarring ([APIPP, 2016a,b](#)).

Hinckley Reservoir is listed as an uninfested lake in terms of aquatic invasive plant species.

4.5.3 Wildlife Resources

As previously noted, the Project Boundary essentially follows the reservoir shoreline and therefore has limited terrestrial habitat. Empirical data for wildlife use of land within the Project Boundary are not readily available. There are, however, typical wildlife species associated with the forest community types, described above, that are adjacent to the Hinckley Reservoir.

Based on the NYSDEC's Black River Wild Forest Management Plan ([NYSDEC, 1996](#)), typical central Adirondack mammal species inhabit this area, including black bear, white-tailed deer, coyote, raccoon, otter, beaver, mink, varying hare, red squirrel, Eastern chipmunk, and porcupine. Bobcat, red and gray fox, muskrat and fisher are less common mammals in the area. Due to its proximity to the Hinckley Reservoir, wildlife found in the Black River Wild Forest may be expected to frequent areas around the Project. Moose (*Alces alces*), which had been locally extinct, have in recent years re-established a population within the

Adirondack Park. NYSDEC biologists estimated that there were about 500 to 800 moose in New York State as of 2010.

Hinckley Reservoir and the surrounding wetlands also provide habitat for migrating bird species. Hinckley Reservoir is located within the Atlantic Flyway, which is a term describing the migration path used in the Eastern United States. Common birds listed in the Black River Wild Forest Management Plan include ruffed grouse, American woodcock, wood duck, American black duck, mallard, and great blue heron. [Appendix D](#) contains tables listing the common mammal ([Table D-1](#)), bird ([Table D-2](#)), and herptile species ([Table D-3](#)) that may utilize the Project.

Table 4.5.2-1: Typical Botanical Resources Found in Upland Forests Surrounding the Project

Common Name	Scientific Name	Forest Layer
Red Oak	<i>Quercus rubra</i>	Canopy
Red Maple	<i>Acer rubrum</i>	Canopy
White Pine	<i>Pinus strobus</i>	Canopy
Sugar Maple	<i>Acer saccharum</i>	Canopy
Red Spruce	<i>Picea rubens</i>	Canopy
Yellow Birch	<i>Betula alleghaniensis</i>	Canopy
Sweet Birch	<i>Betula lenta</i>	Canopy
White Ash	<i>Fraxinus americana</i>	Canopy
Wild Black Cherry	<i>Prunus serotina</i>	Canopy
American Beech	<i>Fagus grandifolia</i>	Canopy
Eastern Hemlock	<i>Tsuga canadensis</i>	Canopy
Red Pine	<i>Pinus resinosa</i>	Canopy
Paper Birch	<i>Betula cordifolia</i>	Canopy
Blueberry/Huckleberry	<i>Vaccinium sp</i>	Understory
Witch Hazel	<i>Hamamelis virginiana</i>	Understory
Mapleleaf Viburnum	<i>Viburnum acerifolium</i>	Understory
Balsam Fir	<i>Abies balsamea</i>	Understory
Striped Maple	<i>Acer pensylvanicum</i>	Understory
Hobblebush	<i>Viburnum lantanoides</i>	Understory
Eastern Hay-Scented Fern	<i>Dennstaedtia punctilobula</i>	Ground
Spinulose Shield Fern	<i>Dryopteris carthusiana</i>	Ground
Canada May-Flower	<i>Maianthemum canadense</i>	Ground
Christmas Fern	<i>Polystichum acrostichoides</i>	Ground
Northern Starflower	<i>Trientalis borealis</i>	Ground
Painted Trillium	<i>Trillium undulatum</i>	Ground
Bracken Fern	<i>Pteridium aquilinum</i>	Ground
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	Ground
Bunchberry	<i>Cornus canadensis</i>	Ground
Goldthread	<i>Coptis trifolia</i>	Ground

Note: Characteristic plant species found in Beech-Maple Mesic and Pine-Northern Hardwood Forests ([NYNHP, 2016](#)).

Table 4.5.2-2: Invasive Plant Species Documented Adjacent to Hinckley Reservoir

Common Name	Scientific Name	Notes
Common Reed	<i>Phragmites australis</i>	Common reed is a tall, herbaceous perennial that thrives in wetlands and disturbed and degraded soils, often along roadsides, ditches, or dredged areas. It can tolerate salt water and a pH range of 3.7-9. Both native and nonnative strains of phragmites occur. Generally invasive populations are nonnative, but it may be difficult to tell the two apart. Plants can sprout from a rhizome fragment and form populations that overtake hundreds of acres and displace critical wetland species.
Garlic Mustard	<i>Alliaria petiolata</i>	Garlic mustard is a biennial herb that thrives in deciduous forests and partially shaded, moist habitats. With an early spring jump on native plants, this invader dominates forest understories. It releases chemicals harmful to soil fungus important to native trees.
Giant Hogweed	<i>Heracleum mantegazzianum</i>	Giant hogweed is a biennial herb that colonizes rich, moist soils along roadside ditches, stream banks, waste areas, and forest edges. Giant hogweed is on the federal noxious weed list because of its dangerous sap. It threatens riparian areas by displacing native plants and exacerbating soil erosion.
Purple Loosestrife	<i>Lythrum salicaria</i>	Purple loosestrife is an herbaceous perennial that spreads both vegetatively and by abundant seed dispersal. Purple loosestrife grows in a variety of wet habitats, including wet meadows, marshes, river banks, and the edges of ponds and reservoirs. It tolerates a wide variety of moisture, nutrient, and pH conditions. Purple loosestrife invades both natural and disturbed wetlands and alters their ecological structure and function.

Source: [APIPP, 2016a,b](#).

4.6 Wetlands, Riparian, and Littoral Habitat (18 C.F.R § 5.6(d)(3)(vi))

4.6.1 Wetland Habitats

Wetlands are defined by the U.S. Fish and Wildlife Service (USFWS) as “lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of the year” ([USFWS, 2013](#)).

Wetland classification information was obtained from the USFWS National Wetland Inventory (NWI) and is shown in [Figure 4.6.1-1](#). The NWI coverage is developed from aerial photography ([USFWS, 2016d](#)). Wetland classifications in this area include freshwater emergent, freshwater forested/shrub, pond, lake, and riverine. [Table 4.6.1-1](#) provides a detailed description of the wetland types found in the vicinity of the Project ([USFWS, 2016c](#)). Analysis of the NWI data shows that there are approximately 280 acres of NWI wetlands adjacent to the Hinckley Reservoir or within 1,000 feet of the Project Boundary (excluding the reservoir and river). Those wetlands that are located within the Adirondack Park Blue Line¹⁵ are under the jurisdiction of the APA.

The New York State Freshwater Wetlands Act of 1975 established policy for the protection of wetlands within New York State. Depending on the wetland's location within New York State, however, the agency responsible for administering the regulations may be different. At Hinckley Reservoir, both the APA and NYSDEC have jurisdiction over wetlands. [Figure 4.6.1-1](#) also shows the location of NYSDEC regulated wetlands adjacent to the Hinckley Reservoir or within 1,000 feet of the Project Boundary. The area of the NYSDEC regulated wetlands equals 59.2 acres.

4.6.2 Wetland and Riparian Zone Vegetation

Riparian zone habitat and vegetation within the Project area is, in most areas, comprised of forests or wetland habitats within 100 feet of the water's edge. In some developed locations, the riparian zone is limited by the presence of roads. At the dam, there is a graded and riprapped bank and road with little to no riparian zone. Sandy beaches are common along the reservoir, depending on the water surface elevation.

No formal surveys of wetland or riparian vegetation have been completed for the Jarvis Project. Depending on the wetland type (emergent, scrub/shrub or forested), there are typical plant species associated with the wetlands in the Project vicinity. Shallow emergent marshes have a very diverse assemblage of herbaceous plants that include grasses, sedges, cattails, wetland ferns, and a variety of forbs. These marshes often have a number of different types of sedges, bulrushes, and rushes, but have less than 50% cover of the tussocks-forming sedges. A shrub swamp is an inland wetland dominated by tall shrubs that occurs along the shore of a lake or river; in a wet depression or valley not associated with lakes; or as a transition zone between a marsh, fen, or bog and a swamp or upland community. In northern New York, many shrub swamps are dominated by alder (*Alnus incana* ssp. *rugosa*); these swamps are sometimes called alder thickets. Other common species include red osier dogwood (*Cornus sericea*), silky dogwood (*C. amomum*), and willows (*Salix* spp.). Along the shores of some lakes and ponds there is a distinct zone dominated by

¹⁵ In 1971, the New York State Legislature created the Adirondack Park Agency to develop long-range land use plans for lands within the Park boundary, commonly referred to as the “Blue Line”.

waterwillows (*Decodon verticillatus*) and/or buttonbush (*Cephalanthus occidentalis*), which can sometimes fill a shallow basin. Tree species typical to forested wetlands in this area include red maple, silver maple, cottonwood, hemlock and tamarack.

4.6.3 Littoral Zone Habitat and Vegetation

The littoral zone within the Project area mainly comprises emergent wetlands and exposed, sandy shoreline, which limits the development of submerged aquatic vegetation in this area. Past reports have observed that “approximately 95% of the bottom material [of Hinckley Reservoir] was made up of sand and gravel, and because the reservoir is so shallow, the bottom material is subject to constant shifting by wave action. This shifting of bottom material provides an inadequate base of aquatic plants.” ([HOCCP, 1989](#)). No formal surveys of littoral zone vegetation have been completed for the Jarvis Project.

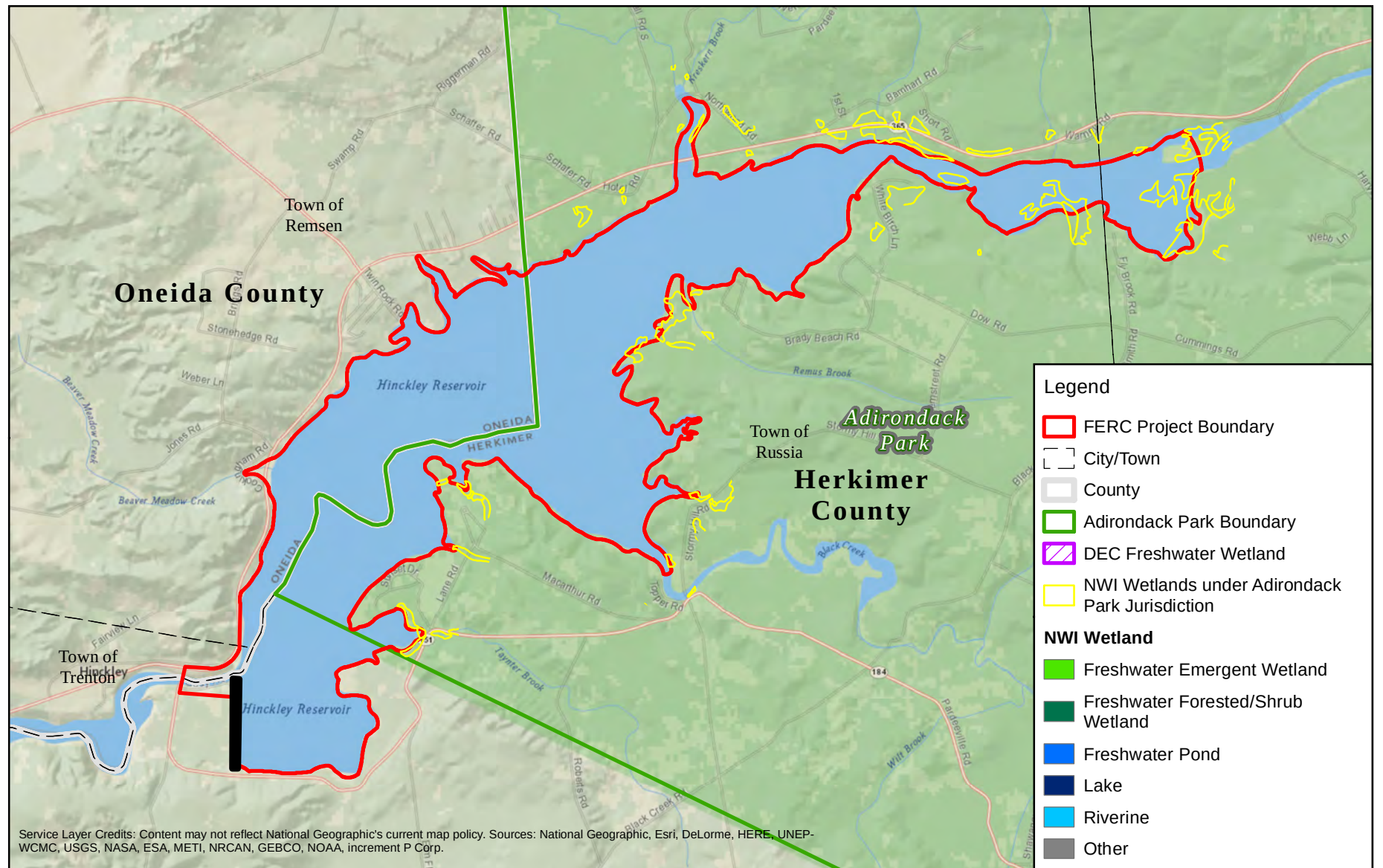
4.6.4 Wetland, Riparian, and Littoral Wildlife

Wetland and riparian areas serve as transition zones between aquatic and terrestrial systems and, as such, support many mammal, bird, reptile, and amphibious species that depend on both habitat types to survive. [Section 4.5.3](#) and [Appendix D](#) provide additional information on the wildlife that may exist within the Project area.

Table 4.6.1-1: NWI Classification Code Descriptions

NWI Code	System/Subsystem	Class	Subclass	Water Regime	Modifiers
PSS1E	Palustrine	Scrub-Shrub	Broad Leaved Deciduous	Seasonally Flooded/Saturated	
PSS1F	Palustrine	Scrub-Shrub	Broad Leaved Deciduous	Semi permanently Flooded	
PFO1E	Palustrine	Forested	Broad Leaved Deciduous	Seasonally Flooded/Saturated	
PFO4E	Palustrine	Forested	Needle-Leaved Evergreen	Seasonally Flooded/Saturated	
PUBHh	Palustrine	Unconsolidated Bottom	-	Permanently Flooded	Diked/Impounded
PEM1E	Palustrine	Emergent	Persistent	Seasonally Flooded/Saturated	
PEM1Fh	Palustrine	Emergent	Persistent	Semi permanently Flooded	Diked/Impounded
L1UBHh	Lacustrine - Limnetic	Unconsolidated Bottom	-	Permanently Flooded	Diked/Impounded
R2UBH	Riverine - Lower Perennial	Unconsolidated Bottom	-	Permanently Flooded	

Source: [USFWS, 2016c](#)



Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.6.1-1:
State and Federal Wetlands in the
Project Vicinity

0 2,000 4,000 8,000
Feet

4.7 Rare, Threatened, and Endangered Species (18 C.F.R § 5.6(d)(3)(vii))

4.7.1 T&E Species (Federal and State Listed Species)

A search of the USFWS's Environmental Conservation Online System ([USFWS, 2016b](#)) was performed to identify species that may exist within the Project Boundary that are listed as threatened or endangered under the Federal Endangered Species Act (ESA). A request was also submitted to the New York Natural Heritage Program regarding any Rare, Threatened, or Endangered (RTE) species that may exist in this area.

The USFWS identified the Northern Long-eared Bat (*Myotis septentrionalis*) as a federally threatened species that may occur within the Project area. The northern long-eared bat is a medium-sized bat about 3 to 3.7 inches in length with a wingspan of 9 to 10 inches. It is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. The species' range includes 37 states. White-nose syndrome, a fungal disease known to affect bats, is currently the predominant threat to this bat. This is especially true throughout the Northeast, where the species has declined by up to 99 percent from pre-white-nose syndrome levels at many hibernation sites. During summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees, as well as in cooler places like caves and mines. This bat is opportunistic in selecting roosts, often using tree species based on suitability to retain bark or provide cavities or crevices.

Bald Eagles are a New York State Threatened species, which occur in and use the waters within the Project vicinity. The New York Natural Heritage Program did not identify any other RTE species within the Project Boundary.

4.7.2 Species of Special Concern

Species of Special Concern is a term that is used to define species that are declining or need conservation; it is not defined by the Federal Endangered Species Act. The USFWS does, however, designate birds of conservation concern, which are defined as "migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities" ([USFWS, 2015](#)). This list was created to help fulfill the 1988 amendment to the Fish and Wildlife Conservation Act that mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA" ([USFWS, 2015](#)). [Table 4.7.2-1](#) provides the Federal list of birds of conservation concern for the Project area (created using the Information for Planning and Conservation [IPaC] tool).

Additionally, [Table 4.7.2-2](#) provides the New York State list of special concern species for Oneida and Herkimer Counties (as provided by the New York Nature Explorer). The New York Nature Explorer pulls data from the New York Natural Heritage Program, the Second New York Breeding Bird Atlas Project, and the New York Amphibian and Reptile Atlas Project. Search results for Oneida County indicated that 22 species could be present in the Project area ([NYSDEC, 2016e](#)), while 18 species could be present in the Project area in Herkimer County ([NYSDEC, 2016d](#)).

Statewide, the New York Annual Loon Census has occurred since 2001, with most of the lake surveys occurring in the Adirondack Park. The Wildlife Conservation Society conducts the census with the help of local volunteers. Based on the results of the 2013 survey, which occurred on July 20, 2013, one adult loon

was observed on Hinckley Reservoir ([WSC North America, 2013](#)). Overall, the census results reveal a relatively stable population estimated at approximately 2,000 loons in the Adirondacks.

4.7.3 Significant Habitats

A search of the USFWS's Environmental Conservation Online System ([USFWS, 2016b](#)) was conducted to identify significant or critical habitats within the Project area. No federally designated critical habitat was identified by the USFWS within the Project area.

The Natural Heritage Program identified two Natural Communities, Rich Sloping Fen and Black Spruce-Tamarack Bog, which are located outside of the Project Boundary. Black Spruce-Tamarack Bogs are naturally low in nutrients and are acidic. Canopy cover is quite variable, ranging from open canopy woodlands with as little as 20% cover of evenly spaced canopy trees to closed canopy forests with 80 to 90% cover. Vascular plant diversity is usually low in these forested peatlands; however, the bryophyte and epiphytic lichen flora may be relatively diverse. Rich Sloping Fens are often surrounded by upland forest and grade into other palustrine communities such as hemlock-hardwood swamp, shrub swamp, or shallow emergent marsh downslope. The water in this wetland type contains high concentrations of minerals and high pH levels. The structure of rich sloping fens is variable; usually there are scattered trees and shrubs and a nearly continuous ground layer of herbs and bryophytes. They may be shrub-dominated or herb-dominated. Species diversity is usually very high and may include species from the surrounding forest ([NYNHP, 2016](#)).

Table 4.7.2-1: Federally Listed Birds of Conservation Concern

Common Name	Scientific Name
American Bittern	<i>Botaurus lentiginosus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bay-breasted Warbler	<i>Dendroica castanea</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
Blue-winged Warbler	<i>Vermivora pinus</i>
Canada Warbler	<i>Wilsonia canadensis</i>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>
Olive-side Flycatcher	<i>Contopus cooperi</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Prairie Warbler	<i>Dendroica discolor</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Short-eared Owl	<i>Asio flammeus</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Wood Thrush	<i>Hylocichla mustelina</i>

All species with the exception of Bald Eagle may only be present during the breeding season
Species list is Project Area specific using the IPaC tool.

Source: [USFWS, 2015](#)

Table 4.7.2-2: New York State Listed Species of Conservation or Special Concern

Common Name	Scientific Name	County	State Conservation Rank
American Bittern	<i>Botaurus lentiginosus</i>	Herkimer/Oneida	Apparently Secure
Cerulean Warbler	<i>Setophaga cerulea</i>	Herkimer/Oneida	Vulnerable (B)
Common Loon	<i>Gavia immer</i>	Herkimer/Oneida	Apparently Secure
Common Nighthawk	<i>Chordeiles minor</i>	Herkimer/Oneida	Imperiled/Vulnerable (B)
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Herkimer/Oneida	Vulnerable (B)
Horned Lark	<i>Eremophila alpestris</i>	Herkimer/Oneida	Vulnerable/Apparently Secure (B)
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Herkimer/Oneida	Imperiled (B)
Vesper Sparrow	<i>Pooecetes gramineus</i>	Herkimer/Oneida	Vulnerable (B)
Whip-poor-will	<i>Antrostomus vociferus</i>	Herkimer/Oneida	Vulnerable (B)
Cooper's Hawk	<i>Accipiter cooperii</i>	Herkimer/Oneida	Apparently Secure
Northern Goshawk	<i>Accipiter gentilis</i>	Herkimer/Oneida	Apparently Secure (B)/ Vulnerable (N)
Osprey	<i>Pandion haliaetus</i>	Herkimer/Oneida	Apparently Secure (B)
Red-shouldered Hawk	<i>Buteo lineatus</i>	Herkimer/Oneida	Apparently Secure (B)
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Herkimer/Oneida	Apparently Secure
Wood Turtle	<i>Glyptemys insculpta</i>	Herkimer/Oneida	Vulnerable
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Herkimer/Oneida	Apparently Secure
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Herkimer/Oneida	Apparently Secure
Extra-striped Snaketail	<i>Ophiogomphus anomalus</i>	Herkimer/Oneida	Imperiled / Vulnerable
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Oneida	Vulnerable (B)
Yellow-breasted Chat	<i>Icteria virens</i>	Oneida	Imperiled (B)
Spiny Softshell	<i>Apalone spinifera</i>	Oneida	Imperiled/ Vulnerable
Spotted Turtle	<i>Clemmys guttata</i>	Oneida	Vulnerable

(B) Indicates a breeding population of a migratory species

(N) Indicates a non-breeding population of a migratory species

Source: [NYSDEC, 2016e](#) (Oneida County) and [NYSDEC, 2016d](#) (Herkimer County)

4.8 Recreation and Land Use (18 C.F.R § 5.6(d)(3)(viii))

4.8.1 Recreation

This section provides a review of existing information about non-fishing outdoor recreation at Hinckley Reservoir. Recreational fishing is described in [Section 4.4](#). A literature review produced no information specific to recreational use of the Reservoir beyond formal filings required by FERC.

4.8.1.1 Existing Recreational Facilities and Opportunities

Recreation opportunities at Hinckley Reservoir include fishing, boating, swimming, camping, and assorted beach and picnic-related activities. In recent years, lake users have organized annual July 4th boat parades and fireworks ([Hinckley Lake, 2016b](#)). Numerous beaches around the reservoir and at least one island are popular and informally used for swimming, boating and camping. Lake users organize annual lake cleanups to maintain informal use areas that would otherwise go untended. ([Hinckley Lake, 2016a](#)).

Three formal recreation sites in the vicinity of the Project offer public access to the shoreline and/or project waters: (1) the Power Authority Boat Launch; (2) the Hinckley Reservoir Picnic Area (also known as the NYSDEC Day Use Area), and (3) Trails End Campground ([Table 4.8.1.1-1](#), [Figure 4.8.1.1-1](#)). Of these three sites, the Power Authority is only responsible for the Power Authority Boat Launch. In addition, the Power Authority maintains an informal scenic area on the northern end of the dam which is used for viewing the reservoir and Project facilities. The boat launch, scenic area, and picnic area are public recreation areas operated for day-use only. Trails End Campground is a commercially operated venture that provides day use and camping, as well as boat launching. Portions of these areas are located within the Project Boundary.

Additionally, portions of the Project lie within the boundaries of the Adirondack State Park, which is widely known for its quality outdoor recreation opportunities. The State Park encompasses 6 million acres of land, of which 2.6 million are state-owned and open to the public for recreation. State-owned lands within the Adirondack State Park that intersect with the Hinckley Reservoir and provide public recreation opportunities include the Black River Wild Forest and Hinckley Reservoir Picnic Area. A small portion of the Black River Wild Forest abuts the Reservoir at the northeastern-most reaches of the Project Boundary; however, a map of the Forest does not identify any formal recreation facilities proximate to the Project ([NYSDEC, 2015a](#)). The Hinckley State Forest is also notable in that it is located immediately south of the Project, but outside the Project Boundary. The State Forest is 1,590 acres in size, and offers 6.5 miles of multi-use trails, primitive camping, hunting and trapping ([NYSDEC, undated](#)). Camp Northwood, an organizational camp located on the northwest side of the reservoir, is also located in the vicinity of the Project area roughly across the reservoir from the Hinckley Reservoir Picnic Area. The camp is privately operated for young children with learning disabilities. Associated with Camp Northwood is Northwood Center, a facility that assists older teens with life skills.

Low water levels can affect the function of recreation facilities such as boat launches and beaches, as well as boating in general when areas become dewatered. Low water conditions experienced during the drought in 2007 resulted in the dewatering of the Power Authority boat launch and closure of the swimming beach at Hinckley Reservoir Picnic Area ([HRWG, 2008](#)).

4.8.1.2 Recreational Use

FERC uses recreation days as a metric for reporting recreational use at hydroelectric projects. A recreation day is defined as each visit by a person to a development for recreational purposes during any portion of a 24-hour period. The Power Authority is required to report estimated recreational use to FERC every six years on a Licensed Hydropower Recreation Report Form 80 (Form 80). The most recent estimate of use available indicates that approximately 12,900 recreation days occurred at publicly operated areas at the Project in 2014 ([NYPA, 2015](#)). This includes activity at the boat launch, the scenic viewing area, and the picnic area. No overnight activity was reported for locations within the Project Boundary.

Review of the Form 80s from 1996, 2002, 2008, and 2014 indicate that estimated recreational use within the Project Boundary is shown to be increasing over time ([Figure 4.8.1.2-1](#)).

4.8.1.3 New York Statewide Comprehensive Outdoor Recreation Plan

New York State's Office of Parks, Recreation and Historic Preservation (OPRHP) reviews statewide recreational needs at five-year intervals. The most recent review is reported in the 2014-2019 Statewide Comprehensive Outdoor Recreation Plan (SCORP) ([New York State OPRHP, 2014](#)). Within the SCORP, OPRHP examines the supply and demand for outdoor recreational opportunities and provides a relative index of need by county. The index is a scale of 1 to 10, where 1 indicates the least level of need, 5 is considered the statewide average, and 10 indicates the highest level of need. Opportunities for pursuits typically identified with hydroelectric projects are generally shown to be near the statewide average in Herkimer and Oneida counties ([Table 4.8.1.3-1](#)). This result is consistent with the findings of the most recent Form 80, which shows that no recreation-related facilities at the Project are being used at more than 50% of capacity.

The SCORP also identifies operational goals for the period covered. While multiple goals are listed, they fall into the general categories of promoting connectivity between resources for community and nature, conserving and protecting natural resources, and promoting and/or engaging adults and youths in participating in outdoor recreation and interpretation activities.

4.8.2 Land Use

Land use classifications found throughout the upper portion of the West Canada Creek watershed (i.e., the area upstream of Hinckley Dam) as well as within 1,000 ft. of the Project Boundary were discussed in [Section 4.1.1](#). As previously noted, the land use adjacent to and within the Project Boundary is typically undeveloped and predominantly characterized by various forest or wetland classifications. Within the Project area there is limited development including various roadways and residences. The majority of land surrounding the Project is privately owned, with the exception of Hinckley State Forest to the south, the Power Authority Boat Launch, the NYSDEC Day Use Area, and state Wild Forest lands north of the reservoir.

The approximately 17 mile Hinckley Reservoir shoreline is within four towns: Ohio (2.7 miles) and Russia (18.3 miles) in Herkimer County, and Remsen (4.7 miles) and Trenton (0.2 miles) in Oneida County ([EPA, 2001](#)). Approximately 93% of the Hinckley Reservoir watershed is located within the Adirondack Park, including much of the Town of Russia and all of the Town of Ohio ([EPA, 2001](#)).

4.8.2.1 Management of Project Lands

NYSCC owns the lands surrounding Hinckley Reservoir, including those lands within the Project Boundary. The Power Authority has an easement to these lands as part of the 1983 agreement with NYSDOT¹⁶. Lands within the Project Boundary are managed in accordance with federal and state regulations. NYSCC has permitting authority within the Project Boundary as governed by the Canal Real Property Management Policy. The NYSCC permit program is discussed in greater detail in [Section 4.8.3](#). In general, Project operations and maintenance, along with recreation, are the primary activities that occur on Project lands.

Management of lands external to the Project Boundary fall under the jurisdiction of the town or county in which they are located. In addition to town or county regulations, land uses within the Adirondack Park are also subject to APA regulations.

4.8.2.2 Protected Rivers

The Project site is not located within or adjacent to any river segment that is designated as a part of, or under study for inclusion in, the National Wild and Scenic River System ([NWSRS, 2016](#)) or included in the Nationwide Rivers Inventory ([NPS, 2016](#)).

New York State's Wild, Scenic and Recreational Rivers Act (WSRRA) protects rivers with outstanding scenic, ecological, recreational, historic, and scientific values ([NYSDEC, 2016g](#)). NYSDDEC administers the WSRRA and has implemented regulations affecting the management, protection, enhancement, and control of land use and development on designated river areas. The APA administers the WSRRA for private lands within the Park boundary ([NYSDEC, 2016g](#)). West Canada Creek is a designated river under the WSRRA ([NYSDEC, 2016g](#)). The Act defines Wild Rivers as free of impoundments and generally inaccessible except by trail, with watersheds or shoreline essentially primitive and waters unpolluted. Scenic River Areas are defined as free of impoundment, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. Recreational River Areas are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past. West Canada Creek is designated as Wild for approximately 7 miles from the headwaters, Scenic for the next approximately 17 miles, and finally Recreational for approximately 9 miles, ending at the Harvey Road Bridge crossing just upstream from Hinckley Reservoir. The remainder of West Canada Creek, including the sections within the Project Boundary, is not classified under the WSRRA.

4.8.2.3 National Trails System and National Wilderness Preservation System

No Project lands are included in, or under study for inclusion in, the National Trails System or the National Wilderness Preservation System.

4.8.2.4 The Adirondack Park

The State of New York created the Adirondack Park in 1892 to protect water and timber resources on state-owned and private lands. The Park encompasses approximately 6 million acres, nearly half of which is constitutionally protected as a "forever wild" State forest preserve. In 1971, the New York State Legislature created the APA to develop long-range land use plans for lands within the Park boundary, commonly

¹⁶ The New York State Legislature transferred control of the NYS Canal System from NYSDOT to NYSTA in 1992 and then from NYSTA to the Power Authority. On January 1, 2017, the NYSCC became a subsidiary of the Power Authority.

referred to as the “Blue Line”. The APA prepared two plans: the State Land Master Plan, signed into law in 1972, and the Adirondack Park Land Use and Development Plan, signed into law in 1973. Although the APA develops and updates land use policy and administers permits for land use within the Park, the NYSDEC is charged with the custody and management of State lands in the Park ([APA, 1979](#)).

4.8.3 Shoreline Management Policy

There are a number of private residences adjacent to the reservoir that use Project lands for fishing, boating, swimming, and other forms of recreation. Docks and beaches have been established at various locations throughout the reservoir by adjacent landowners. Applicants wishing to develop or use Project lands for dock installation or other similar activities are currently required to obtain a permit from NYSCC. NYSCC may issue a 30-day revocable permit upon review by the Division Permit Engineer, the Division Canal Engineer, and the Office of Real Property Management. Permitting decisions are governed by the Canal Real Property Management Policy, which also governs sales and leases of NYSCC property ([NYSCC, 2012](#)).

In addition to the NYSCC permit, applicants may be required to obtain permits from the Town, the NYSDEC, the U.S. Army Corps of Engineers (USACE), and the jurisdictional municipality. Projects within the Adirondack Park boundary may also require a permit from the APA.

4.8.3.1 Shoreline Buffer Zones

The Power Authority does not maintain a buffer zone around the reservoir; however, a number of Town, APA, and NYSCC regulations are in place which provide for shoreline buffers. Shoreline buffer zones vary between jurisdictional municipalities within the Project Area. NYSCC has permitting authority within the Project Boundary, while lands both inside and outside of the Project Boundary are under the jurisdiction of the surrounding municipalities. The Towns of Trenton, Remsen, and Russia have local regulations providing for shoreline buffers; the Town of Ohio does not. APA shoreline restrictions apply to lands within the Park boundary, including the Town of Ohio and a portion of the Town of Russia. Although shoreline restrictions vary, the minimum shoreline setback requirement for any parcel abutting the Project Boundary is 50 feet.

The Town of Trenton zoning law establishes a Land Conservation District, which includes the area within 300 feet on either side of the shoreline at normal water level. Construction of new structures in this overlay requires site plan review and is prohibited within 50 feet of the shoreline at normal water level. The Town of Trenton Planning Board may enforce a smaller or larger shoreline setback on a case-by-case basis, and is required by Town zoning law to consider the slope of the land ([Town of Trenton, 2000](#)).

The Town of Remsen Lot Size and Building Law prohibits construction closer than 50 feet from the front lot line, which includes any shoreline on a public water course ([Town of Remsen, 2008](#)). The Town of Russia employs a Shoreline Overlay Zone extending 150 feet from the high mean water mark for Hinckley Reservoir, West Canada Creek, and Black Creek. Land use in this overlay zone is subject to additional restrictions, including Site Plan Approval requirements for new principal buildings excepting single- and two-family residences, minimum frontage requirements for deeded or contractual access, and a 50 foot minimum shoreline setback ([Town of Russia, 2012](#)).

APA shoreline restrictions require shoreline setbacks according to land use classification as follows:

- Hamlet and Moderate Intensity - 50 feet

- Low Intensity Use and Rural Use - 75 feet
- Resource Management - 100 feet

Docks and boathouses are exempt from these restrictions ([APA, 2015](#)). The majority of private Park lands in the Project vicinity with shoreline frontage are classified Low Intensity or Rural Use, with the exception of the Hamlet of Grant at the mouth of Black Creek and a section classified Moderate Intensity on the north shore of the reservoir, just east of the Park boundary ([APA, 2014](#)).

Table 4.8.1.1-1: Formal Recreation Sites in the Vicinity of the Gregory B. Jarvis Project (FERC No. 3211)

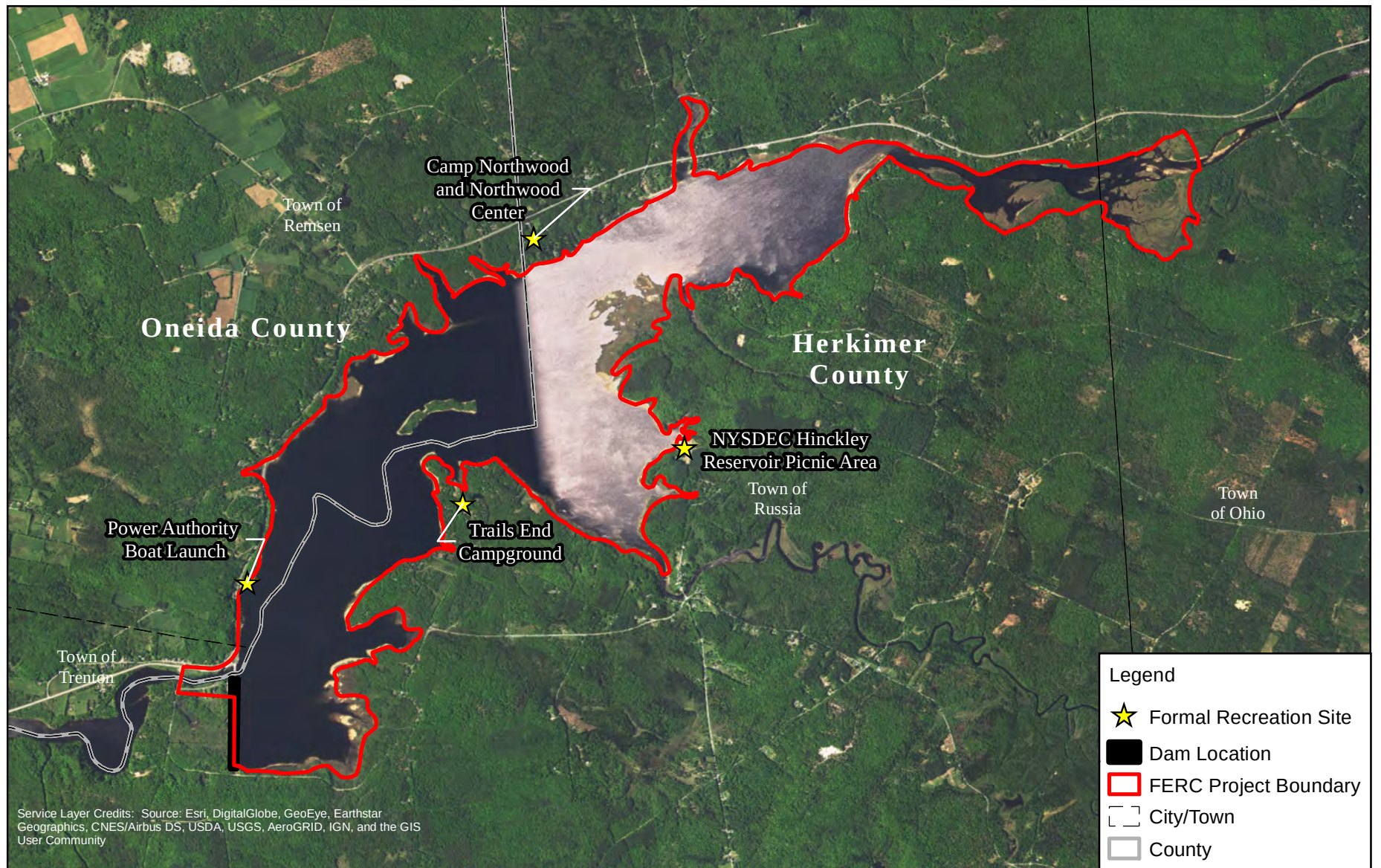
Recreation Site Name	Recreation Facilities
Power Authority Boat Launch Day use, seasonal operation Commission Approved	Single lane launch of concrete planks extending 200 feet into the reservoir. Shoreline angler access, parking capacity for 15 vehicles with trailers, ADA spaces/compliance is unknown. Gated. \$8 launch fee (2016 price).
NYSDEC Hinckley Reservoir Picnic Area Day use, seasonal operation	Swimming beach, bath house, expansive picnic area with pavilions, large grills, picnic tables, and individual pedestal grills. Extensive parking areas. ADA compliant facilities (http://www.dec.ny.gov/outdoor/9179.html).
Trail's End Campground Day use, overnight use, seasonal operation	Cabins, lodge, camp store, campground (tent or RV), pavilion, boat rentals, swimming beach, concrete pad boat launch (free to registered campers, \$10 fee to others (2016 price)) and floating dock, pump service, dump station, bathhouse, laundry, playgrounds, game room, stocked fishing pond (http://www.trailend.com).
Camp Northwood and Northwood Center Organizational Camp	

Table 4.8.1.3-1: Relative Index of Need for Recreation Opportunities in Herkimer and Oneida Counties^a

Recreation Activity	County ¹⁷	
	Herkimer	Oneida
Camping (tenting, RV camping, backpacking)	6	5
Fishing from shore or boat	6	5
Swimming outdoors (poos, lake, or other)	5	5
Walking or jogging on paths or trails	5	5
Park activities (relaxing in park, picnicking, playground use, other day use)	5	4
Biking (non-motorized) on trails, paths, etc. for recreational purposes	5	4
Boating (canoeing, sailing, motor boating, row boating)	5	4

^a ([NYSOPRHP, 2014](#)).

¹⁷ The index is a scale of 1 to 10, where 1 indicates the least level of need, 5 is considered the statewide average, and 10 indicates the highest level of need



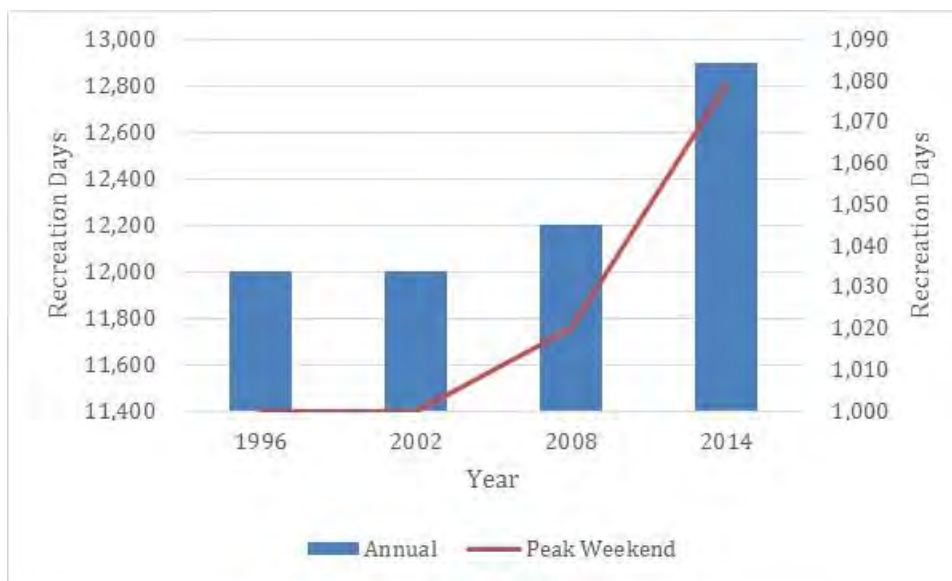
Gregory B. Jarvis Project
(FERC No. P-3211)
Pre-Application Document

Figure 4.8.1.1-1:
Formal Recreation Sites in the
Vicinity of the Gregory B. Jarvis Project



0 2,000 4,000 8,000
Feet

Figure 4.8.1.2-1: Estimated Daytime Recreation Use at the Gregory B. Jarvis Project (P-3211)^a



^a Source data: 1996, 2002, 2008, 2014 Licensed Hydroelectric Recreation Reports for the Gregory B. Jarvis Project. ([NYPA, 1997](#); [NYPA, 2003](#); [NYPA, 2009](#); [NYPA, 2015](#)),

4.9 Aesthetic Resources (18 C.F.R § 5.6(d)(3)(ix))

4.9.1 Visual Character of Project Lands and Waters

Hinckley Reservoir is surrounded primarily by deciduous forest, with areas of evergreen and mixed forest, woody wetlands, and sandy beaches. The approximately 4.5 mi² reservoir is long and narrow, with a maximum width of around 1.7 miles. The low rolling hills surrounding the Project Area are heavily forested and offer limited or no views of the reservoir from the peaks. The area contains rural residential development, primarily single-family residences.

New York State Route 365 (NY 365) runs along the north side of the reservoir, providing limited and occasional unobstructed views of the water. Various minor and local roads offer access and occasional limited views from the south side of the reservoir. Several formal and informal recreation areas offer views of the reservoir, including the Power Authority Scenic Area, Power Authority boat launch, NYSDEC's Hinckley Reservoir Day Use Area, and a number of informal beaches.

The Town of Russia maintains a Scenic Corridor Overlay along NY 365, Hinckley Road, and Black Creek Road "to ensure that new development along scenic rural roadways and in historic hamlets is planned so as to visually harmonize with the scenic and/or historic character of the area, and not detract from it" ([Town of Russia, 2012](#)).

Hinckley Dam consists of a 570-foot long north (right) embankment dam, a 65-foot non-overflow intake structure, a 400-foot long concrete spillway, and a 2,600-foot south (left) embankment. There are only a few public locations from which the dam may be viewed. An informal scenic area at the north embankment provides a view of the reservoir, the dam, the top of the powerhouse, and the project substation on the north side of NY 365. The spillway is visible from a bridge where Hinckley Road crosses West Canada Creek just downriver from the dam. A turnout on South Side Road near the access to the south embankment also provides a view of the dam. Both the dam and the substation can be seen from NY 365.

Views of the Project are seasonally impacted. As the deciduous trees lose their leaves, the views become less obstructed, and areas with no view in summer may offer limited or clear views of the Project in winter.

4.9.2 Scenic Attractions

The historic Village of Barneveld in Trenton and the Town of Remsen are Adirondack Park Scenic Byway communities along the Central Adirondack Trail. Hinckley Reservoir, West Canada Creek, and NYSDEC's Hinckley Reservoir Day Use Area are "recommended destinations" along the Byway, which traverses U.S. Highway 9, NY Route 28 and NY Route 8.

The Town of Russia Comprehensive Plan considers the following roads as "particularly scenic": Partridge Hill Road, Hinckley Road north of Black Creek Road, Elm Flats Road, Black Creek Road east of Grant Road, Buck Hill Road, Norris Road, Simpson Road, Military Road between Dover Road and Hinckley Road, Military Road east of Buck Hill Road, and portions of Grant Road ([Town of Russia, 2005](#)).

Trenton Falls Gorge, downriver from the Project Area, features several waterfalls that drop 300 vertical feet over the course of approximately two miles. Erie Boulevard developed a scenic trail offering views of the falls; the trail is open to the public four weekends per year ([Town of Trenton, 2007](#)).

There are few public trails in the immediate Project vicinity. As noted in [Section 4.8.2](#), Hinckley Reservoir is largely surrounded by private land.

4.10 Cultural Resources (18 C.F.R § 5.6(d)(3)(x))

4.10.1 Cultural Resources Introduction and Geographic Overview

Research was conducted using the New York State Cultural Resource Information System (CRIS), which is maintained by the New York State Historic Preservation Office (SHPO) and the Division for Historic Preservation (DHP) within OPRHP. CRIS contains a comprehensive inventory of archeological sites, State and National Register (NR) properties, properties determined eligible for the NR (NRE), and previous cultural resource surveys.

4.10.2 Archeological Sites

An examination of CRIS identified thirteen reported archeological sites within two miles of the Project ([Table 4.10.2-1](#)). Previously reported archeological sites provide an overview of both the types of sites that may be present in the Project and relation of sites throughout the surrounding region. The presence of few reported sites, however, may result from a lack of previous systematic survey and does not necessarily indicate a decreased archeological sensitivity within the Project.

The reported sites include three precontact sites and ten historic sites. Seven of the sites were identified during the archeological study for the Iroquois Gas Transmission system (IGTS) pipeline located to the southwest of the Project. Another three historic sites in the village of Hinckley were identified during a 2009 study for the proposed sewer system ([Rush & Keck, 2009](#)).

Seven of the historic period sites were scatters of materials associated with 19th and early 20th-century farmsteads and houses associated with the industrial development of the Hinckley area. The “traces of occupation” precontact site to the north of Hinckley is part of a large group of sites reported by Arthur C. Parker, the state archeologist, in the 1920s. Parker rarely visited or investigated the sites but instead relied on local informants and mapped the sites based on written descriptions. The other two precontact sites were lithic scatters, or the waste debris from the production of stone tools. Since no diagnostic material was recovered, the dates of these sites are unknown.

4.10.3 Historic Properties

An examination of CRIS within two miles of the Project identified one property listed on the National Register (NRL) and two properties deemed eligible for the National Register (NRE) ([Table 4.10.3-1](#)). These include the New York State Barge Canal Historic District, recently designated as a National Historic Landmark (NHL). The Hinckley Dam and Reservoir have been determined to be discontinuous contributing properties of the Barge Canal. The listing encompasses the entire Project Boundary.

The Trenton Falls Dam and powerhouse lie downstream of the Jarvis Project (but beyond the 2-mile radius) along West Canada Creek. Both are considered eligible for the National Register ([Figure 4.1.3-1](#)). The Trenton Project dates back to the late 19th and early 20th century and represents an early example of hydroelectric generation in the State. Also eligible is a nearby bridge, built between 1906 and 1918, that is not related to the hydroelectric facility. Slightly further downstream is the Nine Mile Creek Feeder Dam (Morgan Dam). Like the Hinckley Dam and Reservoir, this dam and its associated gatehouse are included as contributing elements (Discontinuous Features) to the broader New York State Barge Canal Historic District.

None of the properties will be adversely affected by the continued operation of the Jarvis facility. The Jarvis facility itself is less than 50 years old and is currently not eligible for the National Register, according to the

criteria developed by the National Park Service. However, it is included in the National Register nomination form for the NYS Barge Canal Historic District as a non-contributing element.

4.10.4 Previous Surveys

A review of CRIS identified eight previous surveys within two miles of the Project ([Table 4.10.4-1](#)). The closest archeological survey occurred on Old Main Street in the hamlet of Hinckley, Town of Trenton. No archeological sites were identified in the shovel testing program near the hydroelectric facility ([Abel, 2011](#)). Three sites were identified downstream in the Village of Hinckley (see A06520.000077 through 79 in [Table 4.10.2-1](#)). None of the sites are within the Project Boundary. A survey of the old Hinckley Road Bridge over the Project Boundary did not identify any historic or archeological properties ([New York State Museum, 1984](#)). A large survey for a natural gas pipeline passed approximately 1 mile south of the Project. Seven sites were identified within the vicinity, including two small precontact sites and five sites associated with the commercial/industrial development of the Hinckley area ([Garrow & Associates, 1990](#)). None of the sites identified in these surveys were subjected to extensive excavations, nor were they determined to be eligible for the National Register.

4.10.5 Precontact Background

Although the middle portions of the Mohawk Valley have been the subject of intensive archeological study ([Snow, 1994, 1995](#)), the upper portion of the valley and especially the smaller tributaries such as the West Canada Creek have received far less scholarly attention. As a result, much of what is known about the precontact period in this portion of the valley is based on inference from other nearby locales.

The first evidence of human occupation in New York State dates to the Paleo-Indian period (10,500-8000 B.C.), shortly after the last ice age. The environment and climate of this period was in rapid flux, with dramatic warming and cooling periods. The megafauna of the Pleistocene had become extinct and human hunters in New York focused on caribou, elk, and deer.

This period of time is poorly defined in the Northeast and is recognized by sporadic surface finds of “fluted” projectile points. Paleo-Indian peoples were organized in small mobile bands of hunters with groups that usually contained about 25 people. The identification of Paleo-Indian remains along with extinct types of fauna is consistent with other sites from this period in North America. Dependence on game animals was probably only one part of the Paleo-Indian subsistence as shown by excavations in Pennsylvania along the Delaware River, which have produced evidence of fishing and wild plant collection by Paleo-Indian groups ([Ritchie, 1969](#)). In general, there are few known Paleo-Indian sites along the West Canada Creek. Surface finds of “fluted” points are more common along the principal terraces of the Mohawk River at lower elevations.

The climate continued to change but was becoming progressively more stable, and New York State was covered with essentially a modern, mixed, hardwood forest. Human populations slowly began to increase. There is evidence of increased mobility and perhaps wider distribution of population throughout the Northeast during this time, which defines the Archaic period (8000-1000 B.C.). During the Archaic, mobility was influenced by the extraction of food and other subsistence resources within limited areas. Seasonal campsites by small bands were common, and food procurement activities occurred in various areas as the seasons progressed ([Ritchie, 1969](#)).

Studies of sites associated with the Archaic period have shown that a wide variety of subsistence patterns existed prior to the presence of horticulture and ceramics, which are indicators of semisedentary lifestyles.

The utilization of such a variety of food sources necessitated a nomadic type of settlement pattern. For example, small hunting camps, fishing stations, shellfish collecting and gathering sites are associated with these groups, as are large multi-activity sites ([Ritchie, 1969](#)).

Following the Archaic, the Woodland period (1000 B.C.-A.D. 1600) was marked by increased sedentism and increased population density as precontact groups established fixed home bases. There is evidence of large-scale storing of food resources in pits excavated into the ground and in large ceramic vessels. Populations began settling in more resource-rich lowlands. By A.D. 1100, the Northern Iroquoian linguistic culture began moving up the Susquehanna Valley and east into the Mohawk Valley during the medieval optimum global warming period ([Snow, 1994](#)). During this phase, palisades and earthworks begin to appear in the archeological record, as well as a close association of living space with agricultural space. Longhouse and settlement improvements appear. This period is also characterized by increased warfare and elaborate matrilineal settlement patterns ([Snow, 1994](#)). This phase lasted until about A.D. 1350 and seems to be the direct predecessor to the Iroquois ([Snow, 1994](#)).

The late Woodland period, the last stage of precontact history in the Northeast, was characterized by population expansion that resulted in the development of the nations and tribes that were later encountered by European settlers, such as the Iroquois. This portion of the Mohawk River lay between two major tribal groups, the Mohawk to the east and the Oneida to the west. During the late 17th and early 18th centuries, these Iroquoian groups — antagonistic towards allied Native populations with the French colonists to the north — were under near-constant pressure from French attacks. In addition, French Jesuit missionaries commonly proselytized among the larger villages. As a result, Native settlement moved frequently, but no substantial villages are known in the West Canada Creek drainage area ([Snow, 1994](#)). Many Natives began to emigrate out of the Mohawk Valley throughout the early 18th century as German Palatine settlers flooded into the rich farmlands ([Fenton & Tooker, 1978](#)). Iroquoian groups were further marginalized in the Mohawk Valley after the Revolutionary War. The Mohawk sided with the English, largely due to the investment of Sir William Johnson into diplomacy with the tribe before the war. Conversely, the Oneida sided with the Americans under the influence of Reverend Samuel Kirkland ([Campisi & Tooker, 1978](#)). Despite their allegiances, both tribes lost significant territory after the war, as the newly formed American government parceled out former tribal lands as rewards to soldiers and officers in the war, especially on the north side of the Mohawk Valley.

In summary, the upper West Canada Creek is located in an area known to have been frequented by small Native Americans groups. Typically larger settlements were along the Mohawk to the south; smaller settlements and short-term encampments are more likely in upland settings. Along the West Canada Creek, which is greatly affected by local rainfall, even smaller and shorter-term Native American encampments may be expected.

4.10.6 Historic Background

The Hinckley Dam and Reservoir were constructed in 1915 to provide low-flow augmentation to the newly constructed Barge Canal during the summer months ([HRWG, 2008](#)). The New York State Barge Canal was created in response to the deteriorating conditions of the canal system, which included the Erie and Champlain Canals. Despite a major investment of \$9,000,000 at the end of the 19th century, the canal system was woefully inadequate ([Whitford 1922](#)). As a result, a new barge canal system that operated largely within the Hudson and Mohawk River systems was devised, taking advantage of new engineering and technological capabilities that allowed for massive dredging of the river bottoms. The new system

required additional water to elevate the level of the in-river canal. As a result, the Hinckley Dam and Reservoir (along with the larger Delta Reservoir system near Rome, NY) and the Nine Mile Creek Feeder Canal were constructed to provide water for the canal, especially during the low-flow summer months ([Tippetts-Abbett-McCarthy-Stratton Engineers and Architects, 1980](#)).

A smaller facility previously existed on the site to provide drinking water to the City of Utica. The Consolidated Water Company, a private concern, owned the rights to the water of the West Canada Creek and provided water to the City. Once the Hinckley Dam and reservoir were completed, the Canal Corporation created an Operating Diagram in 1920 to govern the operation and ensure reliable flows for the multiple water users of the West Canada Creek. In 1937, the City purchased the facilities, which were later transferred to the MVWA. At the time of construction, the dam affected the water flow to Utica Gas & Electric Companies (now Erie Boulevard) power plant at Trenton Falls. Today, the NYSCC and MVWA utilize the water impounded in the reservoir, along with the several downstream hydroelectric facilities (including the Jarvis Project) ([HRWG, 2008](#)).

The Project area was not densely settled by Europeans until well after the Revolutionary War, when allotments and land grants were offered to veterans of the war. This area was formerly part of the 3rd allotment of the Royal Grant of Sir William Johnson, the crown's principal Indian agent in New York ([DeWitt, 1802](#)).

In the late 18th century, the lands on the west side of the Creek were part of a large grant to a company of investors led by Peter Servis. The grant actually benefitted Sir William Johnson and his family's holding by using the other investors as fronts. After the Revolutionary War, most of the land (not previously sold) on both sides of the Creek was confiscated by the Americans from the Loyalist Johnson family and subdivided and sold to new settlers ([Benton, 1856](#)).

The incipient Tryon County created just before the war and named after the royal governor included most of the Mohawk Valley. After the war, the county was broken into several smaller counties including Herkimer and Oneida. At the beginning of the 19th century, lands that now include the Project were situated in the Herkimer County town of Norway and the Oneida County town of Trenton. There is some suggestion that by 1810, a sawmill had already been built in the vicinity of Hinckley Dam ([Durant, 1878](#)). By 1820, the Town of Russia had annexed the area around Hinckley.

Further south and west, a sizable hamlet called Prospect had become established at this time, centered on Prospect Falls, which featured a number of prosperous mills. The area of the Project was becoming known as "Gang Mills" and later as Hinckley ([Durant, 1878](#)). By the mid-19th century, most of the area on the west side of the Creek was owned by Gardener Hinckley and family, who established a large lumbering operation near the Project. With state aid to help clear the Creek of obstacles, Hinckley could float logs downstream to his large gang sawmill to cut the timber into boards. Later, he built a planing mill as well. The vicinity of the mills became known as "Gang Mills," and later the village of Hinckley was officially designated as such in 1891 in Oneida County (although part of the unofficial village extended south into Herkimer County) ([Hardin & Willard, 1893](#)).

The "gang mills," so called due to the large set of parallel saw blades that performed the cutting (unlike later circular saws), were situated on the southeast side of the Creek and were notable in their day. Many thought the mill carried the greatest capacity of horsepower of any mill in that part of the State, with an ability to cut over 5 million board feet of lumber per year. The company manufactured boards, broom handles, laths and

joists, as well as boxes ([Durant, 1878](#)). Gardener Hinckley passed away in 1874, and the operations were carried on by his family and in-laws.

With the decline of hardwood in the Adirondacks to the north, many sawmills converted to process soft woods for paper products. Hinckley was no exception; by 1894 the gang mill was converted to a pulp mill and the concern was renamed Hinckley Fiber Company ([New York Department of Health, 1917](#)). The successful lumber mills at Hinckley drew the interest of the New York Central Railroad, which built a branch line to the village in 1882 that operated until about 1931 ([Johnson, 2001](#)).

The Consolidated Water Company of Utica began to draw water from behind the Hinckley Fiber Company dam around 1906. The 24-inch main followed a circuitous route, crossing over the West Canada Creek several times before reaching the city ([Century Map Company, 1906, 1907](#)). Construction of the new dam for the barge canal system began around 1910. Following the completion of the new dam, the Consolidated Water Company drew water from a pipe and valve at the southern abutment. Previously, the water was pumped from the Creek itself, just upstream of the pulp mill dam.

The Hinckley Dam was finally completed in 1915 under the auspices of the New York State Department of Public Works. The project required the demolition of over 50 structures on the eastern portion of the Village of Hinckley on both the north and south sides of the Creek. One of the few structures to be saved on the south side was the original Hinckley house built circa 1852, now on Cady Road (named after the chief engineer of the dam). An additional four bridges over the Creek were also removed ([State of New York, 1910](#)). The Hinckley Fiber Company's mills downstream to the west remained intact.

The new dam severely impacted the mill's ability to receive logs from their upstream land holdings and the State expressly forbade the company from floating logs over the dam. As a result, the company sued the State, and in 1918, forced a small monetary settlement and the right to float logs to the dam and remove them via a mechanical lift ([Reswick, 1916](#)). As part of the settlement, the pulp mill built a new "slasher house," sawdust bin, and conveyance system to take logs from the reservoir on the northern abutment and move them into the larger processing complex downstream about 2,000 feet ([Figure 4.10.6-1](#)). In actuality, a saw mill, the "slasher house," took the nearly whole logs and cut them into blocks that could be more easily handled in the pulp mill. The facility included a reinforced concrete basement that housed the engines for the machinery above, covered with a two-story wood frame ([Reswick, 1916](#)). The slasher house, sawdust bin, and parts of the conveyor system are now northeast of the Jarvis power plant. A portion of the conveyor system crossed over the powerhouse and current tailrace.

In 1920, the company was purchased by the Oswego Pulp and Paper Company to augment its expanding operations, though the mills at Hinckley remained in operation only for another three years. In 1924, the remaining facilities were purchased by the Consolidated Water Company and subsequently demolished and filled. In 1959, a new hydroelectric facility was constructed one mile downstream in the village of Prospect. The facility is currently owned and operated by Erie Boulevard ([Bashant & Kelly, 1977](#)).

The Hinckley Dam remained largely unchanged until the completion of the Jarvis Hydroelectric Project by the Power Authority in 1984. Through that time, the small hamlet of Hinckley slowly contracted. Many of the 19th- and early 20th-century structures of the settlement remain downstream of the dam, except for those directly related to the pulp mills.

Table 4.10.2-1: Archeological Sites Within Two Miles (3.2 km) of the Project

OPRHP Site No.	NYSM Site No.	Site Identifier	Description	OPRHP Site No.
06517.000003	4149	ACP OND No #	Traces of occupation	06517.000003
04313.000007		IGTS 106A-1-1	19th- and 20th-century historic house site; filled in cellar hole; proposed pipeline runs across cellar hole, artifacts included: pearlware, pipe stem fragments, glass, nails, bone, brick and mortar	04313.000007
04313.000008		IGTS 106A-3-1	This 19th-to 20th-century farm complex includes 3 stone and mortar foundations representing a house, barn and silo	04313.000008
04313.000009		IGTS 107-1-1	This 19th-century scatter of historic artifacts include: brick, glass, pearlware, redware and whiteware	04313.000009
04313.000010		IGTS 107-2-1	Precontact camp consisting of 6 chert flakes	04313.000010
06517.000009		IGTS 105A-1-1	Precontact camp consisting of 13 chert flakes	06517.000009
06517.000010		IGTS 105-1-2	This 19th- to 20th-century historic artifact scatter includes: glass, brick, coal, creamware, pearlware, nails, bone, metal, and 1 button	06517.000010
06520.000064		IGTS 105-1-1	19th- and 20th-century house site and associated artifact scatter; pearlware, redware, and whiteware	06520.000064
06520.000077		Union High School	Historic site of school; occupation period from 1840-1958	06520.000077
06520.000078		7200 Block of Main Street Historic Site	Mid-19th-century historic house site; stone cellar- possible associated with Hinckley/Ballou mill	06520.000078
06520.000079		Tax Map #161.0031-25 Historic Site	Mid-19th-century historic site; may have been a commercial property associated with the Gang Mills saw mill	06520.000079

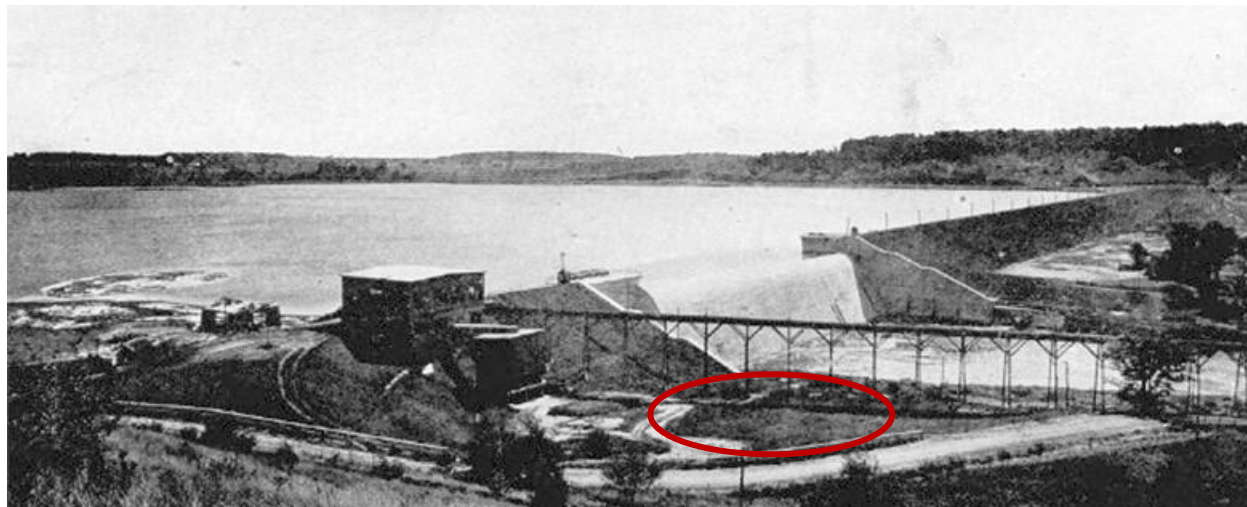
Table 4.10.3-1: Inventoried Properties Within Two Miles (3.2 km) of the Project

USN/NR no.	Property Name	Status	Description	Proximity to Project
14NR06559	New York State Barge Canal Historic District	NRL	Waterford to Tonawanda, Whitehall, Oswego and Waterloo; 1905-1963	Within the Project Boundary
06520.000014	Hinckley Dam and Reservoir	Contributing to NRL New York State Barge Canal Historic District	Off of NY 365; in between southwest end of Kuyahoor Lake and West Canada Creek; built between 1911-1914 to supply water for the Barge Canal; towns of Trenton and Russia	Immediately adjacent to the east

Table 4.10.4-1: Relevant Previous Surveys Within Two Miles (3.2 km) of the Project

Project/Phase	Summary	Citation
Hinckley Sewer District, Phase I and Addendum	No archeological sites found along Old Main Street north of current Project. Testing downstream within village of Hinckley located three historic sites.	(Abel, 2011 ; Rush & Keck, 2009)
Proposed New Main Post Office, Phase I	Testing along Rte. 365 in village of Hinckley, no sites located.	(Dean & Barbour, 2000)
PIN 2016.66.121, BIN 1-00950-9, NY Routes 12 and 365 Interchange, Phase I	Located downstream in Town of Trenton. No sites discovered.	(New York State Museum, 2005)
Proposed Trenton-Middleville Pole Replacement, Phase I	Survey conducted east of Trenton Falls, in Town of Russia. No archeological sites identified.	(Panamerican, 2007)
PIN 2751.01, BIN 3308030, Hinckley Road over West Canada Creek, Phase I	The survey included the downstream portion of the Project along the West Canada Creek as part of a bridge replacement project. No archeological sites identified.	(New York State Museum, 1984)
Iroquois Gas Transmission System, Volume 1- New York, Phase I	Large survey conducted for extensive pipeline across New York. Nearby testing occurred downstream of the Project approximately 1 mile. Several sites identified.	(Garrow & Associates, 1990)

Figure 4.10.6-1: A circa 1920 view of the Hinckley Dam with the pulp mill's log boom behind the dam, slasher house on the earthen portion of the dam, and a large conveyor system below the dam, at the site of future Jarvis Hydroelectric Project, see circle



(Whitford, 1922). <http://www.eriecanal.org/texts/Whitford/1921/Hinckle.jpg>

4.11 Socio-Economic Resources (18 C.F.R § 5.6(d)(3)(xi))

4.11.1 Development Patterns

Hinckley Reservoir is within the Towns of Remsen and Trenton in Oneida County, and Russia and Ohio in Herkimer County. While Oneida and Herkimer Counties are overall 67 and 48 percent urban, respectively, the four towns surrounding the reservoir are considered 100 percent rural. Population densities within the towns range from just 3.3 persons per square mile in the Town of Ohio to 130.7 in the Town of Trenton. By comparison, the density of the State of New York is 411.2 persons per square mile, and Oneida and Herkimer Counties have 193.7 and 45.7 persons per square mile, respectively.

Housing unit densities are similarly spread, ranging from 3.3 units per square mile in the Town of Ohio to 45.4 in the Town of Trenton, with State of New York densities at 172.1 units per square mile ([Table 4.11.1-1](#)). The Town of Ohio's high housing unit density in relation to its population density (both at 3.3/mi²) reflects the town's high proportion of seasonal housing units ([Table 4.11.1-2](#)).

Vacancy rates for Oneida and Herkimer Counties are higher than that of the State of New York ([Table 4.11.1-2](#)). With the exception of the Town of Trenton, the towns abutting Hinckley Reservoir have even higher vacancy rates, with the Town of Ohio topping the list at 58 percent. These higher vacancy rates seem to reflect the higher percentage of seasonal housing units within the towns. With the exception of the Town of Trenton, with just 4 percent of its housing stock in seasonal use, the Towns of Russia, Remsen, and Ohio have high seasonal usage relative to their respective counties and the State as a whole.

4.11.2 Population Patterns and Projections

4.11.2.1 Current and Historical Population

Current and historical population projections for the municipalities abutting the Project are presented in [Table 4.11.2.1-1](#). Between 1980 and 2015, the population in Oneida County as a whole declined by 8.3 percent. The Town of Remsen in this same time frame grew by 18.5 percent, while the Town of Trenton maintained roughly the same population. During the same time frame, Herkimer County population declined by 5.4 percent, although both the Town of Ohio and the Town of Russia experienced population growth, with a 27.3 percent change for the Town of Ohio and a 6.2 percent change for the Town of Russia. New York State grew by 12.7 percent from 1980 to 2015. Although the historic population of some abutting towns has changed significantly since 1980, census estimates for 2015 indicated that populations in each of the abutting towns and counties declined or grew at a maximum rate of 2.2 percent from 2010 census populations.

4.11.2.2 Projected Changes in Population

Cornell University's Program on Applied Demographics has developed county-level population projections for New York in five-year increments through the year 2040. The projections are based on the rates of change from historical data. Population counts from the 2010 Census serve as the starting point for the projections. As shown in [Table 4.11.2.2-1](#), populations for Oneida and Herkimer Counties are projected to steadily decline through 2040. Projections for the State of New York indicate slow growth through 2030, followed by a slight decline, with a cumulative growth rate of 1.3 percent from 2010 to 2040.

4.11.3 Economic and Employment Patterns

4.11.3.1 Labor Force and Unemployment

[Table 4.11.3.1-1](#) presents 2015 labor force and unemployment estimates for the municipalities abutting the Project Area. Oneida County and Herkimer County are within a percentage point of the State of New York's 8.2 percent unemployment rate, while the Towns of Remsen and Russia are within 1.5 percent. At 3.9 percent, the Town of Trenton's rate is lower than that of all the abutting municipalities and less than half of the Statewide rate, while the Town of Ohio, at 20.2 percent, is more than twice the State's rate.

4.11.3.2 Income and Poverty

The abutting municipalities have lower median household incomes than the State as a whole, with the exception of the Town of Trenton, which is nearly 14 percent higher than the State and 25 percent higher than the nation ([Table 4.11.3.2-1](#)). The Town of Trenton also has a higher per capita income than the other abutting municipalities and the nation, although the State's per capita income comes in over 8 percent higher than the Town of Trenton's. The Town of Ohio has the lowest median household and per capita income of the municipalities in question, as well as the highest poverty rate, with 18.3 percent of all residents earning below the poverty threshold. The Town of Trenton has the lowest poverty rate at 7.8 percent, which is roughly half the rate of Herkimer County and the State of New York.

4.11.3.3 Industry and Occupation

[Table 4.11.3.3-1](#) depicts industry and occupation categories for the abutting municipalities and the State of New York. Educational, health and social services was the highest reported industry category for all municipalities. In all municipalities except the Town of Ohio, more than twice as many people were employed in this industry category than in any other. Retail trade and manufacturing industries were also well represented in each of the municipalities.

For all municipalities except the Town of Remsen, the occupation category for management, business, science, and arts was the highest reported. Sales and office occupations were the second highest reported for most municipalities, with service occupations coming in close behind. Natural resources, construction, and maintenance was the lowest reported occupation category for most of the abutting municipalities, as well as for the State of New York.

Table 4.11.1-1 Place of Residence and Density, 2010

	Oneida Co.	Town of Remsen	Town of Trenton	Herkimer Co.	Town of Ohio	Town of Russia	NY State
Place of residence: Urban	67%	0%	0%	48%	0%	0%	86%
Place of residence: Rural	33%	100%	100%	52%	100%	100%	14%
Population	234,878	1,929	4,498	64,519	1,002	2,587	19,378,102
Persons per square mile	193.7	54.4	130.7	45.7	3.3	45.4	411.2
Housing units	104,074	1,089	1,970	33,381	1,006	1,403	8,108,103

[Census, 2010a](#)

Table 4.11.1-2: Housing Characteristics, 2010 (% of Total Units)

	Oneida Co.	Town of Remsen	Town of Trenton	Herkimer Co.	Town of Ohio	Town of Russia	NY State
Housing units: Total	104,074	1,089	1,970	33,381	1,006	1,403	8,108,103
Occupancy Status: Occupied	87%	71%	91%	79%	42%	75%	90%
Occupancy Status: Vacant	13%	29%	9%	21%	58%	25%	10%
Seasonal use	3%	23%	4%	14%	51%	20%	4%

[Census, 2010b](#)

Table 4.11.2.1-1: Historical Population, 1980 through 2015

	1980 ¹	1990 ¹	2000 ¹	2010 ²	2015 ²
Oneida County	253,466	250,836	235,469	234,878	232,500
Change		-1.0%	-6.1%	-0.3%	-1.0%
Cumulative from 1980		-1.0%	-7.1%	-7.3%	-8.3%
Town of Remsen	1,614	1,739	1,950	1,929	1,913
Change		7.7%	12.1%	-1.1%	-0.8%
Cumulative from 1980		7.7%	20.8%	19.5%	18.5%
Town of Trenton	4,449	4,682	4,668	4,498	4,447
Change		5.2%	-0.3%	-3.6%	-1.1%
Cumulative from 1980		5.2%	4.9%	1.1%	0.0%
Herkimer County	66,714	65,797	64,427	64,519	63,100
Change		-1.4%	-2.1%	0.1%	-2.2%
Cumulative from 1980		-1.4%	-3.4%	-3.3%	-5.4%
Town of Ohio	788	880	926	1,002	1,003
Change		11.7%	5.2%	8.2%	0.1%
Cumulative from 1980		11.7%	17.5%	27.2%	27.3%
Town of Russia	2,405	2,294	2,488	2,587	2,555
Change		-4.6%	8.5%	4.0%	-1.2%
Cumulative from 1980		-4.6%	3.5%	7.6%	6.2%
New York State	17,558,072	17,990,455	18,976,457	19,378,102	19,795,791
Change		2.5%	5.5%	2.1%	2.2%
Cumulative from 1980		2.5%	8.1%	10.4%	12.7%
1Vink, 2013					
2Census, 2015b					

Table 4.11.2.2-1: Population Projections, 2015 through 2040

	2010 est.	2015 proj.	2020 proj.	2025 proj.	2030 proj.	2035 proj.	2040 proj.
Oneida County	234,878	233,403	232,007	229,967	226,871	222,718	217,899
Change		-0.6%	-0.6%	-0.9%	-1.4%	-1.9%	-2.2%
Cumulative from 1950		-0.6%	-1.2%	-2.1%	-3.5%	-5.5%	-7.8%
Herkimer County	64,519	63,589	62,261	60,455	58,167	55,424	52,350
Change		-1.5%	-2.1%	-3.0%	-3.9%	-4.9%	-5.9%
Cumulative from 1950		-1.5%	-3.6%	-6.7%	-10.9%	-16.4%	-23.2%
New York State	19,378,102	19,546,904	19,697,021	19,786,848	19,794,733	19,729,053	19,623,506
Change		0.9%	0.8%	0.5%	0.0%	-0.3%	-0.5%
Cumulative from 1950		0.9%	1.6%	2.1%	2.1%	1.8%	1.3%

[Vink, 2011.](#)

Table 4.11.3.1-1: Labor Force and Unemployment, 2015

	Oneida Co.	Town of Remsen	Town of Trenton	Herkimer Co.	Town of Ohio	Town of Russia	NY State
Labor Force	112,269	1,080	2,371	31,847	451	1,188	10,083,719
Unemployment	7.4%	9.7%	3.9%	8.7%	20.2%	9.7%	8.2%

[Census, 2015a](#)

Table 4.11.3.2-1: Income and Poverty, 2014

	Oneida Co.	Town of Remsen	Town of Trenton	Herkimer Co.	Town of Ohio	Town of Russia	NY State
Median household income	\$48,931	\$53,939	\$66,780	\$45,649	\$36,667	\$41,677	\$58,687
Percentage of State	83.4%	91.9%	113.8%	77.8%	62.5%	71.0%	100.0%
Percentage of U.S. ¹	91.5%	100.9%	124.9%	85.4%	68.6%	77.9%	109.7%
Per capita income	\$25,633	\$27,028	\$30,145	\$23,607	\$21,186	\$22,822	\$32,829
Percentage of State	78.1%	82.3%	91.8%	71.9%	64.5%	69.5%	100.0%
Percentage of U.S. ²	89.8%	94.7%	105.6%	82.7%	74.2%	79.9%	115.0%
Poverty Status: All People	16.5%	16.2%	7.8%	15.9%	18.3%	14.8%	15.6%
Poverty Status: Under 18 yrs.	25.7%	26.5%	8.4%	25.1%	28.3%	16.7%	22.1%
Poverty Status: 18-64 years	15.1%	14.4%	9.5%	14.6%	17.3%	15.7%	14.3%
Poverty Status: 65 yrs. & over	9.1%	8.5%	0.9%	9.2%	10.3%	7.6%	11.4%

[Census, 2014b.](#)

¹US Median Household Income: \$53,482

²US Per Capita Income: \$28,555

Table 4.11.3.3-1: Industry and Occupation for Civilian Population 16 Years and Over, 2014

	Oneida Co.	Town of Remsen	Town of Trenton	Herkimer Co.	Town of Ohio	Town of Russia	NY State
Industry							
Agriculture, forestry, fishing, hunting, mining	1,238	20	32	698	19	38	55,088
Construction	4,985	41	128	2,124	80	95	507,377
Manufacturing	10,581	128	224	3,505	28	108	602,516
Wholesale trade	1,668	16	19	670	12	25	228,052
Retail trade	11,430	108	204	3,566	79	131	991,115
Transportation & warehousing, & utilities	3,990	48	141	999	5	42	463,086
Information	1,534	5	46	336	2	25	265,117
Finance, insurance, real estate & rental	8,193	79	200	1,629	19	114	743,192
Professional, scientific, management, administrative, & waste management services	7,805	74	135	1,753	9	45	1,033,130
Educational, health & social services	29,696	272	643	8,218	95	333	2,512,908
Arts, entertainment, recreation, accommodation & food services	9,590	49	174	2,509	35	70	843,139
Other services (except public administration)	5,180	65	23	1,459	4	39	462,783
Public administration	8,072	83	270	1,521	26	56	430,037
Occupation							
Management, business, science, & arts	36,895	253	851	9,423	109	373	3,553,854
Service	21,299	220	414	5,750	52	211	1,850,031
Sales & office	24,472	260	490	7,054	93	312	2,194,062
Natural resources, construction, maintenance	8,497	91	172	2,913	96	121	669,274
Production, transportation, material moving	12,799	164	312	3,847	63	104	870,319

[Census, 2014a.](#)

4.12 Tribal Resources (18 C.F.R § 5.6(d)(3)(xii))

There are no Native American lands within the Project Boundary. According to the Bureau of Indian Affairs and the New York State OPRHP, Native American Nations that may have an interest in the relicensing of the Project include the St. Regis Mohawk Tribe and the Oneida Indian Nation of New York.

The Power Authority will contact the Nations, requesting any existing, relevant, and reasonably available information with respect to resources of concern.

Currently, there are no known Native American traditional cultural properties (TCPs) or religious properties within the Project Boundary. Nor are there known National Register-eligible or -listed sites associated with Native American Nations. At this time, there are no known adverse effects on properties related to Native American Nation interests by the Project.

5 Preliminary Issues and Studies List (18 CFR § 5.6(d)(4))

5.1 Issues Pertaining to the Identified Resources

Based on the information provided in [Section 4](#), the Power Authority believes that sufficient information already exists for the vast majority of environmental resources at the Project. As such, and as discussed in [Section 5.2](#), the Power Authority is proposing one study at this time.

5.1.1 Geology and Soils

Based on the extensive information that is available, the Power Authority believes that it has sufficient information to adequately characterize geology and soil resources within the Project Boundary. Given the composition, characteristics, and conditions of the reservoir banks, shoreline erosion is not believed to be an issue. Hinckley Reservoir water levels are the result of water level and flow management by the NYSCC in accordance with the 2012 Operating Diagram. Due to the various legal agreements in place, current reservoir water level and flow management will continue in the future with or without the Project operating.

There are currently no known issues related to geology and soils at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.2 Water Resources

Hinckley Reservoir is operated by the NYSCC in accordance with the 2012 Operating Diagram. Reservoir releases are determined by the time of year and Hinckley Reservoir elevation. The Power Authority does not deviate from the Operating Diagram unless directed to do so by the NYSCC. In regard to the current 160 cfs continuous minimum flow requirement, and as demonstrated in [Section 4.3.1](#), for all months except March and April, Project outflow exceeds inflow, as the inflow is supplemented with reservoir storage. This is typical of a seasonal store and release reservoir. Given the various legal agreements in place which govern reservoir operations, no further studies for this resource are proposed at this time.

In regard to water quality, review of the available data provided by NYSDEC and MWWA indicate that the Project does not adversely impact water quality. Based on the results of this analysis, no further studies for this resource are proposed at this time.

5.1.3 Fish and Aquatic Resources

Based on available information, fisheries resources within the Project area have been characterized, but with an emphasis on gamefish species. Little or no applicable information was available to characterize certain aspects of fish and aquatic resources, including reproduction and early life history, seasonal occupancy; impingement, entrainment, and passage survival at the Project intakes; and macroinvertebrates, mussels, and zooplankton resources.

Fish movements are impeded by the presence of the dam. Additionally, the presence of the reservoir likely promotes populations of lentic species. Spawning success can be directly affected by water level and flow management of Hinckley Reservoir by NYSCC, particularly the altering or dewatering of any potential spawning habitat. Water level fluctuations may also have secondary impacts on fish growth and survival by influencing the productivity of the reservoir and the resulting food webs. Due to the various legal agreements in place, seasonal water level fluctuations will continue in the future with or without the Project operating.

Since the 5 ³/₈-inches spacing of the Project intake trashracks is relatively wide, impingement of fish is unlikely to be of concern. Entrainment of fish in Project turbines represents downstream passage of fish that could reduce populations within Hinckley Reservoir, though also providing a genetic link to downstream populations; however, species assemblage and size distribution of entrained fish is unknown. Additionally, turbine passage of fish at the Project has an associated mortality that is unknown.

5.1.4 Wildlife and Botanical Resources

There is a very limited amount of terrestrial habitat located within the Project Boundary; out of the approximately 2,818 acres within the Project Boundary, only 96 acres are considered upland.

There are currently no known issues related to wildlife and botanical resources at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.5 Wetlands, Riparian, and Littoral Habitat

The Project Boundary follows the shoreline of Hinckley Reservoir at the normal pool elevation of 1225; as such, there is a very limited amount of wetland, riparian, or littoral habitat within the Project Boundary. The wetland plant communities that currently exist within the Project Boundary have become established under the current operating regime that has existed for many years since the Project was constructed. Seasonal water level fluctuations that occur throughout the reservoir are either naturally occurring or are the result of the 2012 Operating Diagram. Due to the various legal agreements in place, these seasonal water level fluctuations will continue in the future with or without the Project operating.

There are currently no known issues related to wetland, riparian, or littoral habitat resources at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.6 Rare, Threatened, and Endangered Species

There is a limited amount of botanical and wildlife habitat located within the Project Boundary that would support RTE species that have the potential to be present in the Project area; only 96 acres are upland, while 2,667 acres are open water. Existing communities that may potentially exist within the Project Boundary, if any, would have become established under the current operating regime that has existed for many years since the Project was constructed.

There are currently no known issues related to RTE species at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.7 Recreation and Land Use

There are currently no known issues related to land use at the Project. In regard to recreation, potential issues which may need to be examined include seasonal reservoir water level fluctuations and their impact on recreational access, and informal camping and use on beaches and islands. While seasonal water level fluctuations have been observed to impact recreation opportunities, it is important to note that these fluctuations are a result of the 2012 Hinckley Reservoir Operating Diagram.

At this time the Power Authority does not propose further studies pertaining to land use; however, additional studies pertaining to recreation may be required.

5.1.8 Aesthetic Resources

There are currently no known issues related to aesthetic resources at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.9 Cultural Resources

There are currently no known issues related to cultural resources at the Project. Pending consultation with the SHPO, no further studies for this resource are proposed at this time.

5.1.10 Socio-Economic Resources

There are currently no known issues related to socioeconomic resources at the Project. As a result, no further studies for this resource are proposed at this time.

5.1.11 Tribal Resources

There are currently no known issues related to tribal resources at the Project. Pending consultation with the Tribal Nations, no further studies are proposed at this time.

5.2 Potential Studies or Information Gathering

This section identifies potential studies or information gathering that may be needed to analyze the preliminary resource issues identified in [Section 5.1](#).

5.2.1 Assessment of Fish Entrainment and Turbine Passage Survival

The Power Authority is proposing to conduct a literature-based assessment of fish entrainment and turbine passage survival to gain a more complete understanding of any fish passage occurring through the Project's turbines.

5.2.1.1 Study Objective

The objectives of the study are to evaluate the potential for fish entrainment and associated turbine passage mortality at the Project using existing scientific literature and data and to assess the potential effects of entrainment on fish communities at the Project.

5.2.1.2 Project Nexus

Flow through the Project trashracks and generating units could potentially lead to fish being entrained through the powerhouse, which may cause some level of mortality associated with Project operations.

5.2.1.3 Methodology / Level of Effort

Study methods may include: 1) Determining the fish species of interest relative to the assessment, 2) Evaluating which fish species have the potential to be entrained at the Project, based on habitat preferences, behavior or other relevant characteristics; 3) Reviewing studies and associated data conducted at similar projects for relevance to potential entrainment and turbine passage survival at the Project, and 4) Determining potential impacts of the Project on fish species of interest due to entrainment.

5.3 Relevant Qualifying Comprehensive Waterway Plans

Section 10(a)(2)(A) of the Federal Power Act (FPA), 16 USC § 803(a)(2)(A), requires FERC to consider the extent to which a project is consistent with Federal or state comprehensive plans for improving, developing, or conserving a waterway affected by the project. FERC Order No. 481-A, issued on April 27, 1998, established that FERC will accord comprehensive plan status under FPA Section 10(a)(2)(A) to any Federal or state plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
- Specifies the standards, the data, and the methodology used; and
- Is filed with the Secretary of the Commission.

FERC currently lists 40 comprehensive plans for the State of New York, 9 of which pertain to waters in the vicinity of the Project.

- Adirondack Park Agency. 1985. Adirondack Park state land master plan. Ray Brook, New York. January 1985.
- Adirondack Park Agency. n.d. New York State wild, scenic, and recreational rivers system field investigation summaries. Albany, New York.
- New York State Office of Parks, Recreation, and Historic Preservation. New York Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2003-2007. Albany, New York. January 2003.¹⁸
- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
- New York Department of Environmental Conservation. 1979. Hudson River Basin water and related land resources: Level B study report and environmental impact statement. Albany, New York. September 1979.
- New York Department of Environmental Conservation. 1985. New York State Wild, Scenic, and Recreational River System Act. Albany, New York. March 1985.
- State of New York Hudson River Regulating District. 1923. General plan for the regulation of the flow of the Hudson River and certain of its tributaries. Albany, New York. June 7, 1923. 63 pp.
- U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.
- U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

Source: [FERC Revised List of Comprehensive Plans, December 2016](#)

5.4 Relevant Resource Management Plans

In addition to the qualifying Federal and state comprehensive waterway plans listed in [Section 5.3](#) above, some agencies have developed resource management plans to help guide their actions regarding specific resources of jurisdiction. The resource management plans listed below may be relevant to the Project and may be useful in the relicensing proceeding for characterizing desired conditions.

¹⁸ An updated version, 2014-2019 is available but not included in the FERC 2016 List.

- New York State Department of Environmental Conservation (NYSDEC). 2014. [Black Bear](#) Management Plan for New York State Albany, NY.
- New York State Department of Environmental Conservation (NYSDEC). 2011. Management Plan for [White-tailed Deer](#) in New York State 2012-2016. Albany, NY.
- New York State Department of Environmental Conservation (NYSDEC). 2012. Management Plan for [Bobcat](#) in New York State 2012-2017. Albany, NY.
- New York State Department of Environmental Conservation (NYSDEC). 2015. New York State [Fisher](#) Management Plan. Albany, NY.
- New York State Department of Environmental Conservation (NYSDEC). 2005. New York State [Wild Turkey](#) Management Plan. Albany, NY.
- New York State Department of Environmental Conservation (NYSDEC). 2011. New York State [Invasive Species](#) Management Strategy. Ecology and Environment, Inc.

6 Literature and Information Sources Cited in the Descriptions and Summaries of Existing Resource Data (18 C.F.R § 5.6(c)(2))

- Abel, Timothy J. 2011. Phase I Supplemental Archaeological Survey, Hinckley Sewer System, Town of Trenton, Oneida County. Submitted to The Town of Trenton. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- Adirondack Park Agency. 1979. Citizen's Guide to Adirondack Park Agency Land Use Regulations. [Online] URL: < <http://www.apa.ny.gov/Documents/Guidelines/CitizensGuide.pdf>>. Accessed: September 1, 2016.
- Adirondack Park Agency. 2014. Adirondack Park Land Use and Development Plan Map and State Land Map - February 2014 edition. [Online] URL: <<http://adirondack.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=625564b0f5b249f2ba29a931f23891ad>>. Accessed October 14, 2016.
- Adirondack Park Agency. 2015. Shoreline Restrictions. December 1, 2015. [Online] URL: <<http://www.apa.ny.gov/Documents/Flyers/ShorelineRestrictions.pdf>>. Accessed: October 6, 2016.
- Adirondack Park Invasive Plant Program. 2016a. Giant Hogweed. Adirondack Partnership for Regional Invasive Species Management (PRISM). http://adkinvasives.com/species_of_concern/giant-hogweed/?in=terrestrial-target-species Date Accessed: 11/11/2016
- Adirondack Park Invasive Plant Program. 2016b. Common Reed Grass. Adirondack Partnership for Regional Invasive Species Management (PRISM). http://adkinvasives.com/species_of_concern/common-reed-grass/?in=terrestrial-target-species Date Accessed: 11/11/2016
- Allen, D.C., and C.C. Vaughn. 2010. Complex hydraulic and substrate variables limit freshwater mussel species richness and abundance. *Journal of the North American Benthological Society* 29:383-394.
- Anderson, M.G. M. Clark, C.E. Ferree, A. Jospe, A. Olivero Sheldon and K.J. Weaver. 2013. Northeast Habitat Guides: A companion to the terrestrial and aquatic habitat maps. The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office. Boston, MA. <http://nature.ly/HabitatGuide> Date Accessed 2/5/2017
- Bashant, Nancy and Virginia B. Kelly, (editors). 1977. The History of Oneida County: Commemorating the Bicentennial of our National Independence. Oneida County, Utica.
- Benton, Nathaniel S. 1856. A History of Herkimer County, Including the Upper Mohawk Valley. J. Munsell, Albany.
- Bode, R.W., M.A. Novak, L.E. Abele, D.L Heitzman, and A.J. Smith. 2004. Thirty year trends in water quality of rivers and streams in New York State based on macroinvertebrate data, 1972-2002. Mohawk River Drainage. Stream Biomonitoring Unit, Division of Water, NY State Department of Environmental Conservation. Albany.
- Bryce, S.A., Griffith, G.E., Omernik, J.M., Edinger, G., Indrick, S., Vargas, O., and Carlson, D., 2010, Ecoregions of New York (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey, map scale 1:1,250,000.

- Campisi, Jack and Elisabeth Tooker. 1978. Oneida. In *Northeast*, edited by B. G. Trigger, pp. 481-490. *Handbook of North American Indians*. vol. 15, W. C. Sturtevant, general editor. 20 vols. Smithsonian Institution, Washington D.C.
- Century Map Company. 1906. *New Century Atlas of Herkimer County*, New York. Century Map Co, Philadelphia.
- Century Map Company. 1907. *New Century Atlas of Oneida County*, New York. Century Map Co, Philadelphia.
- Connelly, N.A., and T.L. Brown. 2009a. *New York State Angler Survey, 2007 (revised). Report 1: angler effort and expenditures*. New York State Department of Environmental Conservation, Bureau of Fisheries. Albany.
- Connelly N.A., and T.L. Brown. 2009b. *New York State Angler Survey, 2007 (revised). Report 3: estimated angler effort and expenditures in New York state counties*. New York State Department of Environmental Conservation, Bureau of Fisheries. Albany.
- Culp, T, J. Homa, and J. Platt. 1981. *Fish habitat-flow relationship at six study releases below Trenton Hydroelectric Station on West Canada Creek, New York, during August and September 1980*. Niagara Mohawk Power Corporation, Syracuse.
- Dean & Barbour Associates, Inc. 2000. *Report of the State I A/B Cultural Resources Investigation for Proposed New Main Post Office, Village of Hinckley, Town of Trenton, Oneida County, New York*. Submitted to The United States Postal Service. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- DeWitt, Simeon. 1802. *A Map of the State of New York*.
- Dunn, H.L. 2000. Development of strategies for sampling freshwater mussels (*Bivalvia: Unionidae*). pp. 161-167 in R.A. Tankersley, D.I. Warmolts, G.T. Watters, B.J. Armitage, P.D. Johnson, and R.S. Butler (eds.). *Freshwater Mollusk Symposia Proceedings. Part II. Proceedings of the First Freshwater Mollusk Conservation Society Symposium*. Ohio Biological Survey Special Publication, Columbus. 274 pp.
- Durant, Samuel. 1878. *History of Oneida County, New York: With Illustrations and Biographical Sketches of Some of Its Prominent Men and Pioneers*. Everts & Fariss, Philadelphia.
- Environmental Protection Agency. 2001. *Effective Source Protection for Large Rural Watersheds - Hinckley Reservoir*. June 2001.
- Erway, W.D. 2012. *West Canada Creek creel survey 2007*. New York State Department of Environmental Conservation, Region 6, Bureau of Fisheries, Utica.
- Federal Energy Regulatory Commission. 1982. *Order issuing license to Power Authority of the State of New York for the Hinckley Hydroelectric Project, Project No. 3211-002*.
- Federal Energy Regulatory Commission. 2016. *List of Comprehensive Plans*.
<https://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf> Date Accessed: February 28, 2017.
- Fenton, William N. and Elisabeth Tooker. 1978. Mohawk. In *Northeast*, edited by B. G. Trigger, pp. 466-480. *Handbook of North American Indians*. vol. 15, W. C. Sturtevant, general editor. 20 vols. Smithsonian Institution, Washington D.C.

- Ferree, C and M. G. Anderson. 2013. A Map of Terrestrial Habitats of the Northeastern United States: Methods and Approach. The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office. Boston, MA.
<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/habitatmap/Pages/default.asp>
- Garrow & Associates, Inc. 1990. Iroquois Gas Transmission System, Phase I Archaeological Survey, Volume 1- New York. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- Hanson, Lindley. 2016. Geomorphology of Slopes. [Online] URL: http://w3.salemstate.edu/~lhanson/gls210/gls210_slopes.htm. Date Accessed: November 6, 2016.
- Hardin, G.A. and F.H. Willard. 1893. History of Herkimer County, New York. D. Mason & Company, Syracuse, NY.
- Heil, N.E. (editor). 2009. National Wild Fish Health Survey - Laboratory Procedures Manual. 5.0 Edition. U.S. Fish and Wildlife Service, Warm Springs, GA.
<https://www.fws.gov/wildfishsurvey/manual.htm>. Warm Springs, GA.: U.S Fish and Wildlife Service.
- Herkimer-Oneida Counties Comprehensive Planning Program. 1989. Hinckley Reservoir Study. Prepared for The towns of Russia, Ohio, and Remsen, New York.
- Hinckley Lake (NY) @hinckleylake. (2016a August 31). All help appreciated! [Facebook post]. Retrieved from <https://www.facebook.com/hinckleylake/>.
- Hinckley Lake (NY) @hinckleylake. (2016b). Photos of the fireworks June 29, 2016 and July 5, 2016. [Facebook page]. Retrieved from <https://www.facebook.com/hinckleylake/>.
- Hinckley Reservoir Working Group. 2008. Report to the Governor. Available at https://www.google.com/?gws_rd=ssl#q=hinckley+reservoir+working+group+report+to+the+governor.
- Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354
- Johnson, Paula. 2001. Railroads in the Town of Russia. In <http://townofrussia.com/content/History/Home/:field=documents;/content/Documents/File/102.pdf>, edited by T. o. Russia.
- Ichthyological Associates, Inc. 1980. West Canada Creek Instream Flow Study.
- Lellis, W.A, B.S.J. White, J.C. Cole, C.S. Johnson, J.L Devers, E.V.S. Gray, and H.S Galbraith. 2013. Newly documented host fishes for the Eastern Elliptio *Mussel Elliptio Complanata*. Journal of Fish and Wildlife Management. pp. 75-85.
- Mohawk Valley Water Authority (MVWA). 2016. Mohawk Valley Water Authority Water Sample Data from Hinckley Reservoir Intake and Tributaries. September 2016.

- National Park Service (NPS). 2016. National Center for Recreation and Conservation. Nationwide Rivers Inventory – New York Segments. [Online] URL: <<https://www.nps.gov/ncrc/programs/rtca/nri/states/ny.html>>. Accessed 10/14/2016.
- Natural Resources Conservation Service. 2016. NRCS Official Soil Series Description: Search. [Online] URL: <https://soilseries.sc.egov.usda.gov/osdname.aspx>. Date Accessed: November 9, 2016.
- Natural Resources Conservation Service, United States Department of Agriculture, in cooperation with Cornell University Agricultural Experiment Station. 2010. Soil Survey of Essex County, New York. [Online] URL: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/new_york/essexNY2010/Essex_NY.pdf. Date Accessed: November 9, 2016.
- National Wild and Scenic Rivers System. 2016. Explore Designated Rivers/New York. [Online] URL: <<https://www.rivers.gov/new-york.php>>. Accessed 10/14/2016.
- NatureServe. 2016. National species dataset. NatureServe.org. Accessed November 8, 2016.
- Neddeau EJ, McCollough MA, Swartz. BI. 2000. The Freshwater Mussels of Maine. Maine Department of Inland Fisheries and Wildlife, Augusta, Maine, USA.
- New York Department of Health. 1917. Thirty-Seventh Annual Report of the State Department of Health of New York, for the Year Ending December 31, 1916 2. J.B. Lyons Company, Albany, NY.
- New York Natural Heritage Program. 2016. Online Conservation Guide for Appalachian Oak-Hickory Forest. <http://www.acris.nynhp.org/guide.php?id=9980>. Accessed: 11/2/2016.
- New York Power Authority. 1997. FERC Form 80 for Gregory B. Jarvis Project 1996/97. March 1997.
- New York Power Authority. 2003. FERC Form 80 for Gregory B. Jarvis Project 2002. March 2003.
- New York Power Authority. 2009. FERC Form 80 for Gregory B. Jarvis Project 2008. March 2009.
- New York Power Authority. 2015. FERC Form 80 for Gregory B. Jarvis Project 2014. March 2015.
- New York State Canal Corporation. 2012. Canal Real Property Management Policy. [Online] URL: <<http://www.canals.ny.gov/business/realproperty/25-6-01c.pdf>>. Accessed September 13, 2016.
- New York State Canal Corporation. 2016. Hinckley Reservoir Levels. Albany, NY <http://www.canals.ny.gov/waterlevels/hinckley/hinckleywaterlevels.cgi>. Date Accessed: June 19, 2017.
- New York State Department of Environmental Conservation. 1996. Unit Management Plans for Black River Wild Forest Pratt-Northam Memorial Park. J.P. Lewis Tract Easement, John Brown Tract Easement.
- New York State Department of Environmental Conservation. 2010. Mohawk River Basin Waterbody Inventory and Priority Waterbodies List: Middle West Canada Creek Watershed. [Online]. URL: <http://www.dec.ny.gov/chemical/36739.html>. Date Accessed: November 10, 2016.
- New York State Department of Environmental Conservation. 2011a. Hinckley Reservoir LCI Lake Water Quality Summary. October 2011.

- New York State Department of Environmental Conservation. 2012. Mohawk River Basin Plan, Mohawk River Basin Action Agenda 2012-2016. New York State Department of Environmental Conservation. Schenectady, NY.
- New York State Department of Environmental Conservation. 2014b. Mohawk River Basin Waterbody Inventory and Priority Waterbodies List Fact Sheet. [Online]. URL: http://www.dec.ny.gov/docs/water_pdf/wipwlintro.pdf. Date Accessed: November 10, 2016.
- New York State Department of Environmental Conservation. 2015a. New York's Forest Preserve Black River Wild Forest. Map. <http://www.dec.ny.gov/outdoor/56067.html>. Accessed November 21, 2016.
- New York State Department of Environmental Conservation. 2016a. Fishing the West Canada Creek. New York State Department of Environmental Conservation. Watertown, NY. <http://www.dec.ny.gov/outdoor/9238.html>. Accessed November 2016.
- New York State Department of Environmental Conservation. 2016b. List of endangered, threatened and special concern fish and wildlife species of New York State. <http://www.dec.ny.gov/animals/7494.html>. Accessed November, 2016.
- New York State Department of Environmental Conservation. 2016c. New York Freshwater Fishing 2016-2017 Official Regulations Guide. Volume 8, Issue No. 1, April 2016. http://www.dec.ny.gov/docs/fish_marine_pdf/fishguide.pdf
- New York State Department of Environmental Conservation. 2016d. New York Nature Explorer County Results Report. Search Criteria: County: Herkimer; State Protection Status: Special Concern. <http://www.dec.ny.gov/natureexplorer/app/location/county> Accessed: November 2016.
- New York State Department of Environmental Conservation. 2016e. New York Nature Explorer County Results Report. Search Criteria: County: Oneida; State Protection Status: Special Concern. <http://www.dec.ny.gov/natureexplorer/app/location/county/results.4> Accessed: November 2016.
- New York State Department of Environmental Conservation. 2016f. Water quality assessment report. New York State Department of Environmental Conservation. http://www.dec.ny.gov/docs/water_pdf/wimohawkmidwcanada.pdf. Accessed September 23, 2016.
- New York State Department of Environmental Conservation. 2016g. Wild, Scenic and Recreational Rivers. [Online] URL: < <http://www.dec.ny.gov/permits/32739.html> >. Accessed 10/5/2016.
- New York State Department of Environmental Conservation. (undated). Hinckley State Forest. <http://www.dec.ny.gov/lands/107746.html>. Accessed November 21, 2016.
- New York State Department of Transportation. 2013. GEOTECHNICAL DESIGN MANUAL: Chapter 3, Geology of New York State, July 17, 2013.
- New York State Museum. 1984. Cultural Resources Survey Report, PIN 2751.01, BIN 3308030, Hinckley Road over West Canada Creek, Towns of Trenton & Russia, Oneida and Herkimer Counties. Submitted to The New York State Department of Transportation. On file at OPHHP, Waterford, NY.
- New York State Museum. 2005. Cultural Resource Reconnaissance Survey Report for PIN 2016.66.121, BIN 1-00950-9, NY Routes 12 and 365 Interchange, Town of Trenton, Oneida County. Submitted

- to The New York Department of Transportation. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- New York State Office of Parks, Recreation and Historic Preservation. 2014. Statewide Comprehensive Outdoor Recreation Plan 2014-2019. March 26, 2014.
- Panamerican Consultants, Inc. 2007. Phase I Cultural Resources Investigation for the Proposed Trenton-Middleville Pole Replacement, Town of Russia, Herkimer County, New York. Submitted to National Grid. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- Reswick, S. 1916. Long Log and Block Conveyor at Hinckley Dam Engineering News 75(12):552-553.
- Ritchie, William A. 1969. The Archaeology of New York State. The Natural History Press, Garden City, NY.
- Rush, Laurie and Charlene Keck. 2009. Archeologist's Report, Phase IA/B Archeological Investigation, Hinckley Sewer District, Hamlet of Hinckley, Town of Trenton, Oneida County, New York. Submitted to The Bernier Carr Group. On file at OPRHP, Waterford, NY, Cultural Resource Information System, <http://cris.parks.ny.gov>.
- Saunders, D.A. 1989. Adirondack Amphibians and Reptiles. AEC Special Report No. 31. 8 pp. <http://www.esf.edu/aec/adks/herps.htm>. Date Accessed: 11/9/2016
- Snow, Dean R. 1994. The Iroquois. The Peoples of America. Blackwell Publishers, Inc., Cambridge.
- Snow, Dean R. 1995. Mohawk Valley Archaeology: The Sites. State University of New York, Albany.
- State of New York. 1910. Improvement of the Erie, Oswego and Champlain Canals, Chapter 147, Laws of 1903 and Amendatory Laws, Erie Canal, Contract No. 50, Section 5, Special Deputy State Engineer Barge Canal Collection.
- State of New York. 2016a. Official Compilations of Codes, Rules and Regulations of the State of New York – Tile 6. Department of Environmental Conservation – Chapter X. Division of Water Resources – Subchapter A. General – Article 2. Classifications and Standards of Quality and Purity Part 701 Classifications – Surface Waters and Groundwaters. [Online]. URL: [https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I0682f230b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I0682f230b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)). Date Accessed: November 10, 2016.
- State of New York. 2016b. Official Compilations of Codes, Rules and Regulations of the State of New York – Tile 6. Department of Environmental Conservation – Chapter X. Division of Water Resources – Subchapter B. Classes and Standards of Quality and Purity Assigned to Fresh Surface and tidal Salt Waters - Article 11. Mohawk River Drainage Basins Series Part 880. West Canada Creek Drainage Basin. [Online] URL: [https://govt.westlaw.com/nycrr/Document/I4edf45bacd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/I4edf45bacd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)). Accessed 10/5/2016.
- State of New York. 2016c Official Compilations of Codes, Rules and Regulations of the State of New York – Tile 6. Department of Environmental Conservation – Chapter X. Division of Water Resources – Subchapter A. General – Article 2. Classifications and Standards of Quality and Purity – Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations. [Online]. URL:

[https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=1070d30d0b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=1070d30d0b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)). Date Accessed: November 10, 2016.

State of New York Supreme Court. 2013. Mohawk Valley Water Authority v. The State of New York, Erie Boulevard Hydropower, LP and the New York State Canal Corporation: Stipulation and Order of Final Settlement and Amendment of the December 27, 1917 Agreement between the State of New York and the Consolidated Water Company of Utica, NY, Predecessor to the Mohawk Valley Water Authority. February 1, 2013.

Strayer, D.L. and K.J. Jirka. 1997. The pearly mussels of New York State. The New York State Education Department. Fort Orange Press Incorporated. Albany. 113 pp.

The Hinckley Reservoir Working Group. 2008. Report to the Governor by the Hinckley Reservoir Working Group. April 8, 2008. [Online] URL: https://www.health.ny.gov/environmental/investigations/hinckley_reservoir/docs/2008-04-30_report_to_the_governor.pdf. Date Accessed: July 27, 2016.

Tippetts-Abbett-McCarthy-Stratton Engineers and Architects. 1980. Hinckley Reservoir Hydroelectric Development Feasibility Study. Submitted to The Power Authority of the State of New York. On file at New York State Library.

Town of Remsen. 2008. Minimum Lot Size and Requirements for Buildings Law. [Online] URL: <<http://town.remsen.ny.us/content/Laws/View/1:field=documents;/content/Documents/File/58.pdf>>. Accessed September 16, 2016.

Town of Russia. 2005. Town of Russia Comprehensive Plan, Rev. A., as adopted March 2005. [Online] URL: <<http://townofrussia.com/content/Laws/View/1>>. Accessed September 16, 2016.

Town of Russia. 2012. Land Use Regulation Law. [Online] URL: <<http://townofrussia.com/content/Laws/View/1>>. Accessed September 16, 2016.

Town of Trenton. 2000. Town of Trenton Zoning Local Law. [Online] URL: <<http://town.trenton.ny.us/content/Laws/View/36:field=documents;/content/Documents/File/478.pdf>>. Accessed September 16, 2016.

Town of Trenton. 2007. Town of Trenton Master Plan for Recreational Trails. [Online] URL: <<http://town.trenton.ny.us/content/Boards/View/4:field=documents;/content/Documents/File/254.pdf>>. Accessed September 7, 2016.

Tug Hill Commission. 2016. New York State Tug Hill Commission: Tug Hill Region. [Online]. URL: <http://www.tughill.org/tug-hill-region/>. Date Accessed: November 6, 2016.

United States Census Bureau. 1960. Census of Population: 1960 Volume 1 Characteristics of the Population. [Online] URL: <https://www.census.gov/prod/www/decennial.html>. Accessed September 12, 2016.

United States Census Bureau. 2010a. Population, Housing Units, Area, and Density: 2010 - State -- Place and (in selected states) County Subdivision. [Online] URL: http://factfinder.census.gov/bkmk/table/1.0/en/DEC/10_SF1/GCTPH1.ST10?slice=GEO~0400000US36. Accessed September 12, 2016.

United States Census Bureau. 2010b. Profile of General Population and Housing Characteristics: 2010. [Online] URL:

- http://factfinder.census.gov/bkmk/table/1.0/en/DEC/10_SF1/SF1DP1/0500000US36043|0500000US36065|0600000US3604354507|0600000US3604364254|0600000US3606561126|0600000US3606575280?slice=GEO~0600000US3606575280. Accessed September 13, 2016.
- United States Census Bureau. 2014a. 2010-2014 American Community Survey 5-Year Estimates: DP03 – Selected Economic Characteristics. [Online] URL: <<http://factfinder2.census.gov>>. Accessed September 16, 2016.
- United States Census Bureau. 2014b. 2010-2014 American Community Survey 5-Year Estimates: S1701 – Poverty Status in the Past 12 Months. [Online] URL: <http://factfinder.census.gov/bkmk/table/1.0/en/ACS/14_5YR/S1701/0500000US36065>. Accessed September 16, 2016.
- United States Census Bureau. 2015a. 2010-2015 American Community Survey 5-Year Estimates: DP03 – Selected Economic Characteristics. [Online] URL: <<http://factfinder2.census.gov>>. Accessed February 21, 2017.
- United States Census Bureau. 2015b. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015. [Online] URL: <<http://www.census.gov/popest/data/index.html>>. Accessed September 14, 2016.
- United States Fish and Wildlife Service. 2009. National wild fish health survey case report: LM2009-253. <http://ecos.fws.gov/wildfishsurvey/database/nwfh/s/report/html/case/LM2009-253>. Accessed November, 2016.
- United State Fish and Wildlife Service. 2013. Classification of Wetlands and Deepwater Habitats of the United States. <https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States-2013.pdf>
- United States Fish and Wildlife Service. 2015. Birds of Conservation Concern. September 25, 2015. <https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php> Date Accessed: November 15, 2016.
- United States Fish and Wildlife Service. 2016a. ECOS - Environmental Conservation Online System. <http://ecos.fws.gov/ecp/>. Accessed November 2016.
- United States Fish and Wildlife Service 2016b. IPaC Trust Resources Report. Environmental Conservation Online System (ECOS). <https://ecos.fws.gov/ipac/project/7PGRKHW4PBHEBNKLM22GEJKZZA> Accessed: October 2016.
- United States Fish and Wildlife Service 2016c. National Wetlands Inventory Wetland Classification Codes. <https://www.fws.gov/Wetlands/Data/Wetland-Codes.html> Accessed: October 2016.
- United States Fish and Wildlife Service. 2016d. National Wetlands Inventory Mapper V2. <https://www.fws.gov/wetlands/Data/Mapper.html> Accessed: October 2016.
- United States Forest Service. 2016. Ecological Subregions of the United States: Chapter 15, Section M212D: Adirondack Highlands. [Online] URL: <http://www.fs.fed.us/land/pubs/ecoregions/toc.html>. Date Accessed: November 2, 2016.
- United States Geological Survey. 2016. Mineral Resources On-Line Spatial Data. Mineral Resources, Online Spatial Data, Geology, by State, New York. Last modified Jul 20, 2016. <http://mrdata.usgs.gov/geology/state/state.php?state=NY>. Date Accessed: September 28, 2016.

Vink, J.K. 2011. New York Population Projection by Age and Sex. September 8, 2011. [Online] URL: <<http://pad.human.cornell.edu/counties/projections.cfm>>. Accessed: October 6, 2016.

Vink, J.K. 2013. New York profiles. Cornell Program on Applied Demographics. [Online] URL: <<https://pad.human.cornell.edu/profiles/index.cfm>>. Accessed September 14, 2016.

WCS North America. 2013. 2013 NY Loon Census Results for
Web.<https://programs.wcs.org/northamerica/Wild-Places/Adirondacks/Loon-Conservation/Loon-Census.aspx> Date Accessed 2/8/2017

Whitford, Noble E. 1922. History of the Barge Canal of New York State. State of New York, Albany.

**Appendix A – Summary of Contacts and Correspondence Letters Made to Gather Relevant
Information for Preparing the PAD**

Pursuant to 18 CFR 5.6(d)(5), the Power Authority has exercised its due diligence in determining what information exists relevant to the existing environment and potential impacts by contacting appropriate agencies and Native American Nations that may have relevant information pertinent to the Project.

Summary of Contacts

Date	Title	Correspondence From	Correspondence To	Description	Link
9/8/2016	IPaC Trust Resources Report	Elisabeth Bleistine	U.S. Fish & Wildlife Service	Information for Planning and Conservation Online Tool for RTE species	PDF
9/29/2016	Email	David J Newman	Amanda Crandall	NYSDEC water quality information for Hinckley Reservoir	PDF
10/31/2016	Email	Michele Stottler	Richard Goodney (MVWA)	Mohawk Valley Water Authority provided water quality data.	PDF
November 2016	Email	Steve Leach	Frank Flack (NYSDEC)	Various fisheries data	PDF
11/23/2016	NY Natural Heritage Report	NY Natural Heritage Program	Jeff D. Gerlach	Map of the Gregory B. Jarvis Project with Natural Heritage Data	PDF
5/24/2017	Letter to Oneida Nation	Cindy Brady	Ray Halbritter Jesse Bergevin	Request for Information Letter to the Oneida Nation requesting information for use in the PAD development.	PDF
5/24/2017	Letter to Mohawk Tribe	Cindy Brady	Beverly Cook Ken Jock Ron LaFrance Arnold Printup	Request for Information Letter to the Mohawk Tribe requesting information for use in the PAD development	PDF
5/25/2017	Letter to SHPO	Cindy Brady	NY Cultural Resource System (CRIS)	Letter informing the NY SHPO of the Jarvis PAD development.	PDF
5/30/2017	Response Cards	Oneida Nation	Cindy Brady	Certified Mail return cards	PDF
5/30/2017	Response Cards	Mohawk Tribe	Cindy Brady	Certified Mail return cards	PDF
6/5/2017	06022017 CRIS System Response	Tim Lloyd	Cindy Brady	Response to 5/25/17 Letter to SHPO. Provided a unique project tracking number.	PDF

Hinckley Reservoir

IPaC Trust Resources Report

Generated September 08, 2016 01:45 PM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



Table of Contents

IPaC Trust Resources Report	<u>1</u>
Project Description	<u>1</u>
Endangered Species	<u>2</u>
Migratory Birds	<u>3</u>
Refuges & Hatcheries	<u>5</u>
Wetlands	<u>6</u>

U.S. Fish & Wildlife Service

IPaC Trust Resources Report



NAME

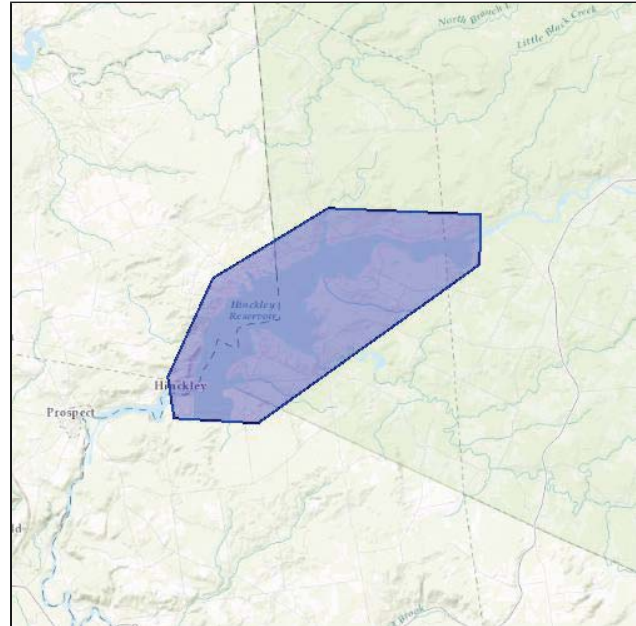
Hinckley Reservoir

LOCATION

Herkimer and Oneida counties, New York

IPAC LINK

<https://ecos.fws.gov/ipac/project/7PGRK-HW4PB-HEBNK-LM22G-EJKZZA>



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

New York Ecological Services Field Office

3817 Luker Road

Cortland, NY 13045-9349

(607) 753-9334

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Mammals

Northern Long-eared Bat *Myotis septentrionalis*

Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.^[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

American Bittern *Botaurus lentiginosus*

Bird of conservation concern

Season: Breeding

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle *Haliaeetus leucocephalus*

Bird of conservation concern

Season: Year-round

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bay-breasted Warbler *Dendroica castanea*

Bird of conservation concern

Season: Breeding

Black-billed Cuckoo *Coccyzus erythrophthalmus*

Bird of conservation concern

Season: Breeding

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0H1

Blue-winged Warbler *Vermivora pinus*

Bird of conservation concern

Season: Breeding

Canada Warbler *Wilsonia canadensis*

Season: Breeding

Bird of conservation concern

Golden-winged Warbler *Vermivora chrysoptera*

Season: Breeding

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0G4

Olive-sided Flycatcher *Contopus cooperi*

Season: Breeding

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0AN

Peregrine Falcon *Falco peregrinus*

Season: Breeding

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0FU

Pied-billed Grebe *Podilymbus podiceps*

Season: Breeding

Bird of conservation concern

Prairie Warbler *Dendroica discolor*

Season: Breeding

Bird of conservation concern

Red-headed Woodpecker *Melanerpes erythrocephalus*

Season: Breeding

Bird of conservation concern

Short-eared Owl *Asio flammeus*

Season: Wintering

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HD

Upland Sandpiper *Bartramia longicauda*

Season: Breeding

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HC

Willow Flycatcher *Empidonax traillii*

Season: Breeding

Bird of conservation concern

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0F6

Wood Thrush *Hylocichla mustelina*

Season: Breeding

Bird of conservation concern

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

[PEM1/SS1E](#)

[PEM1E](#)

[PEM1Eb](#)

[PEM1F](#)

[PEM1Fh](#)

Freshwater Forested/shrub Wetland

[PFO1/SS1E](#)

[PFO1E](#)

[PFO4/1E](#)

[PFO4E](#)

[PSS1/EM1E](#)

[PSS1E](#)

[PSS1F](#)

Freshwater Pond

[PUBFh](#)

[PUBH](#)

[PUBHh](#)

Lake

[L1UBHh](#)

Riverine

[R2UBH](#)

[R5UBH](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

Amanda Crandall

From: Newman, David J (DEC) <david.newman@dec.ny.gov>
Sent: Thursday, September 29, 2016 4:20 PM
To: Amanda Crandall
Subject: Hinckley Reservoir
Attachments: HinckleyReservoir.xlsx

Hi Amanda,

Attached is what I was able to pull together quickly. There are three worksheets within the excel workbook. The DECFisheriesData tab depth is in feet where the other two it is in meters.

Let me know if you have any questions

David J. Newman

Division of Water, Lake Monitoring and Assessment Section

New York State Department of Environmental Conservation

625 Broadway, 4th Floor, Albany, NY 12233-3502

P: (518) 402-8201 | F: (518) 402-9029 | david.newman@dec.ny.gov

www.dec.ny.gov |  | 

Michele Stottler

From: Michele Stottler
Sent: Thursday, January 05, 2017 10:30 AM
To: 'Phil Tangorra'
Subject: RE: Jarvis Relicensing - water quality data

Phil,

Thank you for the information. I think the unscrubbed data is useful.

We have one more request when it's convenient. Could you please send us the MVWA daily withdrawal amounts for 2008. We were able to download values from 2009 to the present from the NYSCC's website and Rich Mueller from NYPA had monthly values prior to 2008 but we're missing 2008.

Thanks again for your help.

Michele

From: Phil Tangorra [mailto:ptangorra@mvwa.us]
Sent: Thursday, January 05, 2017 9:56 AM
To: Michele Stottler <mstottler@gomezandsullivan.com>
Subject: RE: Jarvis Relicensing - water quality data

Michele,

I got your message yesterday. My apologies for the delay in getting this to you. Attached is draft watershed data and data from the MVWA Intakes. Please note that "Dam 33" means that the samples were collected from 33' below the floor of the intake tower, which is 1232.25' elevation. This translates to a sample from elevation of 1199'.

I hope this unscrubbed data is useful. I am a bit overwhelmed currently and could not dedicate more time to assist you more.

Phil

Philip A Tangorra
Director of Water Quality

Mohawk Valley Water Authority
1 Kennedy Plaza
Utica, NY 13502
315-792-0319 – office / 315-792-5201 – fax / 315-939-2404 – mobile
ptangorra@mvwa.us
www.mvwa.us

From: Michele Stottler [mailto:mstottler@gomezandsullivan.com]
Sent: Tuesday, December 06, 2016 4:19 PM
To: Phil Tangorra

Cc: Richard Goodney; Amanda Crandall

Subject: RE: Jarvis Relicensing - water quality data

Hi Phil,

I lost your email with the Thanksgiving holiday. Sorry. Thank you for your response.

We didn't get any answers from Kim about our questions below.

From your response, I gather that if there are data gaps in the attached spreadsheet for various years than no data was collected. Is that also true for 2016 or has it not been processed and added to the spreadsheet?

We're trying to figure out the water level of OCWA's sampling location. The top of the worksheet says 33' and the depth in column P says 33 meters. Is the sampling depth in meters or feet and is it referenced to a certain water level? Also, the depth is only filled out in the spreadsheet through 2005. Is it the sampling location from 2006 to the present also 33 meters?

Column P starting in 2012 lists values for TDS. Are the units for this parameter in mg/L?

Before you go to the trouble of scrubbing the tributary data, what do you collect and what period of record do you have? We have the 1999 and 2000 data from the EPA report.

Thanks for your help.

Michele



Michele E. Stottler, P.E.

Senior Water Resources Engineer
Gomez and Sullivan Engineers, DPC
399 Albany Shaker Road, Suite 203
Loudonville, NY 12211
Ph: 518-407-0050
Fax: 518-407-0053
mstottler@gomezandsullivan.com

From: Phil Tangorra [<mailto:ptangorra@mvwa.us>]

Sent: Monday, November 21, 2016 4:12 PM

To: Michele Stottler <mstottler@gomezandsullivan.com>

Subject: FW: Jarvis Relicensing - water quality data

Hi Michele,

I am not sure if you have received all of the info you requested but I know Kim provided some answers on intake depth. We would only have DO data that is listed, it is not housed any place else. Also, I can provide additional tributary data but it may take a little time for me to review and scrub the data. Let me know how you wish to proceed...

Have a great Thanksgiving

Phil

Philip A Tangorra
Director of Water Quality

Mohawk Valley Water Authority
1 Kennedy Plaza
Utica, NY 13502
315-792-0319 – office / 315-792-5201 – fax / 315-939-2404 – mobile
ptangorra@mvwa.us
www.mvwa.us

From: Richard Goodney
Sent: Tuesday, November 01, 2016 4:04 PM
To: Phil Tangorra
Subject: FW: Jarvis Relicensing - water quality data

Phil,

Gomez and Sullivan are assisting NYPA with their FERC relicensing. Michele works for them and is looking for both some missing and some additional WQ data. We had sent them some data last year or so when they were proposing on the Project.

Plus, she is looking for Tributary info as well if we have it.

Can we help her out?

Thanks, Dick

From: Michele Stottler [<mailto:mstottler@gomezandsullivan.com>]
Sent: Monday, October 31, 2016 5:43 PM
To: Richard Goodney
Cc: Amanda Crandall
Subject: RE: Jarvis Relicensing - water quality data

Dick,

Thanks for talking with me today.

Here are some follow-up questions about the water quality data spreadsheet you sent me previously (attached):

- a. DO and %DO data is missing for 2012, 2014, and 2015. 2013 is missing %DO. Does MVWA have this information stored anywhere else, or was it not able to be obtained during those years?
- b. Is any data available for years prior to 2000, and/or for 2001, 2005 (neither included on table) or 2016?
- c. In the attached spreadsheet, column P indicates the depth these samples were taken at (33 meters). However this column is not completed for years 2006 forward. Is the depth the samples taken at the same for all years? What water level is this depth referenced to?

- d. In respect to the same column (P), for 2012 this column becomes Total Dissolved Solids (TDS). Are these measured in mg/L?
- 2) The 2001 EPA Report of the Hinckley Watershed uses water quality data, supposedly provided by the UMVRWB, for the watershed's tributaries. Does MVWA have any additional tributary WQ data they can provide?

Thanks for your help!

Michele



Michele E. Stottler, P.E.

Senior Water Resources Engineer
Gomez and Sullivan Engineers, DPC
399 Albany Shaker Road, Suite 203
Loudonville, NY 12211
Ph: 518-407-0050
Fax: 518-407-0053
mstottler@gomezandsullivan.com

GSE CONFIDENTIALITY NOTICE: *This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you are not the intended recipient, please do not read or review the content and/or metadata and do not disseminate, distribute or copy this communication. Anyone who receives this message in error should notify the sender (mstottler@gomezandsullivan.com) immediately by return e-mail and delete it from his or her computer.*

From: [Tim Sullivan](#)
To: [Elisabeth leistine](#)
Subject: FW: Jarvis N P Data
Date: Monday, November 2 , 2016 :33:56 AM
Attachments: [Jarvis Pro ect N P Data. d](#)

From: Gerlach, Jeff [mailto:Jeff.Gerlach@nypa.gov]
Sent: Wednesday, November 23, 2016 10:30 AM
To: Michele Stottler <mstottler@gomezandsullivan.com>; Tim Sullivan <timsullivan@gomezandsullivan.com>
Cc: Brady, Cindy <Cindy.Brady@nypa.gov>; Roefaro, Mario <Mario.Roefaro@nypa.gov>; Slade, Mark <Mark.Slade@nypa.gov>; Groom, Tara <Tara.Groom@nypa.gov>; Pezzullo, Vincent <vincent.pezzullo@nypa.gov>; Panepinto, Robert <robert.panepinto@nypa.gov>; Watson, Susan <Susan.Watson@nypa.gov>; Ryden, Maria <Maria.Ryden@nypa.gov>
Subject: Jarvis NHP Data

Hi Michele,

We received the NYS NHP data and I have crudely produced a map showing those results, see attached. According to the NHP database, there are no T&E species within the project limits. There are two Natural communities, Rich Sloping Fen and Black Spruce-Tamarack Bog that are located just outside of NYPA's easement.

Let me know if you have any questions.

Jeff D. Gerlach
Manager, Environmental Studies and Remediation

New York Power Authority
123 Main Street
White Plains, NY 10601
Office: 914-287-3848 | Cell: 914-629-8275 | jeff.gerlach@nypa.gov
www.nypa.gov

GSE CONFIDENTIALITY NOTICE: *This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you are not the intended recipient, please do not read or review the content and/or metadata and do not disseminate, distribute or copy this communication. Anyone who receives this message in error should notify the sender (timsullivan@gomezandsullivan.com) immediately by return e-mail and delete it from his or her computer.*



May 24, 2017

Oneida Indian Nation
Jesse Bergevin
Historic Resources Specialist
2037 Dreamcatcher Plaza
Oneida, New York 13421

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Mr. Bergevin,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601
914-287-3153 (office)
cindy.brady@nypa.gov

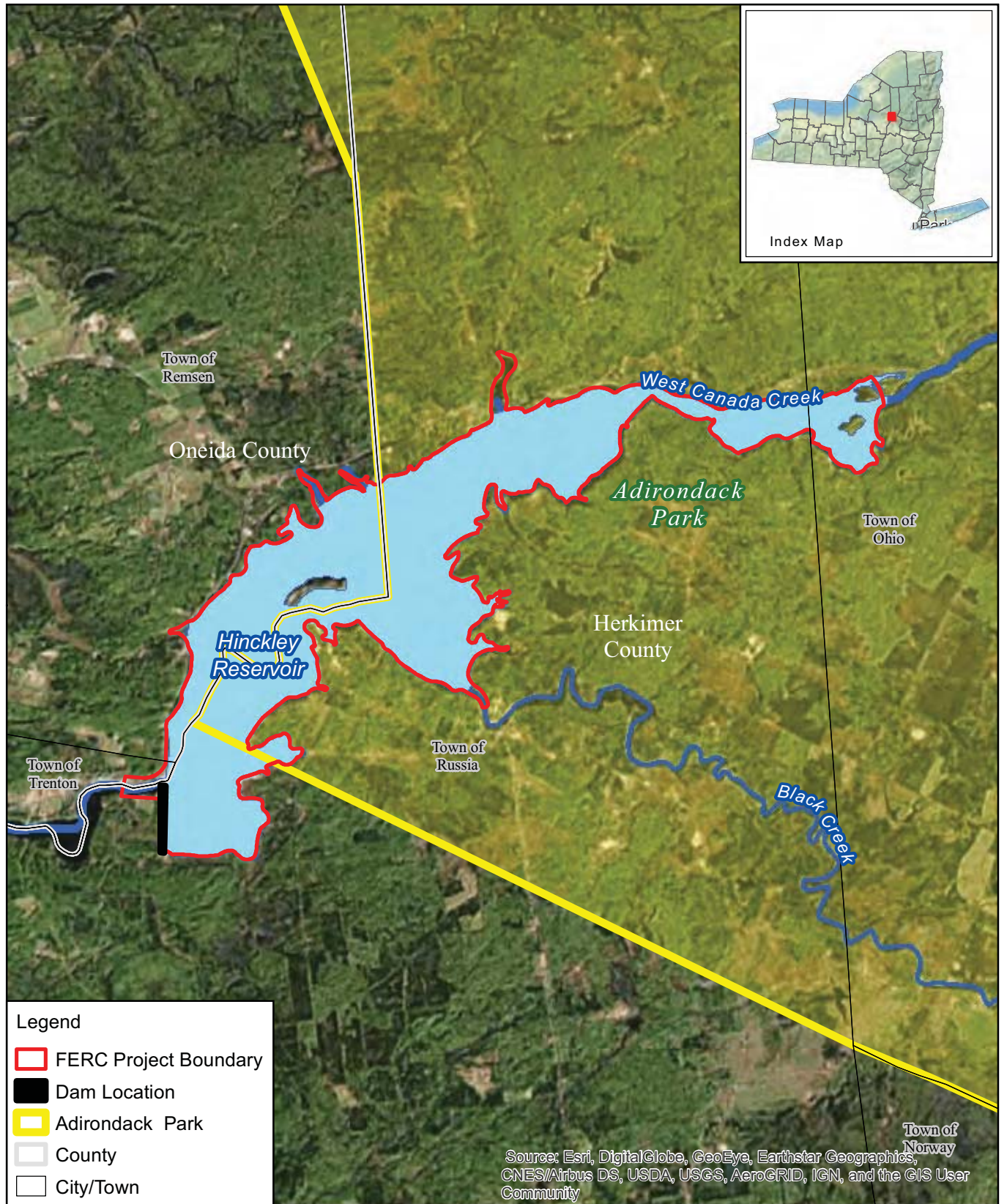
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The signature is written in a cursive, flowing style.

Cindy Brady
Project Manager

cc: Ray Hallbritter



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles



Figure 1:
Project Boundary



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000
Feet



Figure 2:
Project Facilities



May 24, 2017

Oneida Indian Nation
Oneida Nation Representative Ray Hallbritter
2037 Dreamcatcher Plaza
Oneida, New York 13421

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Representative Hallbritter,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601
914-287-3153 (office)
cindy.brady@nypa.gov

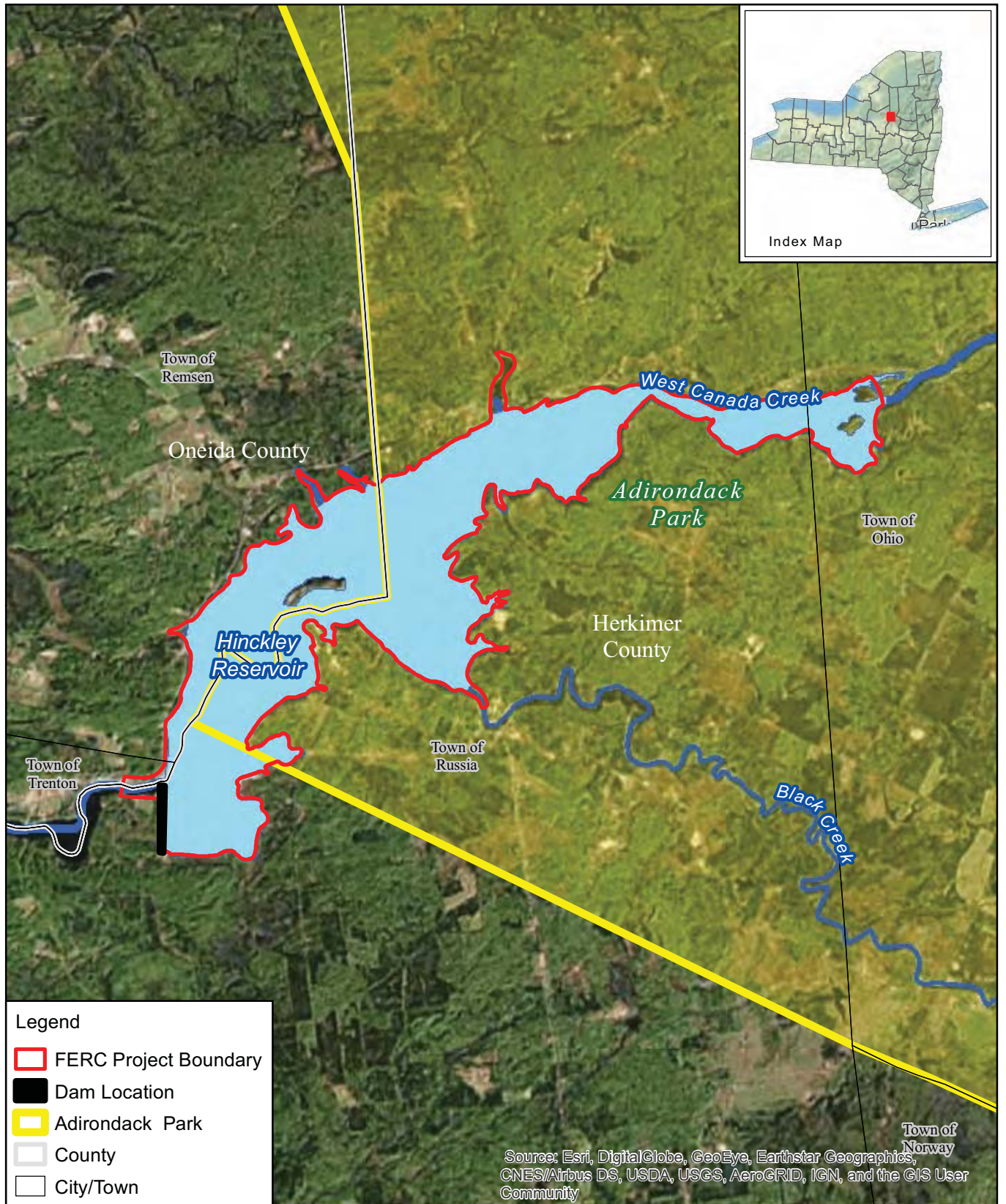
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The signature is written in a cursive, flowing style.

Cindy Brady
Project Manager

cc: Jesse Bergevin



Gregory B. Jarvis Project
(FERC No. P-3211)

Figure 1:
Project Boundary



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles





Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 24, 2017

Saint Regis Mohawk Tribe
Chief Beverly Cook
412 State Route 37
Akwesasne, New York 13655

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Chief Cook,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

914-287-3153 (office)

cindy.brady@nypa.gov

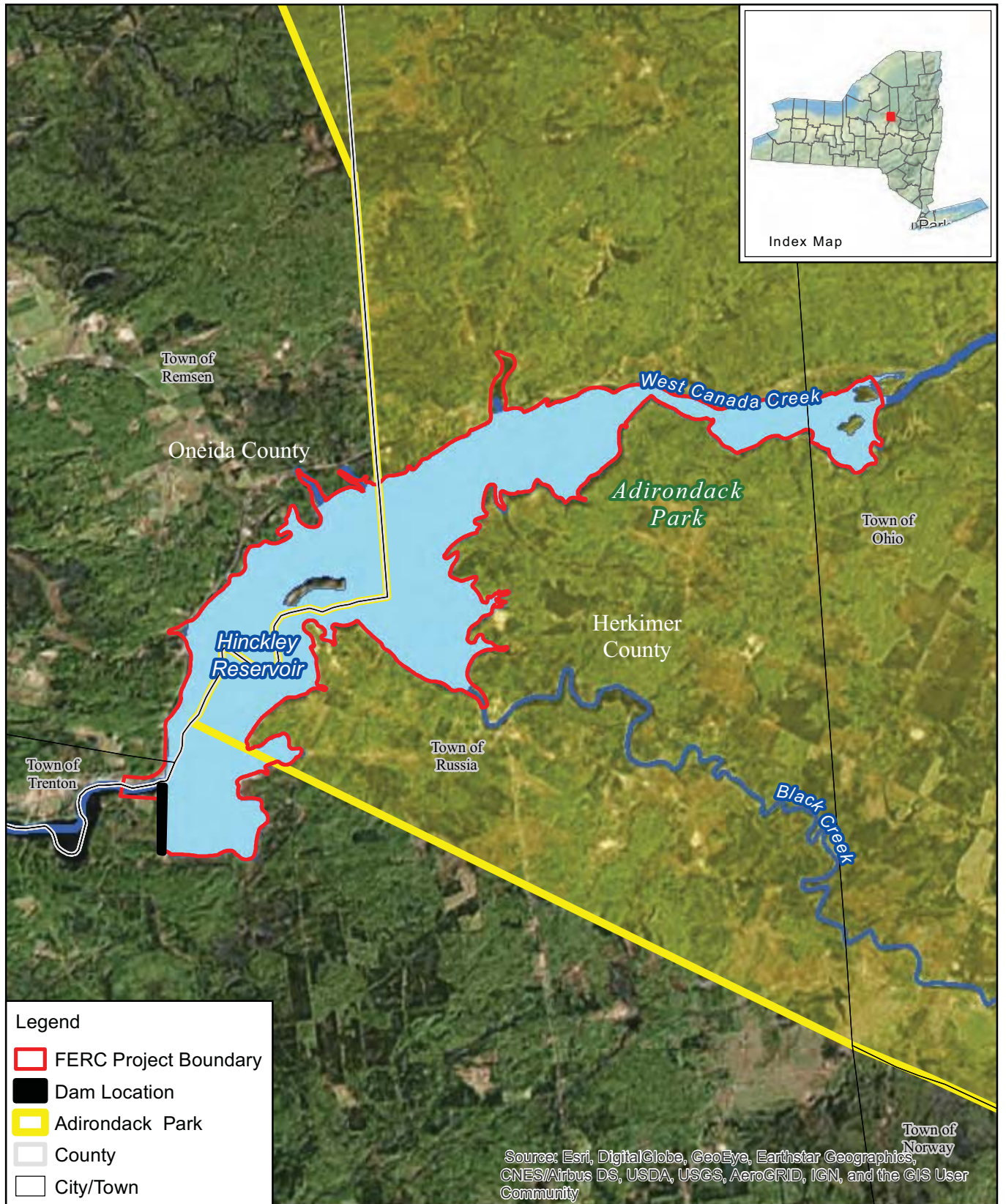
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The signature is written in a cursive, flowing style.

Cindy Brady
Project Manager

cc: Arnold L. Printup
Ken Jock
Chief Paul O. Thompson
Chief Ron LaFrance, Jr.



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles



Figure 1:
Project Boundary



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 24, 2017

Saint Regis Mohawk Tribe
Mr. Ken Jock
412 State Route 37
Akwesasne, New York 13655

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Mr. Jock,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

914-287-3153 (office)

cindy.brady@nypa.gov

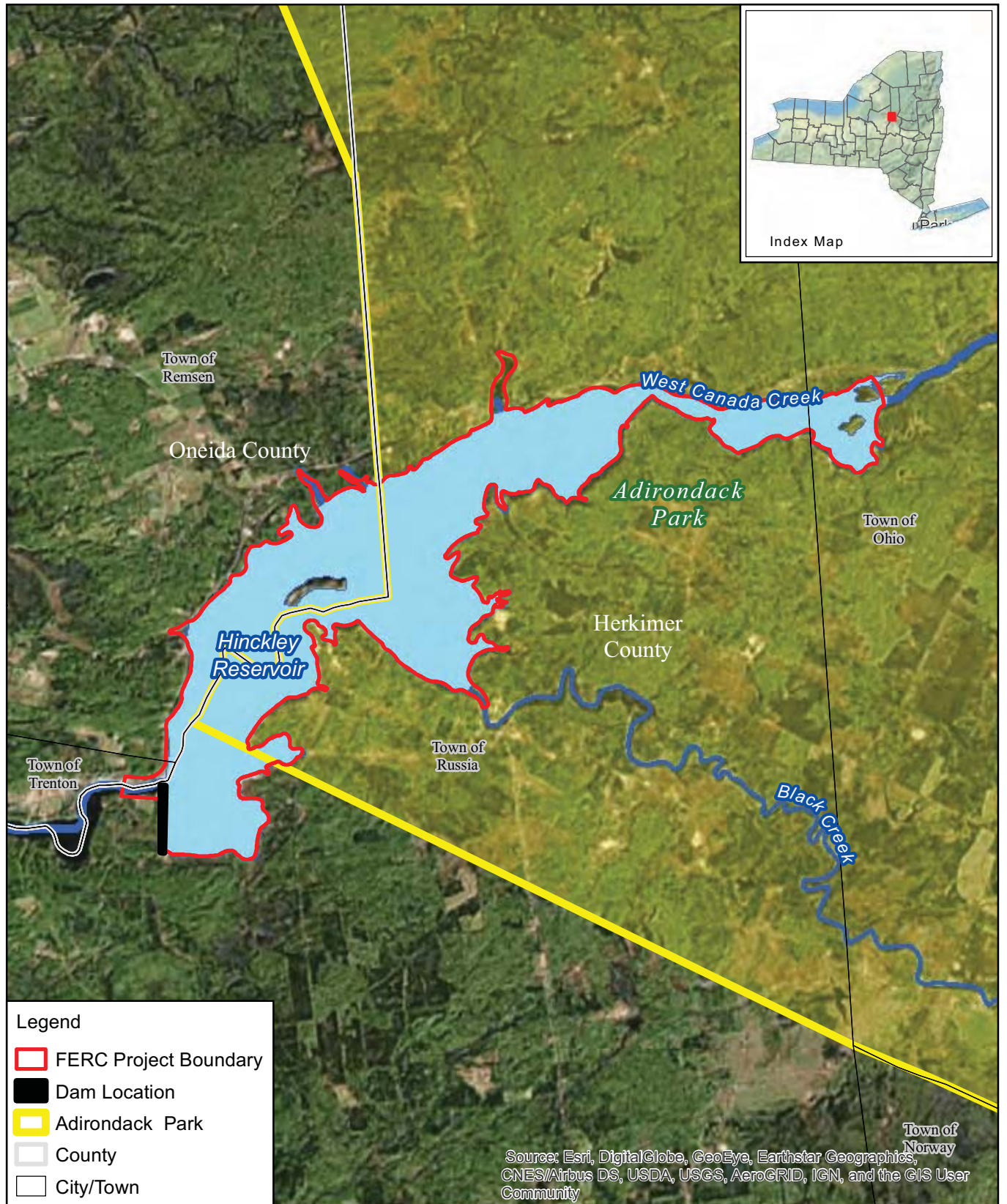
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The script is fluid and cursive, with the first name "Cindy" and last name "Brady" clearly legible.

Cindy Brady
Project Manager

cc: Arnold L. Printup
Chief Paul O. Thompson
Chief Beverly Cook
Chief Ron LaFrance, Jr.



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles



Figure 1:
Project Boundary



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 24, 2017

Saint Regis Mohawk Tribe
Chief Ron LaFrance, Jr.
412 State Route 37
Akwesasne, New York 13655

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Chief LaFrance,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

914-287-3153 (office)

cindy.brady@nypa.gov

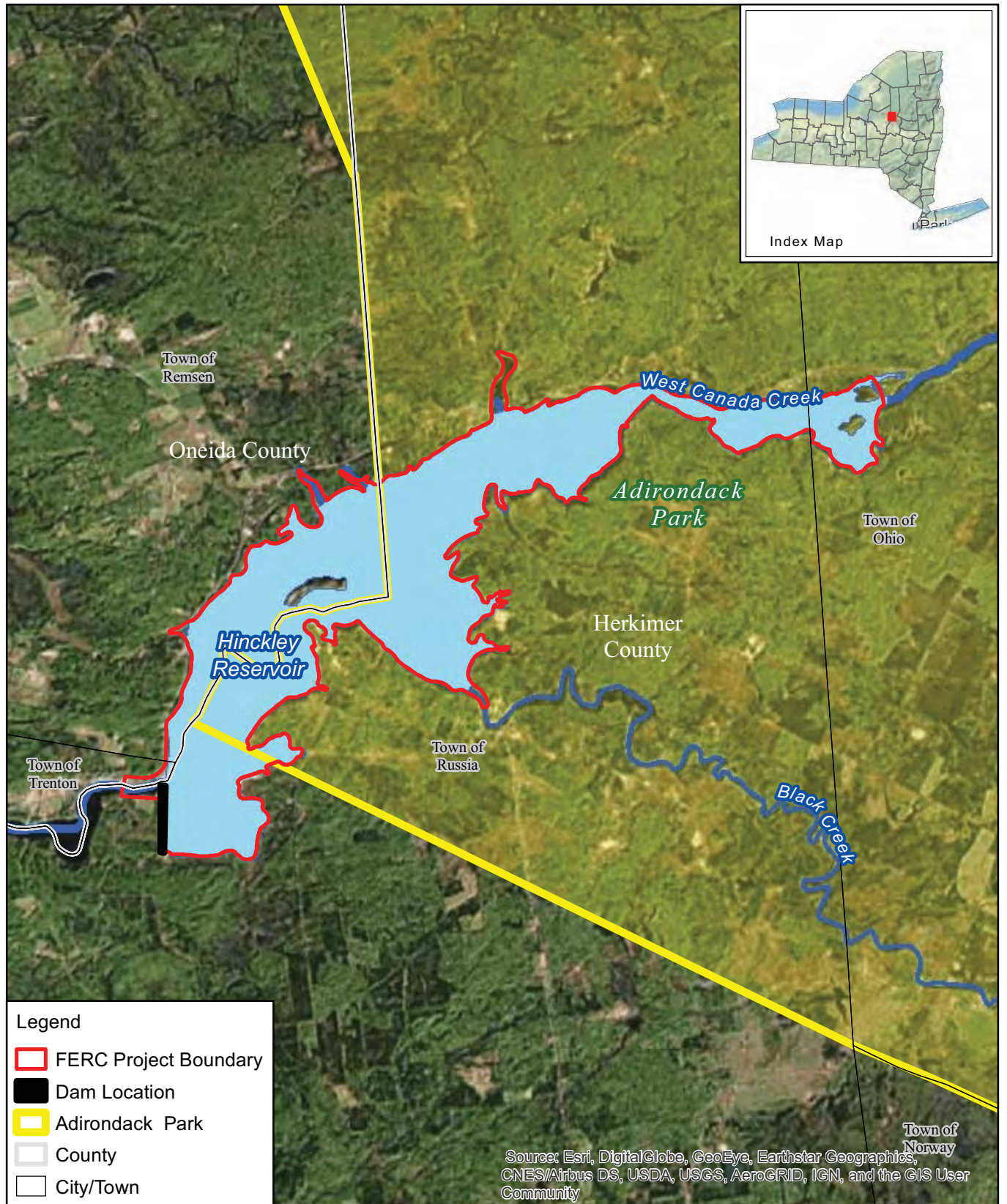
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The signature is written in a cursive, flowing style.

Cindy Brady
Project Manager

cc: Arnold L. Printup
Ken Jock
Chief Paul O. Thompson
Chief Beverly Cook



Gregory B. Jarvis Project
(FERC No. P-3211)

Figure 1:
Project Boundary



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles





Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 24, 2017

Saint Regis Mohawk Tribe
Arnold L. Printup, THPO
412 State Route 37
Akwesasne, New York 13655

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Mr. Printup,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

914-287-3153 (office)

cindy.brady@nypa.gov

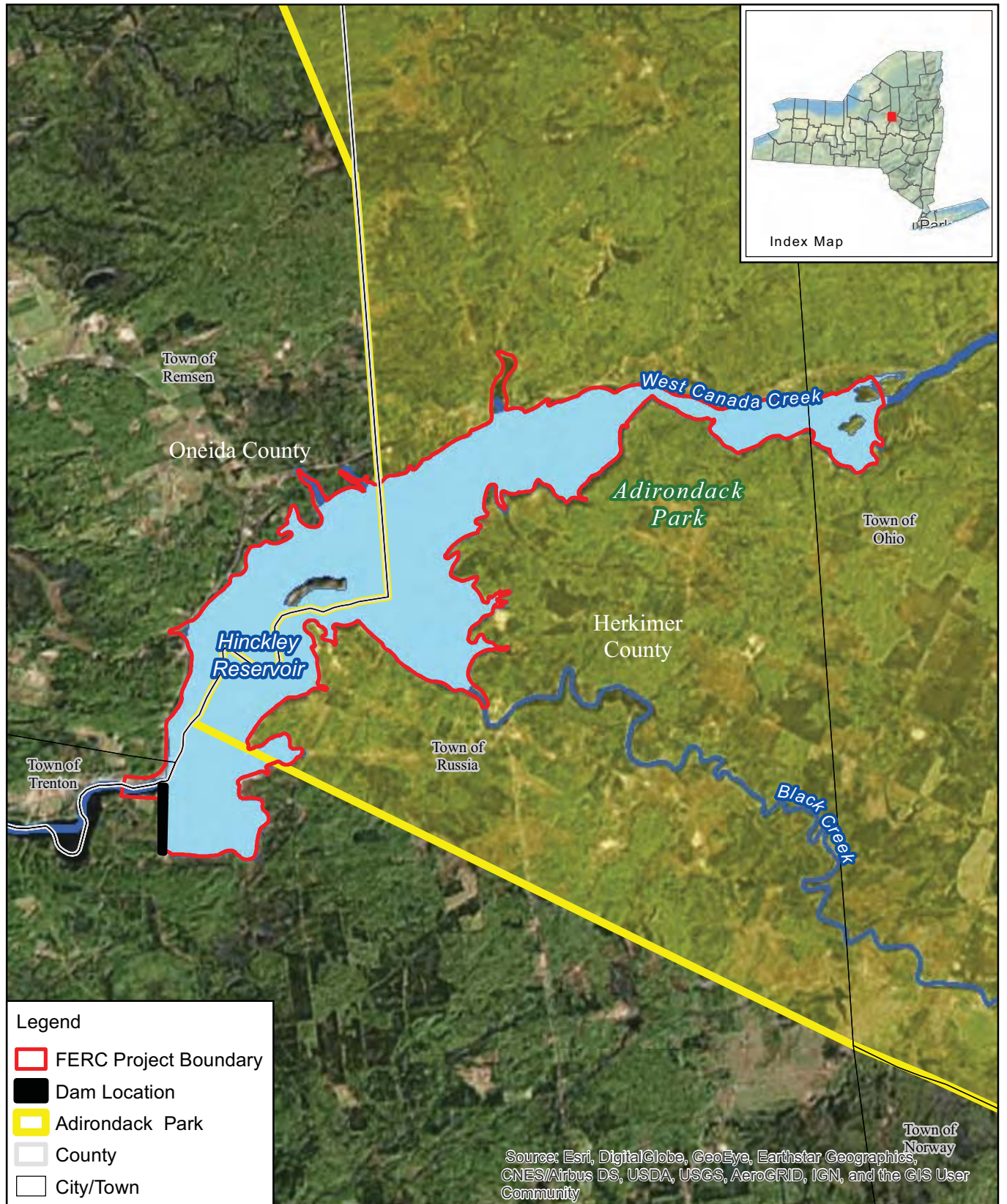
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The signature is written in a cursive, flowing style.

Cindy Brady
Project Manager

cc: Ken Jock
Chief Ron LaFrance, Jr.
Chief Paul O. Thompson
Chief Beverly Cook



Gregory B. Jarvis Project
(FERC No. P-3211)

Figure 1:
Project Boundary



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles





Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 24, 2017

Saint Regis Mohawk Tribe
Chief Paul O. Thompson
412 State Route 37
Akwesasne, New York 13655

**Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)
Request for Information**

Dear Chief Thompson,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

The purpose of this letter is to respectfully request any existing, relevant, and reasonably available information related to the Project that your Nation may have concerning historic, cultural and/or Nation's resources.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

In addition, please let us know if you are aware at this time of any specific issues or information needs pertaining to resources that may be affected by Project operation.

We would appreciate if you would provide such information to us by June 23, 2017, via email, hardcopy, or digitally on CDs or DVDs.

My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601

Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

914-287-3153 (office)

cindy.brady@nypa.gov

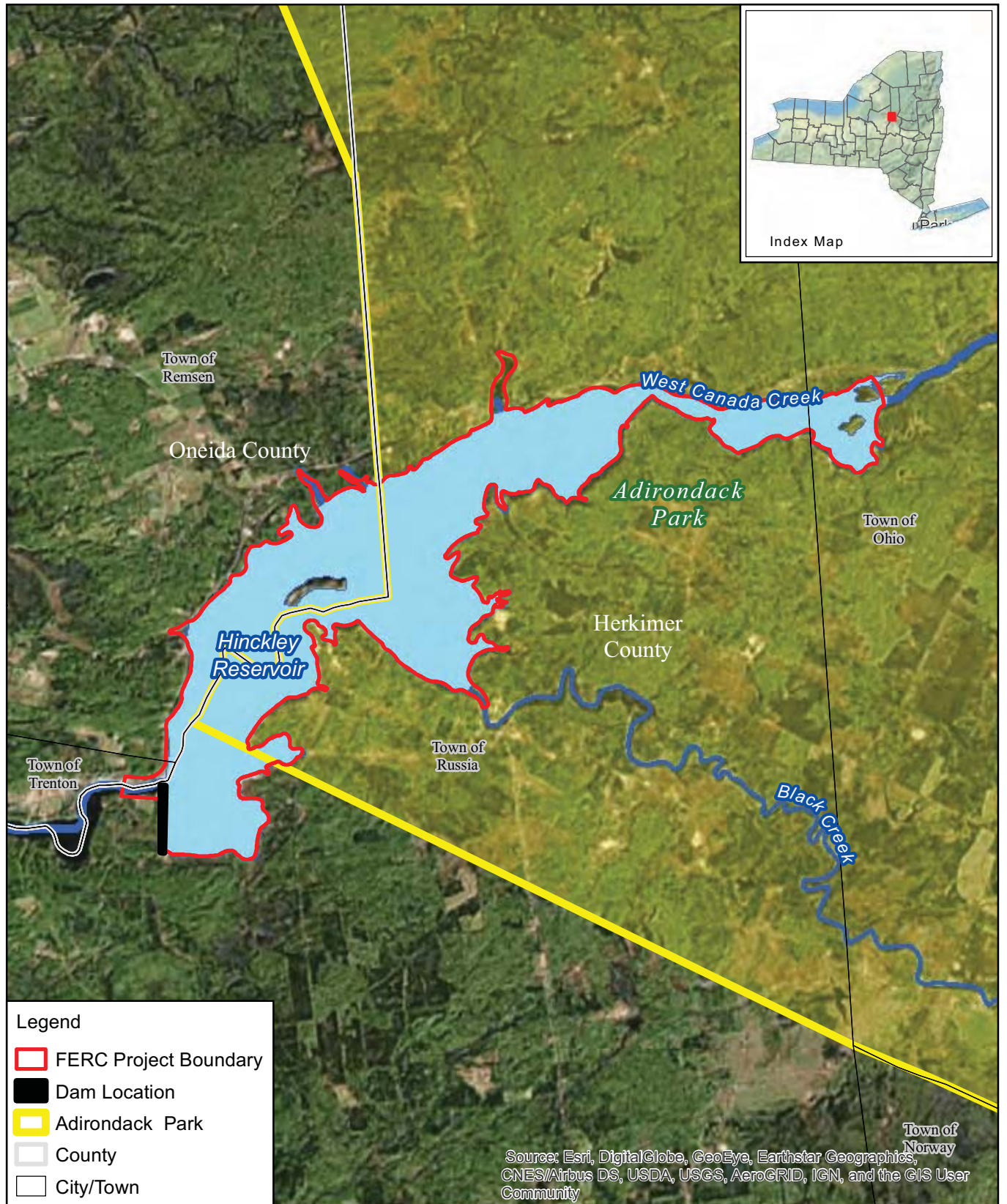
We appreciate receiving any information you are able to provide to us, and/or any questions or comments you may have regarding the relicensing of the Project. Thank you for your cooperation. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The script is fluid and cursive, with the first name "Cindy" and last name "Brady" clearly legible.

Cindy Brady
Project Manager

cc: Arnold L. Printup
Ken Jock
Chief Ron LaFrance, Jr.
Chief Beverly Cook



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles



Figure 1:
Project Boundary



Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities



May 25, 2017

Michael Lynch
Division Director
New York State Division for Historic Preservation
Peebles Island State Park
PO Box 189
Waterford, NY 12188-0189

Re: Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211)

Dear Mr. Lynch,

The New York Power Authority (the Power Authority) is initiating the relicensing process for the Gregory B. Jarvis Power Project (Hinckley Reservoir) (Project), Federal Energy Regulatory Commission (FERC) Project No. 3211. The existing license for the Project expires on July 31, 2022. Accordingly, the Power Authority must file its Notice of Intent (NOI) to relicense the Project by July 31, 2017 and its application for a new FERC license no later than July 31, 2020. Included with the NOI will be a required Pre-Application Document (PAD). The PAD serves to provide FERC and other federal agencies, New York State, and interested parties with readily available information pertaining to the Project.

The PAD is a document that summarizes existing, relevant and reasonably available information on the Project to help the above parties identify issues and information needs regarding the relicensing of the Project and to develop study requests where information gaps may exist regarding the effects of Project operations. Information gathered for the PAD will be used throughout the relicensing process to address issues brought up by stakeholders regarding potential Project effects. The Power Authority is presently preparing the PAD.

For your convenience we have attached Figure 1 which provides a regional map of the Project's location and Figure 2 which depicts the Project's major features.

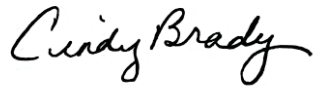
My contact information is:

Cindy Brady
New York Power Authority
123 Main Street
White Plains, NY 10601
914-287-3153 (office)
cindy.brady@nypa.gov

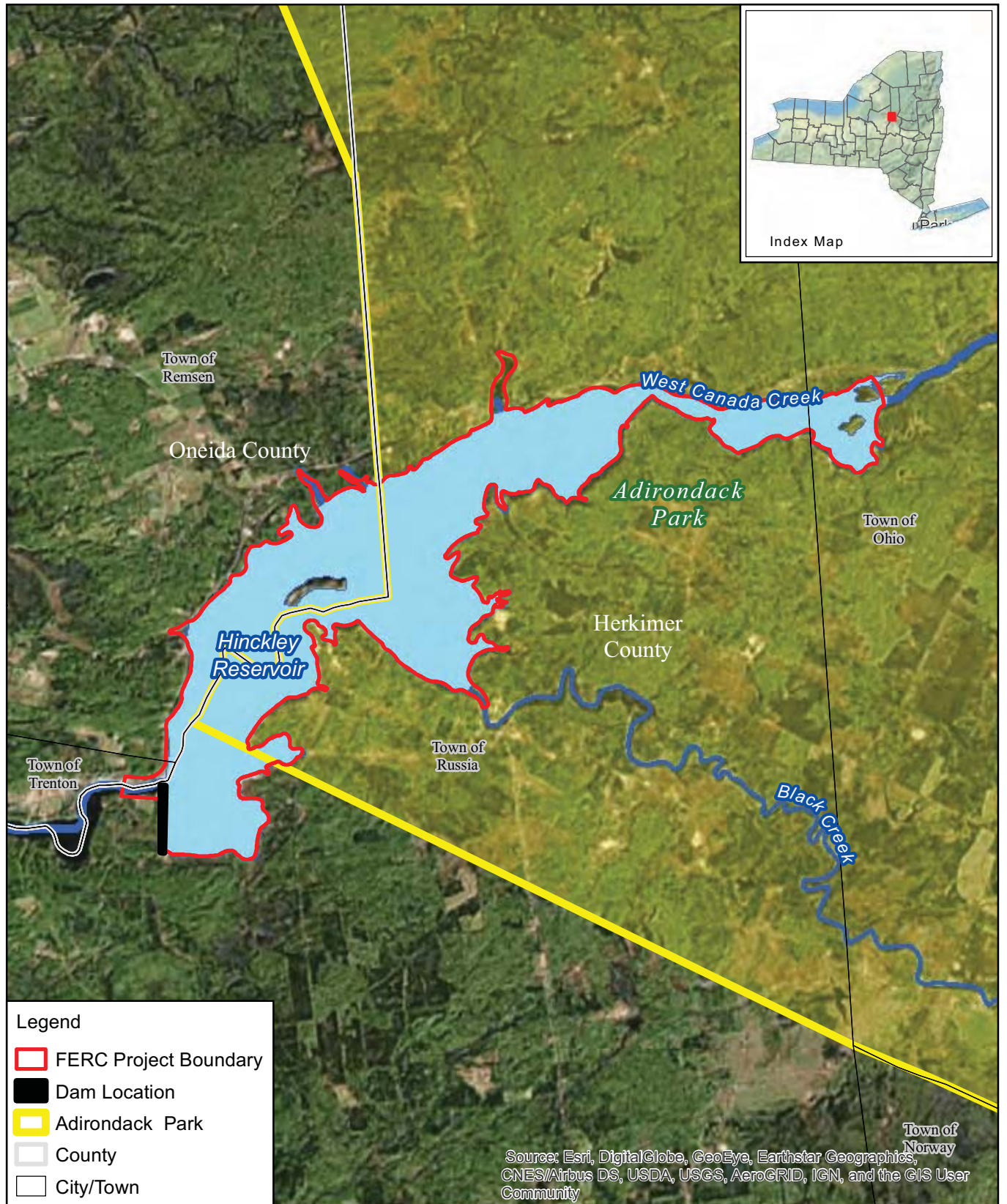
Gregory B. Jarvis Power Project (Hinckley Reservoir) (FERC No. 3211) Request for Information

We look forward to working with you and the rest of the SHPO staff on the relicensing.

Sincerely,

A handwritten signature in black ink that reads "Cindy Brady". The script is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Cindy Brady
Project Manager



Gregory B. Jarvis Project
(FERC No. P-3211)

Figure 1:
Project Boundary



©Copyright 2017
New York Power Authority. All Rights Reserved

0 0.5 1 2 Miles





Gregory B. Jarvis Project
(FERC No. P-3211)



©Copyright 2017
New York Power Authority. All Rights Reserved

0 250 500 1,000 Feet



Figure 2:
Project Facilities

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Oneida Indian Nation
Jesse Bergevin
Historic Resources Specialist
2037 Dreamcatcher Plaza
Oneida, NY 13421



9590 9402 1633 6053 1589 17

2. AI

7017 0660 0000 9408 5025

COMPLETE THIS SECTION ON DELIVERY

A. Signature

x Norma Bartlett

☐ Agent

☐ Addressee

B. Received by (Printed Name)

Norma Bartlett

C. Date of Delivery

5-26-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery

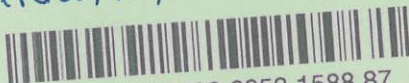
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Oneida Indian Nation
Representative Ray Hallbritter
2037 Dreamcatcher Plaza
Oneida, NY 13421



9590 9402 1633 6053 1588 87

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5018

PS Form

PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

x Norma Bartlett

☐ Agent

☐ Addressee

B. Received by (Printed Name)

Norma Bartlett

C. Date of Delivery

5-26-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery

- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Saint Regis Mohawk Tribe
Chief Beverly Look
412 State Route 37
Akwesasne, NY 13655



9590 9402 1633 6053 1447 98

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5070

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *[Signature]*

- ☐ Agent
- ☐ Addressee

B. Received by (Printed Name)

Neil S. Lock

C. Date of Delivery

7/26/17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery

- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Saint Regis Mohawk Tribe
Chief Paul O. Thompson
412 State Route 37
Akwesasne, NY 13655



9590 9402 1633 6053 1589 00

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5032

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

[Signature]

☐ Agent

☐ Addressee

B. Received by (Printed Name)

Neil S Jay

C. Date of Delivery

5/26/17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Registered Mail Restricted Delivery (\$500)

- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Saint Regis Mohawk Tribe
Chief Ron LaFrance, Jr.
412 State Route 37
Akwesasne, NY 13655



9590 9402 1633 6053 1447 74

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5056

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *Neil S. J...*

☐ Agent

☐ Addressee

B. Received by (Printed Name)

Neil S. J...

C. Date of Delivery

5/26/17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery

- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Saint Regis Mohawk Tribe
 Arnold L. Printup, THPO
 412 State Route 37
 Akwesasne, NY 13655



9590 9402 1633 6053 1588 94

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5049

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X *[Signature]*

- ☐ Agent
- ☐ Addressee

B. Received by (Printed Name)

Neil S. [Signature]

C. Date of Delivery

5/26/17

D. Is delivery address different from item 1? ☐ Yes
 If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Saint Regis Mohawk Tribe
Mr. Ken Jock
412 State Route 37
Akwesasne, NY 13655



9590 9402 1633 6053 1447 67

2. Article Number (Transfer from service label)

7017 0660 0000 9408 5063

COMPLETE THIS SECTION FOR DELIVERY**A. Signature**☐ Addressee☐ Addressee**B. Received by (Printed Name)**

Neil S. Jock

C. Date of Delivery

5/26/17

- D. Is delivery address different from item 1?** ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery

- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

From: [Tim Sullivan](#)
To: [Elisabeth leistine](#)
Cc: [Michele Stottler](#)
Subject: FW: [E TERNA]Jarvis Power Project FERC Relicensing - 1 PR0365
Date: Monday, June 05, 2017 1:25:26 PM

Hi Elisabeth,

Please update the Jarvis IMS correspondence log to include the email below.

Thanks,
Tim

From: Brady, Cindy [mailto:Cynthia.Brady@nypa.gov]
Sent: Monday, June 05, 2017 9:37 AM
To: Panepinto, Robert <robert.panepinto@nypa.gov>
Cc: Gerlach, Jeff <Jeff.Gerlach@nypa.gov>; Slade, Mark <Mark.Slade@nypa.gov>; Michele Stottler <mstottler@gomezandsullivan.com>; Tim Sullivan <timsullivan@gomezandsullivan.com>
Subject: FW: [EXTERNAL]Jarvis Power Project FERC Relicensing - 17PR03658

FYI

From: Lloyd, Timothy (PARKS) [mailto:Timothy.Lloyd@parks.ny.gov]
Sent: Friday, June 2, 2017 4:08 PM
To: Brady, Cindy <Cynthia.Brady@nypa.gov>
Cc: Opalka, Anthony (PARKS) <Anthony.Opalka@parks.ny.gov>; Vagvolgyi, Christina (PARKS) <Christina.Vagvolgyi@parks.ny.gov>
Subject: [EXTERNAL]Jarvis Power Project FERC Relicensing - 17PR03658

NYPA ALERT: This is an external email. Use caution before clicking attachments or links. See below for more.

Cindy:

We received your submission into the Cultural Resource Information System (CRIS) for the referenced project. The PR Number (17PR03658) is the unique number that we use to track projects. It appears that there's nothing for SHPO/OPRHP to do at this time. If we can be of any assistance, please let us know.

Tim

Tim Lloyd, Ph.D., RPA
Scientist – Archaeology
Division for Historic Preservation

New York State Parks, Recreation & Historic Preservation
Peebles Island State Park, P.O. Box 189, Waterford, New York 12188-0189

518-268-2186 | timothy.lloyd@parks.ny.gov
www.nysparks.com/shpo

For suspicious emails. Contact Help Desk (718-4357). Or open a new email, insert the suspicious email and send to Email Abuse.

GSE CONFIDENTIALITY NOTICE: *This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you are not the intended recipient, please do not read or review the content and/or metadata and do not disseminate, distribute or copy this communication. Anyone who receives this message in error should notify the sender (timsullivan@gomezandsullivan.com) immediately by return e-mail and delete it from his or her computer.*

Steve Leach

From: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Sent: Wednesday, November 09, 2016 3:34 PM
To: Steve Leach
Subject: RE: follow-up question to Prospect fish survey data

Correct. A single fish, of a single species, was collected at sites 1-3. Site 4 was a zero catch. It is what it is.
Frank

From: Steve Leach [<mailto:sleach@normandeau.com>]
Sent: Wednesday, November 09, 2016 9:45 AM
To: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Subject: follow-up question to Prospect fish survey data

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hi Frank,

Thank you again for providing your survey data for Hinckley and Prospect reservoirs. A quick question:

The effort and survey data for Prospect list species by site #, which seems to suggest that only Smallmouth Bass were collected at site 1, only Golden Shiner at site 2, etc. I suspect that the species counts are collective for sites 1-3 (with no catch for site 4), but wanted to verify that with you. Note that I am not presenting anything particularly differently, just rearranging into tabular/ figure format.

Thanks again,

Total Catch

Name of Water	WIN	Survey Number	Date	Site #	Species Code	Common Name	Total Length
Prospect Reservoir	H-240-180-P5355	609207	10/21/2009	1	600	Smallmouth Bass	
Prospect Reservoir	H-240-180-P5355	609207	10/21/2009	2	377	Golden Shiner	
Prospect Reservoir	H-240-180-P5355	609207	10/21/2009	3	419	White Sucker	
Prospect Reservoir	H-240-180-P5356	609208	10/21/2009	4		Zero Catch	

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Please consider the environment before printing this e-mail.

Steve Leach

From: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Sent: Monday, October 31, 2016 8:57 AM
To: Steve Leach
Cc: Erway, David B (DEC)
Subject: RE: West Canada Creek

It is all downstream of Trenton falls.

From: Steve Leach [<mailto:sleach@normandeau.com>]
Sent: Sunday, October 30, 2016 8:46 PM
To: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Subject: RE: West Canada Creek

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Frank,

Thanks very much. This will be very useful to me in trying to piece together the PAD sections that I am responsible for. An additional request however, I have just recently heard that you may have HOBO temperature logger data for West Canada Creek. If that is true, is any of it from reaches upstream of Trenton Falls, and are those data available?

Thanks again,

STEVE LEACH
Normandeau Associates, Inc.
603-757-4004 (office), 603-547-7712 (mobile)

From: Flack, Frank (DEC) [<mailto:frank.flack@dec.ny.gov>]
Sent: Friday, October 2, 2016 2:24 PM
To: Steve Leach
Subject: FW: West Canada Creek

I hope this helps! It is our last 10 or so years of surveys in the watershed and stocking history.
Frank

Please consider the environment before printing this e-mail.

Steve Leach

From: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Sent: Friday, October 28, 2016 3:24 PM
To: Steve Leach
Subject: FW: West Canada Creek
Attachments: E250_Erway_2012.pdf; Hinckley Reservoir.xlsx; Prospect Res.xlsx; Stocking history_WCanada System.xlsx; West Canada_hydro.xlsx

I hope this helps! It is our last 10 or so years of surveys in the watershed and stocking history.
Frank

Note: attached documents not included here:
E250_Erway_2012.pdf
Hinckley Reservoir.xlsx
Prospect Res.xlsx
Stocking history _Wcanada System.xlsx
West Canada_hydro.xlsx

Steve Leach

From: Steve Leach
Sent: Friday, October 21, 2016 11:48 AM
To: Frank Flack (frank.flack@dec.ny.gov)
Subject: West Canada Creek IFIM
Attachments: WESTCANADACREEKIFIM 1980 PART1.pdf; WESTCANADACREEK PART2.pdf; WESTCANADACREEK PART3.pdf

Hi Frank,

I suspect you may have already been provided these, but if not: as previously discussed, I promised to provide the West Canada Creek IFIM reports if they turned up - and they have.

In reality, though, this is my cover story to revisit my request for any fishery survey, etc. survey that you can provide for Hinkley Reservoir and Jarvis Station tailwaters.

Thanks again for any information you can provide,

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Steve Leach

From: Steve Leach
Sent: Friday, September 23, 2016 9:06 AM
To: 'Flack, Frank (DEC)'; Erway, David B (DEC)
Subject: RE: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

Frank,

It was good to make contact and be able to speak with you directly. My mailing address and other contact information follows. By the way, please let me know when you have any hard copy materials to send over, I'll be glad to provide a FedEx account number that you can use:

STEVE LEACH
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Have a good day,

From: Flac , Fran DEC [<mailto:ran . lac @dec.ny.gov>]
Sent: Thursday, September 22, 2016 2:24 PM
To: Steve Leach; Erway, David DEC
Subject: RE: Request for information reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

We can give you the most recent fish data surveys we have and the recent stocking history. Do you want above Hinckley, Hinckley, prospect and west Canada creek below Trenton falls? If you find the IFIM report from the early 1980s we would love to have a copy. I know of no invertebrates or mussel surveys of the watershed. The DOW might have some water quality data.

Frank

From: Steve Leach [<mailto:sleach@normandeau.com>]
Sent: Wednesday, September 21, 2016 4:41 PM
To: Flack, Frank (DEC) <frank.flack@dec.ny.gov>; Erway, David B (DEC) <david.erway@dec.ny.gov>
Subject: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello,

I am working with Gomez & Sullivan in preparation of the Jarvis Station relicensing pre-application document. I am attempting to locate any and all available data / reports concerning fisheries and aquatic resources specific to Hinckley Reservoir, though I would also be interested in data pertaining to West

Canada Creek adjacent to the FERC defined project area. I was given your contact information today in reference to your 2012 fisheries survey of Hinckley Reservoir.

I would greatly appreciate any references, reports, data, etc. that you can provide including the above mentioned report, the Trenton Falls IFIM report, any trout stocking and population status reports, creel survey reports, etc. and any other fisheries resources reports that may be available. Also, can you tell me whether any surveys of aquatic invertebrates and mussels have been performed in the project area; and if so direct me to the experts (including you or your staff if that is the case).

Again, thank you for any assistance you can provide in obtaining reference material.

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Please consider the environment before printing this e-mail.

Steve Leach

From: Steve Leach
Sent: Friday, September 23, 2016 7:48 AM
To: 'Flack, Frank (DEC)'; Erway, David B (DEC)
Subject: RE: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

Frank,

Thanks very much. The primary focus is the Jarvis/ Hinckley project area as defined by FERC, but I am interested in the upstream and downstream reaches to provide perspective. So, to answer your question, I would like (in a sort of order of priority): Hinckley, above Hinckley, and if easily available Prospect and West Canada Cr. Below Trenton Falls.

If these are not readily available electronically and need to be scanned, photocopied or whatever and I need to send someone out to do that, please just let me know.

Meanwhile, could you give me a brief description of the scope of those studies? I assume those surveys detailed species assemblage, but I am also trying to determine what data gaps exist with some primary topics: spatio/temporal distribution, population dynamics including age/size structure, migratory and spawning seasonality.

If and when I lay hands on the IFIM report, I will gladly share.

Thanks again,

STEVE LEACH
Normandeau Associates, Inc.
603-757-4004 (office), 603-547-7712 (mobile)

From: Flack, Frank (DEC) [<mailto:fran.flack@dec.ny.gov>]
Sent: Thursday, September 22, 2016 2:24 PM
To: Steve Leach; Erway, David (DEC)
Subject: RE: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

We can give you the most recent fish data surveys we have and the recent stocking history. Do you want above Hinckley, Hinckley, prospect and west Canada creek below Trenton falls? If you find the IFIM report from the early 1980s we would love to have a copy. I know of no invertebrates or mussel surveys of the watershed. The DOW might have some water quality data.

Frank

From: Steve Leach [<mailto:sleach@normandeau.com>]
Sent: Wednesday, September 21, 2016 4:41 PM
To: Flack, Frank (DEC) <fran.flack@dec.ny.gov>; Erway, David B (DEC) <david.erway@dec.ny.gov>
Subject: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or

Hello,

I am working with Gomez & Sullivan in preparation of the Jarvis Station relicensing pre-application document. I am attempting to locate any and all available data / reports concerning fisheries and aquatic resources specific to Hinckley Reservoir, though I would also be interested in data pertaining to West Canada Creek adjacent to the FERC defined project area. I was given your contact information today in reference to your 2012 fisheries survey of Hinckley Reservoir.

I would greatly appreciate any references, reports, data, etc. that you can provide including the above mentioned report, the Trenton Falls IFIM report, any trout stocking and population status reports, creel survey reports, etc. and any other fisheries resources reports that may be available. Also, can you tell me whether any surveys of aquatic invertebrates and mussels have been performed in the project area; and if so direct me to the experts (including you or your staff if that is the case).

Again, thank you for any assistance you can provide in obtaining reference material.

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Please consider the environment before printing this e-mail.

Steve Leach

From: Flack, Frank (DEC) <frank.flack@dec.ny.gov>
Sent: Thursday, September 22, 2016 3:24 PM
To: Steve Leach; Erway, David B (DEC)
Subject: RE: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

We can give you the most recent fish data surveys we have and the recent stocking history. Do you want above Hinckley, Hinckley, prospect and west Canada creek below Trenton falls? If you find the IFIM report from the early 1980s we would love to have a copy. I know of no invertebrates or mussel surveys of the watershed. The DOW might have some water quality data.

Frank

From: Steve Leach [<mailto:sleach@normandeau.com>]
Sent: Wednesday, September 21, 2016 4:41 PM
To: Flack, Frank (DEC) <frank.flack@dec.ny.gov>; Erway, David B (DEC) <david.erway@dec.ny.gov>
Subject: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello,

I am working with Gomez & Sullivan in preparation of the Jarvis Station relicensing pre-application document. I am attempting to locate any and all available data / reports concerning fisheries and aquatic resources specific to Hinckley Reservoir, though I would also be interested in data pertaining to West Canada Creek adjacent to the FERC defined project area. I was given your contact information today in reference to your 2012 fisheries survey of Hinckley Reservoir.

I would greatly appreciate any references, reports, data, etc. that you can provide including the above mentioned report, the Trenton Falls IFIM report, any trout stocking and population status reports, creel survey reports, etc. and any other fisheries resources reports that may be available. Also, can you tell me whether any surveys of aquatic invertebrates and mussels have been performed in the project area; and if so direct me to the experts (including you or your staff if that is the case).

Again, thank you for any assistance you can provide in obtaining reference material.

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Steve Leach

From: Steve Leach
Sent: Wednesday, September 21, 2016 4:41 PM
To: 'frank.flack@dec.ny.gov'; 'david.erway@dec.ny.gov'
Subject: Request for information / reports: Fisheries and aquatic resources surveys, Hinckley Reservoir, West Canada Creek

Hello,

I am working with Gomez & Sullivan in preparation of the Jarvis Station relicensing pre-application document. I am attempting to locate any and all available data / reports concerning fisheries and aquatic resources specific to Hinckley Reservoir, though I would also be interested in data pertaining to West Canada Creek adjacent to the FERC defined project area. I was given your contact information today in reference to your 2012 fisheries survey of Hinckley Reservoir.

I would greatly appreciate any references, reports, data, etc. that you can provide including the above mentioned report, the Trenton Falls IFIM report, any trout stocking and population status reports, creel survey reports, etc. and any other fisheries resources reports that may be available. Also, can you tell me whether any surveys of aquatic invertebrates and mussels have been performed in the project area; and if so direct me to the experts (including you or your staff if that is the case).

Again, thank you for any assistance you can provide in obtaining reference material.

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Steve Leach

From: Quartz, William <william_quartz@fws.gov>
Sent: Thursday, November 17, 2016 8:10 AM
To: Steve Leach
Subject: WFHS inquiry

Steve,

The kidney samples on BHIA media would detect the bacteria A.sal., E.ict. and Y.ruc., these weren't found, R. salmonarium (kidney disease) was not tested for, we usually only test salmonids for kidney disease. The kidney/spleen samples on CHSE and EPC cells would detect the viruses IPNV, IHNV and VHS, while kidney/spleen on FHM and BF-2 cells would detect the viruses LMBV, and SVCV (only SMB), no viruses were found.

We can not say the body of water is pathogen free, but, we can say, that these fish, at this time, were pathogen free. I hope this information helps and any other questions feel free to contact us.

William Quartz
Wild Fish Health Biologist
USFWS Lamar Fish Health Center
william_quartz@fws.gov
570-726-6611

Steve Leach

From: Steve Leach
Sent: Thursday, November 17, 2016 8:34 AM
To: 'Quartz, William'
Subject: RE: WFHS inquiry

William,

Thanks very much. That does clarify things for me. I understand that this test specific to the samples provided - and that it was 7 years in the past. I am attempting to present what data are available for this reservoir, which are few; but it was interesting to find that some fish had been submitted to the program and to be able to follow the trail.

Thanks again,

STEVE LEACH
Normandeau Associates, Inc.
603-757-4004 (office), 603-547-7712 (mobile)

From: uartz, William [mailto:william_quartz@ws.gov]
Sent: Thursday, November 17, 2016 10:10 AM
To: Steve Leach
Subject: WFHS inquiry

Steve,

The kidney samples on BHIA media would detect the bacteria A.sal., E.ict. and Y.ruc., these weren't found, R. salmonarium (kidney disease) was not tested for, we usually only test salmonids for kidney disease. The kidney/spleen samples on CHSE and EPC cells would detect the viruses IPNV, IHNv and VHS, while kidney/spleen on FHM and BF-2 cells would detect the viruses LMBv, and SVCv (only SMB), no viruses were found.

We can not say the body of water is pathogen free, but, we can say, that these fish, at this time, were pathogen free. I hope this information helps and any other questions feel free to contact us.

William Quartz
Wild Fish Health Biologist
USFWS Lamar Fish Health Center
william_quartz@fws.gov
570-726-6611

Steve Leach

From: Steve Leach
Sent: Wednesday, November 16, 2016 11:59 AM
To: 'wildfishsurvey@fws.gov'
Subject: question regarding Case Number: LM2009-253
Attachments: USFWS2009.pdf

Good afternoon,

I am working on pre application documents for the Jarvis Hydroelectric Project on West Canada Creek, New York. Based on some fish collection data provided to me by NYSDEC, I see that Smallmouth Bass and Yellow Perch samples were submitted to you for pathology in 2009. The case report (see attached) states that no pathogens were detected. I would like to report that along with pathogens tested for. From Heil (2009), I assume that the following were tested for, however I would like to confirm that this is true, and if I am missing anything else that was tested.

A. salmonicida
E. ictaluri
R. salmoninarum
Y. ruckeri
IPNV
LMBV (for Smallmouth Bass only or Yellow Perch also?)

I will greatly appreciate your confirmation or additional information.

Thank you,

STEVE LEACH
Senior Biologist
Normandeau Associates, Inc.
917 Rt. 12, Westmoreland, NH 034676
603-757-4004 (office), 603-547-7712 (mobile)
sleach@normandeau.com www.normandeau.com

Excellence through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

Please consider the environment before printing this e-mail.

Steve Leach

From: Joseph Snavely
Sent: Monday, November 14, 2016 8:25 AM
To: Steve Leach
Subject: FW: New York Species Accounts

FYI - I'm just catching up from last week and below is another confirmation from DEC for the lack of information in the basin for unionids – from the state zoologist.

Kindest regards,
Joe

JOSEPH SNAVELY
Principal Scientist/ Senior Project Manager
NORMANDEAU ASSOCIATES, INC.
400 Old Reading Pike, Building A, Suite 101
Stowe, PA 19464-USA
484.945.2631 (direct), 267.644.8928 (cell)
jsnavely@normandean.com www.normandean.com

Excellence Through Employee Ownership

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandean Associates, Inc. at (980) 494-3315 and permanently delete this message.

From: Schlesinger, Matthew D (DEC) [mailto:matthew.schlesinger@dec.ny.gov]
Sent: Wednesday, November 09, 2016 3:45 PM
To: Joseph Snavely <jsnavely@normandean.com>
Subject: RE: New York Species Accounts

Hi Joe,

I understand you spoke with Lisa Holst. To supplement the rare species information she looked for, I checked a spatial database of all mussel species that we compiled about 4 years ago. There were no mussel records in that basin. I don't know whether it's received any survey effort. Hope that helps.

Cheers,
Matt

~~~~~  
Matthew D. Schlesinger, Ph.D.  
Chief Zoologist, New York Natural Heritage Program  
Adjunct Assistant Professor, SUNY College of Environmental Science and Forestry  
625 Broadway, Albany NY 12233-4757  
Office: (518) 402-8939, Cell: (518) 478-5261  
[matthew.schlesinger@dec.ny.gov](mailto:matthew.schlesinger@dec.ny.gov)  
[www.nynhp.org](http://www.nynhp.org)

---

**From:** Joseph Snavely [<mailto:jsnavely@normandeau.com>]  
**Sent:** Tuesday, November 08, 2016 2:06 PM  
**To:** Schlesinger, Matthew D (DEC) <[matthew.schlesinger@dec.ny.gov](mailto:matthew.schlesinger@dec.ny.gov)>  
**Subject:** FW: New York Species Accounts

*ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.*

Hello Matthew,

Mary Walsh gave me you name a potential source of unionid distribution information. I was looking for any information for the West Canada Creek basin. Do you have any information for this area? Thanks

Kindest regards,  
Joe

JOSEPH SNAVELY  
Principal Scientist/ Senior Project Manager  
**NORMANDEAU ASSOCIATES, INC.**  
400 Old Reading Pike, Building A, Suite 101  
Stowe, PA 19464-USA  
484.945.2631 (direct), 267.644.8928 (cell)  
[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

*Excellence Through Employee Ownership*

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (980) 494-3315 and permanently delete this message.

---

**From:** Walsh, Mary [<mailto:MWalsh@paconserve.org>]  
**Sent:** Tuesday, November 08, 2016 2:01 PM  
**To:** Joseph Snavely <[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com)>  
**Subject:** RE: New York Species Accounts

The only other person I can think of is Matthew Schlesinger ([mdschles@gw.dec.state.ny.us](mailto:mdschles@gw.dec.state.ny.us)) from the New York Natural Heritage Program

Best,  
Mary

---

**From:** Joseph Snavely [<mailto:jsnavely@normandeau.com>]  
**Sent:** Tuesday, November 08, 2016 11:46 AM  
**To:** Walsh, Mary  
**Subject:** New York Species Accounts

Hi Mary,

Do you know anyone that may have species records from New York beyond Kurt Jirka and Dave Strayer? I'm researching a watershed for species accounts and looking to fill in some gaps.

Thanks

Kindest regards,

Joe

JOSEPH SNAVELY  
Principal Scientist/ Senior Project Manager  
**NORMANDEAU ASSOCIATES, INC.**  
400 Old Reading Pike, Building A, Suite 101  
Stowe, PA 19464-USA  
484.945.2631 (direct), 267.644.8928 (cell)  
[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

*Excellence Through Employee Ownership*

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (980) 494-3315 and permanently delete this message.

---

Please consider the environment before printing this e-mail.

## Steve Leach

---

**From:** Joseph Snavely  
**Sent:** Tuesday, November 08, 2016 4:18 PM  
**To:** Steve Leach; Don Mason; William Ettinger  
**Subject:** RE: mussel info from Hinckley Reservoir

I just spoke with a few colleagues and waiting to talk with one more. I'll craft a few sentences regarding Hinckley, West Canada Creek, and the Erie canal drainage. At the moment, there is very little data from this drainage. However, the state acknowledges a large gap in their species distribution data.

Stay tuned.

Kindest regards,  
Joe

JOSEPH SNAVELY  
Principal Scientist/ Senior Project Manager  
**NORMANDEAU ASSOCIATES, INC.**  
400 Old Reading Pike, Building A, Suite 101  
Stowe, PA 19464-USA  
484.945.2631 (direct), 267.644.8928 (cell)  
[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

*Excellence Through Employee Ownership*

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (980) 494-3315 and permanently delete this message.

---

**From:** Steve Leach  
**Sent:** Tuesday, November 08, 2016 12:21 PM  
**To:** Don Mason <[dmason@normandeau.com](mailto:dmason@normandeau.com)>; Joseph Snavely <[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com)>; William Ettinger <[wettinger@normandeau.com](mailto:wettinger@normandeau.com)>  
**Subject:** RE: mussel info from Hinckley Reservoir

Pre Application Document, that is FERC terminology for the document filing that kicks off the relicensing process.

Time coding for this is:  
23913.000

STEVE LEACH  
Normandeau Associates, Inc.  
603-757-4004 (office), 603-547-7712 (mobile)

---

**From:** Don Mason  
**Sent:** Tuesday, November 08, 2016 11:00 AM  
**To:** Joseph Snavely; William Ettinger  
**Cc:** Steve Leach  
**Subject:** RE: mussel info from Hinckley Reservoir

Public Access Document, right Steve? Steve may have some knowledge on fish.

Donald P. Mason  
Senior Aquatic Ecologist  
NORMANDEAU ASSOCIATES, INC  
25 Nashua Rd, Bedford, NH 03110  
603-637-1172 (direct) 603-848-7474 (cell)  
[dmason@normandeau.com](mailto:dmason@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

*Excellence through employee ownership*

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (603) 472-5191 and permanently delete this message.

---

**From:** Jose h Snively  
**Sent:** 0 November, 2016 10:52 AM  
**To:** Don Mason; William Ettinger  
**Cc:** Steve Leach  
**Subject:** RE: mussel in Hinckley Reservoir

Thanks Don,

I'll take a look. You won't get anything out of the DEC biologists of significance on mussels or historic locations. For my own edification PAD? Potential affect determination.

It will help for me to come up to speed on the background a bit. What are our resident fish species in this system? Have we in fact laid eyes on this system or is this a lit review exercise?

Kindest regards,  
Joe

JOSEPH SNAVELY  
Principal Scientist/ Senior Project Manager  
NORMANDEAU ASSOCIATES, INC.  
400 Old Reading Pike, Building A, Suite 101  
Stowe, PA 19464-USA  
484.945.2631 (direct), 267.644.8928 (cell)  
[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

*Excellence Through Employee Ownership*

The contents of this email message may contain privileged, confidential, or otherwise protected information and are solely for the use of the designated recipient(s). If you are not an intended recipient, do not copy, disseminate or disclose the contents of this communication. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. If you have received this email in error, please notify me immediately or contact Normandeau Associates, Inc. at (980) 494-3315 and permanently delete this message.

---

**From:** Don Mason  
**Sent:** Tuesday, November 08, 2016 10:40 AM  
**To:** William Ettinger <[wettinger@normandeau.com](mailto:wettinger@normandeau.com)>; Joseph Snively <[jsnavely@normandeau.com](mailto:jsnavely@normandeau.com)>  
**Cc:** Steve Leach <[sleach@normandeau.com](mailto:sleach@normandeau.com)>  
**Subject:** mussel info from Hinckley Reservoir

Steve Leach in our Westmoreland, NH office asked me to provide some mussel text for a PAD he's putting together for the Hinckley Reservoir in New York, about 20 mi northeast of Utica. Apparently there is no information on potential mussel species in the reservoir so I was



## Appendix B – Current License

100329

20 FERC 162,264

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Power Authority of the State of New York ) Project No. 3211-002

ORDER ISSUING LICENSE (MAJOR)

( Issued August 12, 1982 )

The Power Authority of the State of New York (Applicant) filed an application on December 22, 1981, for a license for the Hinckley Hydroelectric Project, FERC No. 3211-000. 1/ The project would be located on West Canada Creek at river mile 35.4, a stream subject to the jurisdiction of Congress under its authority to regulate interstate commerce, near the Hamlet of Hinckley, in Oneida and Herkimer Counties, New York. The project dam is located 2.5 and 4.5 miles upstream from the Niagara Mohawk Power Corporation's (NMPC) Prospect and Trenton generating facilities (FERC Project No. 2701), respectively. Notice of the application has been published and comments have been received from interested Federal, State, and local agencies. No protests or petitions to intervene have been received, and none of the agencies objected to issuance of the license.

Existing facilities include the state-owned Hinckley Dam and 2,850-acre Hinckley Reservoir. Hinckley Dam consists of earthen embankments 570 and 2,600 feet long on each end of a non-overflow gravity dam section 65 feet long, and a 400-foot-long spillway. The Applicant proposes to construct intake and power conduits, a 70-foot by 68-foot powerhouse with 2 turbine/generator units rated at 4.5 MW each, and a 280-foot-long tailrace. The project would be a peaking facility, operating in coordination with Project No. 2701.

No Federal lands would be impacted by the proposed action.

Project Operation and Minimum Flows

The Department of the Interior (Interior) recommended that the project be operated in a run-of-river mode such that there would be a minimum flow of 160 cfs downstream of the New York State Department of Transportation (DOT) barge canal diversion weir.

---

1/ Authority to act on this matter is delegated to the Director, Office of Electric Power Regulation, under 18 C.F.R. §375.308 (1982).

5

DC-A-36

8708230182

100330

- 2 -

Interior further recommended that when adequate flows for project operation are not available, all flows should be passed over the spillway. Also, during periods when flows exceed the maximum hydraulic capacity of the project, all excess flows should be passed over the spillway.

The Applicant stated that it would operate the project in conformity with the terms and conditions of the Section 401 Water Quality Certification issued on October 28, 1981. The certification includes resource management recommendations as outlined in a letter dated November 6, 1981, and requires that the Applicant assure that sufficient water would be made available at all times to maintain the 160-cfs continuous downstream flow requirement, as well as diversion flows required for DOT barge canal purposes. The Applicant further stated that the 160 cfs flow requirement would be met through the coordinated operation of Hinckley, Prospect, and Trenton Falls power facilities as outlined in the Exhibit B of the license application.

In response to Interior's recommendations concerning spillage, the Applicant stated that since 1920, DOT has operated the Hinckley Reservoir on the basis of a rule curve prepared by the Department of the State Engineer and Surveyor. The reservoir is annually drawn down to at least 35 feet below the spillway crest. Since 1960, the average reservoir elevation has been 12.6 feet below the spillway crest. The Applicant's proposed operating scheme is based on this 1920 reservoir rule curve.

Spillage of flows as recommended by Interior would require that the reservoir remain filled. This would preclude the reservoir's intended function of providing low-flow augmentation to the barge canal, would inhibit meeting the 160-cfs continuous downstream minimum flow required by the 401 Certification and recommended by Interior, and would eliminate any flood control potential.

It is concluded that the Applicant's proposed operating plan as outlined in Exhibit B is consistent with the intended function of the reservoir in providing low-flow augmentation to the DOT barge canal. This plan would also provide assurance of a 160-cfs minimum flow below the barge canal diversion weir for maintenance of the downstream aquatic habitat. Therefore, Special Article 20 is included in this license to ensure that the project, in coordination with Project No. 2701 downstream, would provide the necessary flows for maintenance of the aquatic habitat below the barge canal diversion weir.

### Recreational Resources

There are no recreational facilities in the immediate area of proposed construction; however, Hinckley Reservoir supports substantial water-based recreation, as does the Prospect impoundment and West Canada Creek. West Canada Creek is considered an important and well-utilized trout fishery.

Interior stated that the Report on Recreational Resources (Report) contained in the Exhibit E does not provide a thorough evaluation of the project's recreational potential, and that a recreational plan should be developed in cooperation with the New York State Office of Parks and Recreation (OPR). OPR recommended that the Applicant contribute to facilities to accommodate fishing, boating, parking, and picnicking. The Applicant responded that it would develop appropriate boat access on Hinckley Reservoir, and would assist in developing recreational opportunities in the downstream Prospect Pool as outlined in the DEC coordinated resource management recommendations, dated November 6, 1981.

The Applicant's Report did not include a detailed plan for recreational development at the project. Therefore, Special Article 21 is included in the license requiring the Applicant to consult with the DEC, OPR, DOT, and NMPC in developing a revised Report for the project.

### Cultural Resources

Interior stated that the Applicant has not provided evidence of the State Historic Preservation Officer's (SHPO) determination regarding impacts to historical, archeological, or cultural resources. The Applicant responded that the SHPO was provided material to determine the significance of existing structures and possible effects of project development and, further, that DEC stated, as lead agency, that its review was coordinated with the SHPO. Nevertheless, Special Article 22 requires the Applicant to consult with the SHPO prior to any ground-disturbing construction activity to ascertain whether any archeological or cultural surveys, or mitigative measures are necessary.

### Endangered Species

The U.S. Fish and Wildlife Service (FWS) has stated that except for occasional transient species, no Federally-listed or proposed threatened or endangered species are known to exist in the project impact area.

### Historical and Archeological Resources

No sites either listed or determined to be eligible for inclusion in the National Register of Historic Places are located within the project impact area.

### Environmental Impacts

Impacts associated with the project as proposed and conditioned would be confined to the construction period. Localized increases in turbidity and sedimentation would result, primarily from placement of a cofferdam on the upstream face of the project dam, and excavation for the tailrace channel, power tunnel and powerhouse foundation. The degree of impact would be dependent on local climatic conditions. The Applicant would, however, employ erosion and sedimentation control measures to preclude any significant impacts to the City of Utica's water supply and downstream aquatic resources.

During project operations, no significant impacts to the Hinckley Reservoir environs, wetlands, or downstream aquatic habitats are foreseen. The rate of seasonal reservoir water level fluctuation would be moderated, and the downstream Prospect Reservoir would be stabilized and remain at a higher elevation for a longer period. Operation of the project in coordination with Project No. 2701 would provide for low-flow augmentation to the DOT barge canal, a minimum flow of 160 cfs below the diversion weir, and adequate water supply for the City of Utica. Therefore, on the basis of the record and Staff's independent analysis, it is concluded that issuance of a license for the project will not constitute a major Federal action significantly affecting the quality of the human environment.

### Safety and Adequacy

The existing dam has a high hazard potential. The New York Regional Office inspected the project and found spalling of concrete surfaces and vegetative growth, depressions and burrow holes in the earth embankment. The Applicant is aware of the deficiencies and intends to correct them upon acquisition of an easement from the State of New York Department of Transportation, the current dam owners, for use of the project for hydroelectric generating purposes. 2/ The spillway capacity with the impoundment 1 foot below the top of the embankment is approximately equal to the PMF flood peak outflow of 106,000 cfs. The spillway is adequate.

---

2/ Although the Hinckley Dam and Reservoir are state-owned, we are not including in the license a special article re-affirming Applicant's obligation to secure the rights necessary to use these structures or reasserting the Commission's licensing jurisdiction over the Dam and Reservoir for project purposes as we did in New York State Electric Gas Assoc., Project No. 2934, 15 FERC ¶61,066 (April 23, 1981). Applicant has included the Dam and Reservoir in its license application and represented that adequate rights to use those facilities will be secured. Moreover, the terms of Article 5 constitute an explicit statement of the Licensee's obligation on this matter.



00333

- 5 -

The dam is not safe against overturning and sliding for flood loading. The Applicant proposes to study methods for strengthening the dam and Special Article 23 requires the Applicant to submit for approval prior to start of construction the design details of the proposed modification and a stability analysis of the dam under various loading conditions, including PMF and earthquake.

#### Comprehensive Development and Economic Feasibility

The project will make good use of the flow and fall of West Canada Creek, is not in conflict with any planned or potential development, and will be best adapted to the comprehensive development of the basin under present conditions upon compliance with the terms and conditions of the license. The project will operate as a peaking facility and generate an estimated average 25,410,000 kWh annually. <sup>3/</sup> The project is economically feasible compared to the fuel cost for an equivalent amount of peaking power in the first year of operation.

#### License Term

The proposed scale of development is less than that which would warrant a full 50-year term since the project's dam and reservoir currently exist. Therefore pursuant to the Commission's policy for licensing projects involving moderate development, <sup>4/</sup> this license term will be for a period of 40 years.

#### It is ordered that:

(A) This license is issued to the Power Authority of the State of New York, (Licensee), under Part I of the Federal Power Act (Act), for a period of 40 years, effective the first day of the month in which this order is issued, for the construction, operation, and maintenance of the Hinckley Project No. 3211 located on West Canada Creek in Oneida and Herkimer Counties, New York. The project affects the interests of interstate commerce. This license is subject to the terms and conditions of the Act, which are incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the Act.

---

<sup>3/</sup> The project will produce 25,410,000 kWh annually, saving the equivalent of 41,700 barrels of oil or 11,800 tons of coal annually.

<sup>4/</sup> See The Montana Power Company, Mystic Lake Project No. 2301, Order Issuing New License (Major) (issued October 3, 1976).

56 EPC 2008

- 6 -

00334

(B) The Hinckley Project No. 3211 consists of:

(1) All lands, to the extent of the Licensee's interests in those lands, constituting the project area and enclosed by the project boundary. The project area and boundary are shown and described by certain exhibits that form part of the application for license and that are designated and described as:

| <u>Exhibit</u> | <u>FERC No. 3211-</u> | <u>Showing</u>       |
|----------------|-----------------------|----------------------|
| G, Sheet 1     | 8                     | Project Location Map |

Project works consisting of: (1) a dam consisting of earthen embankments 570 and 2,600 feet long, both 53 feet high, a non-overflow gravity dam section 65 feet long and 82 feet high, and a 400-foot-long spillway, 83 feet high; (2) Hinckley Reservoir, with a surface area of 4.46 square miles and a usable storage capacity of 76,200 acre-feet between spillway crest elevation of 1,225 and elevation 1,164.5; (3) an intake structure in the non-overflow gravity section and a 120-foot-long conduit 15 feet in diameter through this section; (4) two 90-foot-long power penstocks 10.5 feet in diameter; (5) a powerhouse approximately 70 feet square containing two 4.5-MW turbine/generator units operating under a head of 63 feet; (6) an open trapezoidal tailrace channel 280 feet long and 50 feet wide at the bottom; (7) 4.16-kV generator leads and the 10-MVA, 4.16/46-kV step-up transformer; (8) a 3-mile-long, 46-kV transmission line to be owned and built by the Niagara Mohawk Power Corporation between the project switchyard and the Prospect substation; and (9) appurtenant facilities.

The location, nature, and character of these project works are generally shown and described by the exhibits cited above and more specifically shown and described by certain other exhibits and reports that also form part of the application for license and that are designated and described as:

| <u>Exhibit</u> | <u>FERC No. 3211-</u> | <u>Showing</u>              |
|----------------|-----------------------|-----------------------------|
| F, Sheet 1     | 1                     | Dam Profile                 |
| F, Sheet 2     | 2                     | Existing Structures Plan    |
| F, Sheet 3     | 3                     | Existing Structures Section |
| F, Sheet 4     | 4                     | North Chamber Outlet Works  |

-00335

- 7 -

| <u>Exhibit</u> | <u>FERC No. 3211-</u> | <u>Showing</u>                   |
|----------------|-----------------------|----------------------------------|
| F, Sheet 5     | 5                     | South Chamber Outlet Works       |
| F, Sheet 6     | 6                     | New Intake, Plan & Section       |
| F, Sheet 7     | 7                     | Proposed Project, Plan & Section |

(3) All of the structures, fixtures, equipment, or facilities used or useful in the operation or maintenance of the project and located within the project boundary, all portable property that may be employed in connection with the project, located within or outside the project boundary, as approved by the Commission, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Exhibit A, paragraph 3 which includes information on generating equipment, Section 3 of Exhibit E, and the Exhibit F and G drawings are approved and made a part of the license.

(D) This license is also subject to Articles 1 through 18 set forth in Form L-11 (revised October, 1975), entitled "Terms and Conditions of License for Unconstructed Major Project Affecting the Interest of Interstate or Foreign Commerce," attached to, and made a part of this license. The license is also subject to the following additional articles:

Article 19. (a) In accordance with the provisions of this article, the Licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain other types of use and occupancy, without prior Commission approval. The Licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the Licensee shall also have continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the Licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the Licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(reported at 54 FERC 1864)

000336

- 8 -

(b) The types of use and occupancy of project lands and waters for which the Licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the Licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The Licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the uses and occupancies for which it grants permission are maintained in good repair and comply with applicable State and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the Licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the Licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the Licensee's costs of administering the permit program. The Commission reserves the right to require the Licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The Licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges and roads for which all necessary State and Federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the Licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

00337

- 9 -

(d) The Licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary State and Federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary Federal and State water quality certificates or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary Federal and State approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the Licensee must file a letter to the Director, Office of Electric Power Regulation, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any Federal or State agency official consulted, and any Federal or State approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the Licensee to file an application for prior approval, the Licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraphs (c) or (d) of this article:

(1) Before conveying the interest, the Licensee shall consult with Federal and State fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the Licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.



00338

- 10 -

(3) The instrument of conveyance must include covenants running with the land adequate to ensure that: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.

(4) The Commission reserves the right to require the Licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

Article 20. Licensee, in cooperation with the Niagara Mohawk Power Corporation, the New York State Department of Transportation (DOT), and the New York State Department of Environmental Conservation, shall operate the Hinckley Hydroelectric Project in such a manner as to provide a continuous minimum flow of 160 cubic feet per second in West Canada Creek downstream of the DOT barge canal diversion weir.

Article 21. The Licensee shall, within 1 year from the date of issuance of this license, file for approval a revised Report on Recreational Resources for the project. The report shall be prepared in consultation with the New York State Office of Parks and Recreation, the New York State Department of Environmental Conservation, the New York Department of Transportation, and the Niagara Mohawk Power Corporation, and shall include a description of the type and location of the recreational facilities to be provided and the construction, operation, and maintenance schedule.

Article 22. The Licensee shall, prior to the commencement of any construction at the project, consult with the New York State Historic Preservation Officer (SHPO) about the need for any cultural resources survey and salvage work. The Licensee shall make available funds in a reasonable amount for any survey and mitigation work as required. If any previously unrecorded archeological or historic sites are discovered during the course of construction or development of any project works or other facilities at the project, construction activity shall be halted, a qualified archeologist shall be consulted to determine the significance of the sites, and the Licensee shall consult with the SHPO to develop and implement a mitigative plan for the protection of significant archeological or historical resources. If the Licensee and the SHPO cannot agree on the amount of money to be expended on archeological or historic work related to the project, the Commission reserves the right to require the Licensee to conduct, at its own expense, any such work found necessary.

Article 23. The Licensee shall submit for approval by the Director, Office of Electric Power Regulation, within six months from the issuance date of this order a schedule and design details, including a design report, for proposed modifications that would ensure the stability of Hinckley Dam for the loading conditions of normal pool plus maximum credible earthquake and floods up to and including the probable maximum flood. The Licensee shall not commence construction of any project works until the schedule and design of proposed modifications are approved.

Article 24. The Licensee shall file with the Commission's Regional Engineer and the Director, Office of Electric Power Regulation, one copy each of the contract drawings and specifications for pertinent features of the project such as water retention structures, powerhouse and water conveyance structures, at least 60 days prior to start of construction. The Director, Office of Electric Power Regulation, may require changes in the plans and specifications to ensure a safe and adequate project. 7

Article 25. The Licensee shall review and approve the design and construction procedures for contractor-designed cofferdams and deep excavations prior to the start of construction. The Licensee shall file with the Commission's Regional Engineer and Director, Office of Electric Power Regulation, one copy of the approved construction drawings and specifications, and a copy of the letter of approval.

Article 26. The Licensee shall commence construction of the project within two years from the effective date of the license and shall thereafter in good faith and with due diligence prosecute such construction and shall complete construction of such project works within four years from the effective date of the license.

- 12 -

00346

Article 27. The Licensee shall pay the United States the following annual charges, effective the first day of the month in which this license is issued.

For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 12,000 horsepower.

Article 28. The Licensee shall continue to consult and cooperate with the U.S. Fish and Wildlife Service, the U.S. Park Service of the Department of the Interior, the New York State Office of Parks and Recreation, the New York State Department of Environmental Conservation, the New York State Department of Transportation, and other appropriate agencies for the protection and development of the environmental resources and values of the project area. The Commission reserves the right to require changes in the project works or operations that may be necessary to protect and enhance those resources and values.

(E) This order is final unless a petition appealing it to the Commission is filed within 30 days from the date of its issuance, as provided in Section 1.7(d) of the Commission's regulations, 18 C.F.R. Section 1.7(d) (1981). The filing of a petition appealing this order to the Commission or an application for rehearing as provided in Section 313(a) of the Act does not operate as a stay of the effective date of this license or of any other date specified in this order, except as specifically ordered by the Commission. The Licensee's failure to file a petition appealing this order to the Commission shall constitute acceptance of this license. In acknowledgment of acceptance of this order and its terms and conditions, it shall be signed by the Licensee and returned to the Commission within 60 days from the date this order is issued.

Lawrence R. Anderson  
Director, Office of Electric  
Power Regulation

## Appendix C – Water Quality Monitoring Data

Table C-1: Water Quality Data Collected by MVWA from Water Supply Intake between 2000 and 2016

| Date       | Alkalinity<br>(mg CaCO3/L) | Ca-Hardness<br>(mg CaCO3/L) | Total Hardness<br>(mg CaCO3/L) | PO4<br>(mg/L) | NOX<br>(mg/L) | NO2<br>(mg/L) | Temp<br>(°C) | DO%    | DO<br>(mg/L) | SpC<br>(uS/cm) | Turbidity<br>(NTU) | pH   | ORP   | TOC<br>(mg/L) | UV-254 | SUVA | Total Coliform<br>(per 100 mL) | E. Coli<br>(per 100 mL) | Chlorophyll<br>Concentration<br>(ug/L) | Notes                          |
|------------|----------------------------|-----------------------------|--------------------------------|---------------|---------------|---------------|--------------|--------|--------------|----------------|--------------------|------|-------|---------------|--------|------|--------------------------------|-------------------------|----------------------------------------|--------------------------------|
| 7/11/2000  | 14                         | 14                          | 16                             | 1.02          | 0.2           |               | 18.80        | 65.4   | 6.03         | 43             | 2.29               | 6.63 |       |               |        |      |                                |                         |                                        |                                |
| 8/10/2000  | 14                         | 14                          | 17                             | 0.79          | 0.2           |               |              | 71.3   | 6.13         | 16             | 0.78               | 6.84 |       | 5.57          | 0.191  | 3.43 |                                |                         |                                        |                                |
| 9/15/2000  | 18                         | 18                          | 20                             | 0.29          | 0.2           |               |              |        | 9.5          | 111            | 0.92               | 7.89 |       |               |        |      |                                |                         |                                        |                                |
| 5/29/2002  | 12                         | 8                           | 9                              | 0.25          | 0.3           |               | 13.72        | 99.5   | 10.39        | 43             | 2.19               | 6.83 | 185   | 4.63          | 0.164  | 3.54 | 112                            | 0                       |                                        |                                |
| 7/2/2002   | 11                         | 12                          | 16                             | 0.25          | 0.3           |               | 21.33        | 88.5   | 7.94         | 63             | 1.06               | 7.29 | 156   | 4.72          | 0.175  | 3.71 | 365                            | 7                       |                                        |                                |
| 8/1/2002   | 18                         | 16                          | 19                             | 0.44          | 0.2           |               | 23.93        | 83.4   | 7.05         | 42             | 0.76               | 7.33 | 136   | 4.61          | 0.152  | 3.30 | 461                            | 1                       |                                        |                                |
| 9/25/2002  | 24                         | 22                          | 28                             | 0.56          | 0.2           |               | 19.63        | 96.1   | 8.8          | 54             | 2.19               | 5.69 | 333   | 4.14          | 0.131  | 3.16 | 219                            | 4                       |                                        |                                |
| 10/24/2002 | 18                         | 18                          | 24                             | 0.86          | 0.3           |               | 10.50        | 97.3   | 10.85        | 60             | 2.15               | 5.87 | 291   | 5.44          | 0.196  | 3.60 | 326                            | 16                      | 2.1                                    |                                |
| 4/28/2003  | 6                          | 8                           | 10                             | 0.025         | 0.6           |               | 7.77         | 112.2  | 13.35        | 48             | 1.42               | 5.74 | 324   | 4.21          | 0.154  | 3.66 | 24                             | 1                       | 0.3                                    |                                |
| 5/27/2003  | 8                          | 7                           | 11                             | 0.107         | 0.4           |               | 15.29        | 100.0  | 10.03        | 36             | 0.95               | 9.33 | 277   | 4.43          | 0.163  | 3.68 | 125                            | 2                       | 1.3                                    |                                |
| 7/17/2003  | 12                         | 16                          | 22                             | 0.051         | 0.3           |               | 21.52        | 91.7   | 8.09         | 49             | 1.31               | 6.84 | 306   | 4.02          | 0.141  | 3.51 | 326                            | 3                       | 5.5                                    |                                |
| 8/18/2003  | 16                         | 14                          | 19                             | 0.119         | 0.3           |               | 22.16        | 97.1   | 8.47         | 43             | 0.80               | 7.13 | 187   | 5.36          | 0.211  | 3.94 | 317                            | 5                       | 4.2                                    |                                |
| 8/21/2003  | 16                         | 16                          | 20                             | 0.072         | 0.2           |               | 21.95        | 93.0   | 8.14         | 41             | 1.56               | 6.54 | 281   | 6.34          | 0.231  | 3.64 |                                |                         | 2.3                                    |                                |
| 10/15/2003 | 14                         | 14                          | 16                             |               |               |               | 14.04        | 96.1   | 9.89         | 52             | 1.01               | 6.16 | 393   | 6.050         | 0.244  | 4.03 | 151                            | 1                       | 2.3                                    |                                |
| 4/19/2004  | 8                          | 8                           | 10                             |               |               |               | 6.07         | 100.50 | 12.49        | 32             | 1.180              | 6.49 | 284   | 3.66          | 0.141  | 3.85 | 24                             | 0                       | 2.2                                    |                                |
| 6/14/2004  | 9                          | 12                          | 14                             | 0.006         |               |               | 19.85        | 95.30  | 8.69         | 36             | 1.180              | 6.90 | 305   | 5.64          | 0.215  | 3.81 | 72                             | 1                       | 3.5                                    |                                |
| 7/19/2004  | 18                         | 18                          | 20                             | 0.005         |               |               | 22.00        | 119.50 | 10.45        | 51             | 0.930              | 7.77 | 241   | 4.45          | 0.161  | 3.62 | 261                            | 3                       | 11.7                                   |                                |
| 8/30/2004  | 20                         | 16                          | 20                             | 0.018         | 0.061         | -0.004        | 20.26        | 100.20 | 9.07         | 46             | 1.140              | 7.24 | 354   | 6.51          | 0.188  | 2.89 | 1733                           | 1                       | 2.7                                    |                                |
| 9/14/2004  | 18                         | 16                          | 22                             | -0.004        | 0.052         | -0.015        | 20.58        | 95.90  | 8.62         | 39             | 0.900              | 7.81 | 292   | 5.21          | 0.183  | 3.51 | 219                            | 1                       | 2.6                                    |                                |
| 10/4/2004  | 16                         | 14                          | 20                             | 0.000         | 0.018         | 0.000         | 16.71        | 93.40  | 9.08         | 43             | 1.300              | 7.55 | 252   | 5.47          | 0.206  | 3.77 | 89                             | 0                       | 2.6                                    |                                |
| 4/24/2006  | 12                         | 12                          | 12                             | <0.025        | 0.33          | <0.1          | 8.12         | 97.8   | 11.54        | 36             | 1.55               | 7.05 | 298.4 | 3.250         | 0.141  | 4.34 | 240                            | <1                      |                                        |                                |
| 5/15/2006  | 8                          | 12                          | 14                             | <0.025        | <0.25         | <0.1          | 13.55        | 97     | 10.69        | 33             | 2.08               | 6.64 | 308   | 3.700         | 0.151  | 4.08 | 33.1                           | 6.3                     |                                        |                                |
| 6/8/2006   | 12                         | 12                          | 12                             | <0.025        | <0.25         | <0.1          | 16.12        | 89.1   | 8.78         | 42             | 0.92               | 7.77 | 249.1 |               |        |      | 727                            | 21.3                    |                                        |                                |
| 7/17/2006  | 12                         | 16                          | 18                             | <0.025        | <0.25         | <0.1          | 21.49        | 91.7   | 8.1          | 36             | 0.65               | 7.06 | 234   |               |        |      | 727                            | 21.3                    |                                        |                                |
| 8/14/2006  | 12                         | 16                          | 22                             | <0.025        | <0.25         | <0.1          | 22.18        | 85.2   | 7.42         | 39             | 2.45               | 7.1  | 223.3 |               |        |      | 275                            | 2                       |                                        |                                |
| 9/5/2006   | 18                         | 18                          | 20                             | <0.025        | <0.25         | <0.1          | 18.73        | 96.7   | 9.02         | 45             | 1.67               | 7.32 | 243   |               |        |      | 172.2                          | 1                       |                                        |                                |
| 10/16/2006 | 14                         | 16                          | 24                             | <0.025        | <0.25         | <0.1          | 11.58        | 97     | 10.55        | 47             | 1.85               | 7.39 | 254   |               |        |      | 47.1                           | <1                      |                                        |                                |
| 4/23/2007  | 4                          | 10                          | 11                             | <0.025        | 0.4921        | <0.1          | 4.37         | 102.9  | 13.36        | 35             | 2.06               | 7.3  | 192.8 | 3.320         | 0.123  | 3.70 | 38.9                           | 0                       |                                        |                                |
| 5/4/2007   | 1                          | 8                           | 10                             | <0.025        | 0.4499        | <0.1          | 10           |        |              |                | 2.01               | 6.67 | 178   | 3.840         | 0.138  | 3.59 | 37.9                           | 1.0                     |                                        |                                |
| 6/4/2007   | 6                          | 10                          | 14                             | <0.025        | <0.25         | <0.1          | 20.36        | 124.9  | 11.28        | 39             | 1.1                | 7.44 | 203.5 | 3.630         | 0.129  | 3.55 | 248.1                          | 1.0                     |                                        |                                |
| 7/2/2007   | 18                         | 18                          | 20                             | <0.025        | <0.25         | <0.1          | 21.23        | 114.9  | 10.2         | 46             | 1.34               | 7.64 | 148.1 | 3.610         | 0.11   | 3.05 | 921                            | 2                       | -0.6                                   |                                |
| 8/20/2007  | 23                         | 46                          | 52                             | <0.025        | <0.25         | <0.1          |              | 91     | 8.18         | 0.074          | 1.5                | 7.7  | 159   | 4.120         | 0.121  | 2.94 | 1119.85                        | 0                       |                                        |                                |
| 9/17/2007  |                            |                             |                                |               |               |               |              |        |              |                |                    |      |       |               |        |      |                                |                         |                                        | Water was at 45 ft. from floor |
| 4/21/2008  | 5.9                        | 6.9                         | 8.9                            | <0.025        | 0.2568        | <0.1          | 6.01         | 91.7   | 11.42        | 0.023          | 0.88               | 6.99 | 217   | 4.63          | 0.155  | 3.35 | 344.8                          | 0                       |                                        |                                |
| 5/19/2008  | 8.1                        | 2                           | 13                             | <0.025        | <0.25         | <0.1          | 10.99        | 91.2   | 10.06        | 0.024          | 0.69               | 6.81 | 356.2 | 4.51          | 0.157  | 3.48 | 129.1                          | 0                       |                                        |                                |



| Date       | Alkalinity<br>(mg CaCO3/L) | Ca-Hardness<br>(mg CaCO3/L) | Total Hardness<br>(mg CaCO3/L) | PO4<br>(mg/L) | NOX<br>(mg/L) | NO2<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(uS/cm) | Turbidity<br>(NTU) | pH    | ORP   | TOC<br>(mg/L) | UV-254 | SUVA | Total Coliform<br>(per 100 mL) | E. Coli<br>(per 100 mL) | Chlorophyll<br>Concentration<br>(ug/L) | Notes                                                 |
|------------|----------------------------|-----------------------------|--------------------------------|---------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|-------|-------|---------------|--------|------|--------------------------------|-------------------------|----------------------------------------|-------------------------------------------------------|
| 6/16/2008  | 8.9                        | 7                           | 18                             | <0.025        | <0.25         | <0.1          | 19.65        | 96.7  | 8.86         | 0.047          | 0.98               | 7.21  | 235   | 4.58          | 0.151  | 3.30 | 193.5                          | 4.1                     |                                        |                                                       |
| 7/14/2008  | 15.2                       | 17.8                        | 18.4                           | <0.025        | <0.25         | <0.1          | 21.42        | 94.8  | 8.38         | 0.044          | 0.68               | 7.05  | 227.1 | 4.72          | 0.143  | 3.03 | 686.7                          | 6.3                     |                                        |                                                       |
| 8/4/2008   | 15                         | 18                          | 20.6                           | <0.025        | <0.25         | <0.1          | 21.39        | 91.9  | 8.13         | 0.054          | 1.1                | 6.99  | 255.5 | 5.85          | 0.211  | 3.61 | 920.8                          | 5.2                     |                                        |                                                       |
| 8/26/2008  | 19                         | 21                          | 24                             | 0.0511        | <0.25         | <0.1          | 21.25        | 103.6 | 9.19         | 0.048          | 0.7                | 7.46  | 271.3 | 5.72          | 0.174  | 3.04 | 410.6                          | 7.4                     |                                        |                                                       |
| 9/23/2008  |                            |                             |                                |               |               |               |              |       |              |                |                    |       |       |               |        |      |                                |                         |                                        | No sample - unable to access intakes due to wasp nest |
| 10/14/2008 | 20                         | 44                          | 110                            | <0.025        | <0.25         | <0.1          | 14.54        | 97.9  | 9.97         | 0.06           | 0.95               | 7.54  | 151.3 | 5.16          | 0.16   | 3.10 | 56.1                           | 3.1                     |                                        |                                                       |
| 4/13/2009  | 7.1                        | 7.4                         | 8                              | <0.025        | <0.25         | <0.1          | 3.67         | 110.4 | 14.6         | 0.015          | 1.28               | 6.86  | 324.8 |               |        |      | 235.9                          | 0                       |                                        |                                                       |
| 5/11/2009  | 7                          | 8                           | 17                             | <0.025        | <0.25         | <0.1          | 11.9         | 89.1  | 9.62         | 0.029          | 0.8                | 7.03  | 234.7 |               |        |      | 290.9                          | 2                       |                                        |                                                       |
| 5/27/2009  | 11                         | 10                          | 13                             | <0.025        | <0.25         | <0.1          | 13.48        | 91.6  | 9.55         | 0.03           | 1.08               | 6.84  | 235.6 |               |        |      | 248                            | 1                       |                                        |                                                       |
| 6/8/2009   | 10                         | 8                           | 10                             | <0.025        | <0.25         | <0.1          | 15.41        | 97.3  | 9.72         | 0.034          | 0.57               | 7.12  | 213.9 |               |        |      | 40.2                           | 2                       |                                        |                                                       |
| 6/22/2009  | 10                         | 11                          | 15                             | <0.025        | <0.25         | <0.1          | 19.47        | 93.4  | 8.58         | 0.033          | 1.02               | 7.3   | 197.8 |               |        |      | 275.5                          | 9.8                     |                                        |                                                       |
| 7/6/2009   | 11                         | 10                          | 19                             | <0.025        | <0.25         | <0.1          | 16           | 76.7  | 7.57         | 0.035          | 0.56               | 6.91  | 198.7 |               |        |      | 150                            | 2                       |                                        |                                                       |
| 7/20/2009  |                            |                             |                                |               |               |               |              |       |              |                |                    |       |       |               |        |      |                                |                         |                                        | Locked out by Power Company                           |
| 8/4/2009   | 18                         | 16                          | 22                             | <0.025        | <0.25         | <0.1          | 20.52        | 78.2  | 7.04         | 0.052          | 0.56               | 7.16  | 225.3 |               |        |      | 1232.87                        | 4.1                     |                                        |                                                       |
| 8/18/2009  |                            |                             |                                |               |               |               |              |       |              |                |                    |       |       |               |        |      |                                |                         |                                        | Low Water Level                                       |
| 8/31/2009  | 15                         | 17                          | 20                             | <0.025        | <0.25         | <0.1          | 20.65        | 72.9  | 6.55         | 0.053          | 0.82               | 7.33  | 202.5 |               |        |      | 648.8                          | 4.1                     |                                        |                                                       |
| 9/14/2009  |                            |                             |                                |               |               |               |              |       |              |                |                    |       |       |               |        |      |                                |                         |                                        | Low Water Level                                       |
| 9/28/2009  | 14                         | 19                          | 32                             | <0.025        | <0.25         | <0.1          | 16.9         | 89    | 8.62         | 0.05           | 1.18               | 7.38  | 169.4 |               |        |      | 770.1                          | 10.9                    |                                        |                                                       |
| 10/14/2009 | 15                         | 22                          | 28                             | <0.025        | <0.25         | <0.1          | 10.78        | 88.5  | 9.81         | 0.042          | 1.34               | 7.44  | 180.9 |               |        |      | 387.3                          | 6.3                     |                                        |                                                       |
| 5/17/2010  | 11                         | 11                          | 14                             | <0.025        | <0.25         | <0.1          | 13.41        | 95.2  | 9.93         | 0.045          | 0.93               | 7.06  | 399.8 |               |        |      | 24.5                           | 1                       |                                        |                                                       |
| 6/1/2010   | 16                         | 14                          | 16                             | <0.025        | <0.25         | <0.1          | 19.52        | 95.6  | 8.78         | 0.044          | 1.29               | 7.33  | 443.3 |               |        |      | 147                            | 0                       |                                        |                                                       |
| 8/23/2010  | 18                         | 21                          | 24                             | <0.025        | <0.25         | <0.1          | 21.55        |       |              | 0.043          | 0.66               | 7.313 | 377.9 |               |        |      | 387.3                          | 4.1                     |                                        |                                                       |
| 9/7/2010   | 18                         | 22                          | 27                             | <0.025        | <0.25         | <0.1          | 19.83        | 82.3  | 7.51         | 0.04           | 0.7                | 7.04  | 403.2 |               |        |      | 224                            | <1                      |                                        |                                                       |
| 9/20/2010  | 20                         | 29                          | 63                             | <0.025        | <0.25         | <0.1          | 17.35        | 87.7  | 8.42         | 0.04           | 0.84               | 7.27  | 457   |               |        |      | 139.6                          | 1                       |                                        |                                                       |
| 10/4/2010  | 12                         | 12                          | 16                             | <0.025        | <0.25         | <0.1          | 14.49        | 91.5  | 9.33         | 0.031          | 1.14               | 6.81  | 450.3 |               |        |      | >2419                          | 122.3                   |                                        |                                                       |
| 5/23/2011  | 8                          | 14                          | 16                             | <0.025        | 0.16          | <0.05         | 12.24        | 99.1  | 10.62        | 0.026          | 1.03               | 6.47  | 283.9 |               |        |      | 275.5                          | 1                       |                                        |                                                       |
| 6/6/2011   | 13                         | 10                          | 17                             | <0.025        | 0.09          | <0.05         | 17.78        | 97.8  | 9.3          | 0.03           | 0.58               | 7.1   | 365.1 |               |        |      | 181.5                          | <1                      |                                        |                                                       |
| 6/19/2011  | 13                         | 9                           | 15                             | <0.025        | <0.05         | <0.05         | 19.71        | 68.2  | 6.24         | 0.034          | 0.71               | 7.18  | 365.2 |               |        |      | 272                            | <1                      |                                        |                                                       |
| 7/11/2011  | 16                         | 17                          | 20                             | <0.025        | 0.06          | <0.05         | 20.26        | 61.3  | 5.55         | 0.042          | 0.64               | 6.9   | 364.5 |               |        |      | 307.6                          | 3.1                     |                                        |                                                       |
| 7/25/2011  | 14                         | 14                          | 21                             | <0.025        | <0.05         | <0.05         | 24.52        | 102.7 | 8.56         | 0.039          | 0.86               | 7.34  | 333.4 |               |        |      | 727                            | 12                      |                                        |                                                       |
| 8/8/2011   | 20                         | 16                          | 23                             | <0.025        | <0.05         | <0.05         | 24.29        |       |              | 0.042          | 0.91               | 7.61  | 347.5 |               |        |      | 365.4                          | 1                       |                                        |                                                       |
| 9/12/2011  | 13                         | 11                          | 15                             | <0.025        | <0.05         | <0.05         | 17.58        |       |              | 0.039          | 1.24               | 6.9   | 388.1 |               |        |      | >2419                          | 91                      |                                        |                                                       |
| 9/27/2011  | 7                          | 18                          | 27                             | <0.025        | 0.08          | <0.05         | 18.04        |       |              | 0.037          | 1.29               | 6.64  | 353.2 |               |        |      | 78.9                           | 3.1                     |                                        |                                                       |
| 10/11/2011 | 20                         | 25                          | 30                             | <0.025        | <0.05         | <0.05         | 15.32        | 90.9  | 9.1          | 0.037          | 1.88               | 6.98  | 482.7 |               |        |      | 52                             | 1                       |                                        |                                                       |
| 10/24/2011 | 12                         | 15                          | 17                             | <0.025        | <0.05         | <0.05         |              |       |              |                | 1.36               |       |       |               |        |      | >2419                          | 25.6                    |                                        |                                                       |

| Date      | Alkalinity<br>(mg CaCO3/L) | Ca-Hardness<br>(mg CaCO3/L) | Total Hardness<br>(mg CaCO3/L) | PO4<br>(mg/L) | NOX<br>(mg/L) | NO2<br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(uS/cm) | Turbidity<br>(NTU) | pH   | ORP | TOC<br>(mg/L) | UV-254 | SUVA | Total Coliform<br>(per 100 mL) | E. Coli<br>(per 100 mL) | Chlorophyll<br>Concentration<br>(ug/L) | Notes                                                        |
|-----------|----------------------------|-----------------------------|--------------------------------|---------------|---------------|---------------|--------------|-----|--------------|----------------|--------------------|------|-----|---------------|--------|------|--------------------------------|-------------------------|----------------------------------------|--------------------------------------------------------------|
| 5/7/2012  | 9                          | 10                          | 10                             | <0.025        | 0.42          | <0.05         | 10.9         |     |              |                | 1.06               | 7.14 | 143 |               |        |      | 51.2                           | 1                       |                                        |                                                              |
| 7/10/2012 | 16                         | 14                          | 18                             | <0.025        | 0.1           | <0.05         | 23.8         |     |              | 42.8           | 1.16               | 7.54 | 224 |               |        |      |                                |                         |                                        |                                                              |
| 8/1/2012  | 20                         | 16                          | 20                             | <0.025        | <0.05         | <0.05         | 24.7         |     |              | 50.6           | 2.22               | 7.75 | 199 |               |        |      |                                |                         |                                        |                                                              |
| 8/13/2012 | 14                         | 18                          | 22                             | <0.025        | <0.05         | <0.05         | 24.1         |     |              | 62.5           | 1.89               | 7.32 | 184 |               |        |      |                                |                         |                                        |                                                              |
| 9/17/2012 | 28                         | 24                          | 28                             | <0.025        | <0.05         | <0.05         | 20.1         |     |              | 68             | 2.15               | 7.1  | 194 |               |        |      |                                |                         |                                        |                                                              |
| 10/1/2012 | 22                         | 22                          | 26                             | <0.025        | <0.05         | <0.05         |              |     |              | 65.9           | 3.2                | 7.42 | 170 |               |        |      | >2419                          | 6.3                     |                                        |                                                              |
| 5/20/2013 | 8                          | 8                           | 10                             |               | 0.22          | <0.05         | 15           |     | 9.1          | 28.7           | 1.13               | 6.87 |     |               |        |      | 13.4                           | <1                      |                                        |                                                              |
| 6/3/2013  | 14                         | 14                          | 16                             | <0.025        | 0.18          | <0.05         | 14.9         |     | 8.4          | 34.1           | 0.87               | 7.19 |     |               |        |      | 102.2                          | 3.1                     |                                        |                                                              |
| 6/25/2013 | 14                         | 10                          | 14                             | <0.025        | 0.18          | <0.05         | 19.5         |     |              | 33.5           | 0.96               | 7.1  |     |               |        |      | 165.8                          | 2                       |                                        |                                                              |
| 7/29/2013 | 12                         | 12                          | 14                             | <0.025        | <0.05         | <0.05         | 22.3         |     | 5.2          | 33.1           | 0.87               | 7.08 |     |               |        |      | 387                            | 1                       |                                        |                                                              |
| 8/12/2013 | 16                         | 14                          | 18                             | <0.025        | <0.05         | <0.05         | 21.7         |     | 7.9          | 95.4           | 0.85               | 6.89 |     |               |        |      | 156.5                          | 1                       |                                        |                                                              |
| 9/9/2013  | 20                         | 16                          | 20                             | <0.025        | 0.06          | <0.05         | 19.9         |     | 7.4          | 46.7           | 1.89               | 7.36 |     |               |        |      | 547.5                          | 1                       |                                        |                                                              |
| 9/24/2013 | 18                         | 18                          | 20                             | <0.025        | 0.08          | <0.05         | 17.5         |     | 9.9          | 50.6           | 1.47               | 7.41 |     |               |        |      | 325.5                          | 8.5                     |                                        |                                                              |
| 5/20/2014 | 8                          | 10                          | 12                             | <0.025        | 0.13          | <0.05         | 11.7         |     |              | 23             | 1.01               | 6.64 |     |               |        |      | 980.4                          | 59.4                    |                                        | No random samples were taken from the raw tap at the dam lab |
| 6/17/2014 | 12                         | 12                          | 16                             | <0.025        | 0.15          | <0.05         |              |     |              | 31.3           | 1.12               | 7.01 |     |               |        |      | 579                            | 9.8                     |                                        |                                                              |
| 7/17/2014 | 14                         | 12                          | 16                             | <0.025        | 0.1           | <0.05         | 20.2         |     |              | 33.7           | 1.74               | 6.82 |     |               |        |      | 1046                           | 1                       |                                        |                                                              |
| 8/19/2014 | 16                         | 16                          | 16                             | <0.025        | <0.05         | <0.05         | 19.7         |     |              | 39.9           | 2.25               | 7.12 |     |               |        |      | 109.2                          | 6.3                     |                                        |                                                              |
| 9/23/2014 | 18                         | 20                          | 22                             | <0.025        | 0.08          | <0.05         | 16.6         |     |              | 48.1           | 1.76               | 7.2  |     |               |        |      | 142.1                          | 5.2                     |                                        |                                                              |
| 4/26/2015 | 4                          | 6                           | 8                              | <0.025        | 0.38          | <0.05         | 6.5          |     |              | 21.67          | 1.67               | 6.6  |     |               |        |      | 225                            | <1                      |                                        |                                                              |
| 5/21/2015 | 8                          | 8                           | 12                             | <0.025        | 0.28          | <0.05         | 11           |     |              | 26.4           | 1.68               | 6.74 |     |               |        |      | 59.4                           | <1                      |                                        |                                                              |
| 7/28/2015 | 16                         | 14                          | 18                             | <0.025        | 0.08          | <0.05         | 21           |     |              | 41.4           | 1.12               | 6.96 |     |               |        |      | 260                            | 4                       |                                        |                                                              |
| 8/31/2015 | 20                         | 20                          | 24                             | <0.025        | 0.06          | <0.05         | 21.5         |     |              | 59.3           | 2.08               | 7.17 |     |               |        |      | 84                             | 5                       |                                        |                                                              |
| 9/21/2015 | 22                         | 22                          | 26                             | <0.025        | <0.05         | <0.05         | 19.7         |     |              | 65.7           | 2.51               | 7.42 |     |               |        |      | >2419                          | 88                      |                                        |                                                              |
| 5/10/2016 | 14                         | 12                          | 14                             | <0.025        | 0.12          | <0.05         | 10.5         |     |              | 34             | 1.92               | 7.12 |     |               |        |      | 23                             | 1                       |                                        |                                                              |
| 6/13/2016 | 16                         | 20                          | 26                             | <0.025        | 0.05          | <0.05         | 16.5         |     |              | 37.9           | 1.35               | 7.35 |     |               |        |      | 214.3                          | 10                      |                                        |                                                              |
| 7/6/2016  | 24                         | 20                          | 24                             | <0.025        | 0.06          | <0.05         | 18.9         |     |              | 45.8           | 1.14               | 7.01 |     |               |        |      | 214.3                          | 15.8                    |                                        |                                                              |
| 8/13/2016 | 20                         | 20                          | 20                             | <0.025        | <0.05         | <0.05         |              |     |              | 48.9           | 2.37               | 6.63 |     |               |        |      | 648.8                          | 61.3                    |                                        |                                                              |
| 9/13/2016 | 22                         | 20                          | 26                             | <0.025        | <0.05         | <0.05         | 22.1         |     |              | 48.3           | 1.02               | 7.37 |     |               |        |      | 1553                           | 2                       |                                        |                                                              |

[MVWA, 2016](#)

**Table C-2: Water Quality Data Collected by NYSDEC Fisheries Department from Hinckley Reservoir: 1989, 1994, 2009, 2010**

| Date       | Sample Depth (m) | Sample Depth (ft) | Water Temp (°C) | Dissolved Oxygen (mg/L) |
|------------|------------------|-------------------|-----------------|-------------------------|
| 08/24/1989 | 0.00             | 0.00              | 21.10           | 7.00                    |
|            | 13.72            | 45.00             |                 | 6.00                    |
| 06/23/1994 | 0.00             | 0.00              | 22.22           | 10.00                   |
|            | 1.52             | 5.00              | 21.11           |                         |
|            | 3.05             | 10.00             | 21.11           |                         |
|            | 4.57             | 15.00             | 21.11           |                         |
|            | 6.10             | 20.00             | 20.00           |                         |
|            | 7.62             | 25.00             | 19.44           |                         |
|            | 9.15             | 30.00             | 18.33           |                         |
|            | 10.67            | 35.00             | 17.78           |                         |
|            | 12.20            | 40.00             | 16.67           |                         |
|            | 13.72            | 45.00             | 16.11           |                         |
|            | 15.24            | 50.00             | 15.00           |                         |
|            | 16.77            | 55.00             | 14.44           |                         |
|            | 18.29            | 60.00             | 13.89           |                         |
|            | 19.82            | 65.00             | 13.89           |                         |
|            | 21.34            | 70.00             | 13.89           | 8.00                    |
| 08/11/2009 | 1.98             | 6.50              | 22.11           | 8.20                    |
|            | 3.99             | 13.10             | 21.39           | 7.70                    |
|            | 6.01             | 19.70             | 21.22           | 7.20                    |
|            | 7.99             | 26.20             | 20.72           | 6.50                    |
|            | 10.00            | 32.80             | 20.22           | 6.20                    |
|            | 12.01            | 39.40             | 19.61           | 5.90                    |
|            | 13.99            | 45.90             | 18.89           | 5.30                    |
|            | 16.01            | 52.50             | 18.50           | 5.10                    |
|            | 17.99            | 59.00             | 17.89           | 4.40                    |
|            | 20.00            | 65.60             | 17.28           | 0.60                    |
|            | 22.01            | 72.20             | 17.28           | 0.40                    |
|            | 23.99            | 78.70             | 17.28           | 0.40                    |
| 03/11/2010 | 2.01             | 6.60              | 1.72            | 11.70                   |
|            | 3.99             | 13.10             | 1.39            | 11.60                   |
|            | 6.01             | 19.70             | 1.78            | 11.10                   |
|            | 7.99             | 26.20             | 2.28            | 8.40                    |

[NYSDEC, 2011a](#)

**Table C-3: Water Quality Data Collected by NYSDEC from Hinckley Reservoir between 6/2011 and 9/2011**

| Date       | Sample Depth (m) | Sample Depth (ft) | Water Temp (°C) | Dissolved Oxygen (mg/L) | Oxidation-Reduction Potential (millivolts) | pH   | Specific Conductance (umhos/cm) |
|------------|------------------|-------------------|-----------------|-------------------------|--------------------------------------------|------|---------------------------------|
| 06/14/2011 | 0.00             | 0.00              | 18.73           | 8.20                    | 210.00                                     | 5.80 | 30.00                           |
|            | 1.00             | 3.28              | 19.70           | 8.15                    | 216.00                                     | 5.87 | 30.00                           |
|            | 2.00             | 6.56              | 19.70           | 7.95                    | 243.00                                     | 5.44 | 41.00                           |
|            | 3.00             | 9.84              | 19.70           | 6.90                    | 237.00                                     | 5.52 |                                 |
|            | 4.00             | 13.12             | 19.70           | 5.25                    | 264.00                                     | 5.20 |                                 |
|            | 5.00             | 16.40             | 19.70           | 4.50                    | 267.00                                     | 5.10 |                                 |
|            | 6.00             | 19.68             | 19.70           | 4.05                    | 285.00                                     | 4.85 |                                 |
|            | 7.00             | 22.96             | 19.69           | 3.20                    | 310.00                                     | 4.50 |                                 |
|            | 8.00             | 26.24             | 19.69           | 2.88                    | 290.00                                     | 5.25 |                                 |
|            | 9.00             | 29.52             | 19.65           | 2.76                    | 325.00                                     | 4.25 |                                 |
|            | 10.00            | 32.80             | 18.58           | 2.89                    | 305.00                                     | 4.70 |                                 |
|            | 11.00            | 36.08             | 17.25           | 2.80                    | 340.00                                     | 4.24 |                                 |
|            | 12.00            | 39.36             | 15.35           | 2.45                    | 220.00                                     |      | 31.00                           |
|            | 13.00            | 42.64             | 13.25           | 2.38                    | 275.00                                     |      |                                 |
|            | 14.00            | 45.92             | 12.15           | 2.43                    | 480.00                                     |      |                                 |
|            | 15.00            | 49.20             | 11.45           | 2.65                    | 490.00                                     |      |                                 |
|            | 16.00            | 52.48             | 10.60           | 2.92                    | 376.00                                     |      |                                 |
|            | 17.00            | 55.76             | 10.39           | 3.75                    | 366.00                                     |      | 24.00                           |
| 07/12/2011 | 0.00             | 0.00              | 23.57           | 8.90                    | 361.00                                     | 6.88 | 37.60                           |
|            | 1.00             | 3.28              | 23.27           | 8.19                    | 360.00                                     | 6.87 | 36.10                           |
|            | 2.00             | 6.56              | 23.03           | 7.77                    | 369.00                                     | 6.81 | 37.30                           |
|            | 3.00             | 9.84              | 22.47           | 6.99                    | 376.00                                     | 6.70 | 38.60                           |
|            | 4.10             | 13.45             | 21.30           | 6.51                    | 380.00                                     | 6.63 | 41.80                           |
|            | 5.00             | 16.40             | 20.63           | 6.32                    | 385.00                                     | 6.57 | 41.60                           |
|            | 6.00             | 19.68             | 19.15           | 5.74                    | 395.00                                     | 6.42 | 40.90                           |

| Date       | Sample Depth (m) | Sample Depth (ft) | Water Temp (°C) | Dissolved Oxygen (mg/L) | Oxidation-Reduction Potential (millivolts) | pH   | Specific Conductance (umhos/cm) |
|------------|------------------|-------------------|-----------------|-------------------------|--------------------------------------------|------|---------------------------------|
|            | 7.00             | 22.96             | 19.00           | 5.68                    | 399.00                                     | 6.37 | 40.70                           |
|            | 8.00             | 26.24             | 18.50           | 5.69                    | 403.00                                     | 6.29 | 37.40                           |
|            | 9.00             | 29.52             | 18.13           | 5.71                    | 408.00                                     | 6.20 | 34.10                           |
|            | 10.10            | 33.13             | 17.90           | 5.65                    | 412.00                                     | 6.13 | 32.60                           |
|            | 11.00            | 36.08             | 17.61           | 5.65                    | 414.00                                     | 6.11 | 31.30                           |
|            | 11.60            | 38.05             | 17.32           | 5.09                    | 279.00                                     | 6.16 | 30.70                           |
|            | 12.00            | 39.36             | 17.34           | 4.95                    | 318.00                                     | 6.08 | 38.20                           |
| 08/11/2011 | 0.00             | 0.00              | 23.02           | 6.19                    | 86.00                                      | 7.19 | 45.00                           |
|            | 1.00             | 3.28              | 23.02           | 5.23                    | 13.20                                      | 6.76 | 44.00                           |
|            | 2.00             | 6.56              | 23.02           | 5.17                    |                                            | 6.61 |                                 |
|            | 2.75             | 9.02              | 23.00           | 5.00                    |                                            | 6.58 |                                 |
|            | 3.25             | 10.66             | 22.90           | 4.67                    | 142.40                                     | 6.50 |                                 |
|            | 4.00             | 13.12             | 22.80           | 4.31                    | 147.00                                     | 6.32 | 42.00                           |
|            | 5.00             | 16.40             | 22.60           | 3.53                    | 151.00                                     | 6.74 |                                 |
|            | 6.00             | 19.68             | 22.28           |                         | 160.00                                     | 6.12 | 43.00                           |
|            | 7.00             | 22.96             | 22.27           | 3.58                    | 164.00                                     | 6.07 | 53.00                           |
|            | 8.00             | 26.24             | 22.13           | 3.53                    | 166.00                                     | 6.04 | 53.00                           |
|            | 9.25             | 30.34             | 21.75           | 3.28                    | 166.00                                     | 6.00 | 53.00                           |
|            | 10.50            | 34.44             | 21.84           | 3.37                    | 167.00                                     | 5.97 | 53.00                           |
|            | 12.00            | 39.36             | 21.84           | 3.34                    | 166.00                                     | 5.95 |                                 |
|            | 13.00            | 42.64             | 20.56           | 2.75                    | 168.00                                     | 5.86 |                                 |
| 09/13/2011 | 0.00             | 0.00              | 20.01           | 7.44                    | 355.00                                     | 7.26 | 49.10                           |
|            | 1.00             | 3.28              | 19.87           | 7.26                    | 360.00                                     | 7.08 | 48.70                           |
|            | 2.00             | 6.56              | 19.77           | 7.28                    | 364.00                                     | 7.04 | 48.70                           |
|            | 2.90             | 9.51              | 19.66           |                         | 366.00                                     | 7.02 | 48.40                           |
|            | 3.90             | 12.79             | 19.62           | 7.17                    | 367.00                                     | 7.00 | 48.50                           |



| Date | Sample Depth (m) | Sample Depth (ft) | Water Temp (°C) | Dissolved Oxygen (mg/L) | Oxidation-Reduction Potential (millivolts) | pH   | Specific Conductance (umhos/cm) |
|------|------------------|-------------------|-----------------|-------------------------|--------------------------------------------|------|---------------------------------|
|      | 5.00             | 16.40             | 18.62           | 6.60                    | 377.00                                     | 6.79 | 38.50                           |
|      | 6.00             | 19.68             | 18.08           | 6.43                    | 384.00                                     | 6.66 | 37.40                           |
|      | 7.00             | 22.96             | 17.63           | 5.87                    | 392.00                                     | 6.49 | 36.40                           |
|      | 8.00             | 26.24             | 17.43           | 6.37                    | 395.00                                     | 6.46 | 32.20                           |
|      | 8.90             | 29.19             | 17.34           | 6.28                    | 400.00                                     | 6.37 | 30.40                           |
|      | 10.00            | 32.80             | 17.12           | 6.32                    | 405.00                                     | 6.28 | 28.70                           |
|      | 10.70            | 35.10             | 16.93           | 6.52                    | 410.00                                     | 6.20 | 27.70                           |
|      | 12.40            | 40.67             | 16.68           | 6.69                    | 415.00                                     | 6.12 | 25.20                           |
|      | 13.30            | 43.62             | 16.39           | 6.85                    | 419.00                                     | 6.05 | 23.70                           |
|      | 13.70            | 44.94             | 16.25           | 6.80                    | 417.00                                     | 6.10 | 22.80                           |
|      | 15.20            | 49.86             | 16.09           | 6.72                    | 421.00                                     | 5.96 | 24.40                           |
|      | 16.10            | 52.81             | 15.99           | 6.26                    | 422.00                                     | 5.89 | 21.30                           |
|      | 17.00            | 55.76             | 15.92           | 6.36                    | 421.00                                     | 5.84 | 20.90                           |

[NYSDEC, 2011a](#)

**Table C-4: Tributary Sampling Results – West Canada Creek, Site 1**

| Date                       | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      |                                      |                           |                      |                        |
| 4/28/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 300                  |                        |
| 5/5/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 140                                  | 90                        | 627                  |                        |
| 5/13/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 40                                   | 10                        | 220                  |                        |
| 5/19/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 50                                   | 20                        | 630                  |                        |
| 5/26/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 30                                   | 0                         | 365                  |                        |
| 6/1/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 50                                   | 50                        | 280                  |                        |
| 6/9/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 425                  |                        |
| 6/16/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 120                                  | 30                        | 340                  |                        |
| 6/22/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 860                                  | 660                       | 370                  |                        |
| 6/29/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 50                                   | 20                        | 325                  |                        |
| 7/7/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 200                                  | 10                        | 430                  |                        |
| 7/13/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 130                                  | 30                        | 200                  |                        |
| 7/28/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 90                                   | 30                        | 480                  |                        |
| 8/4/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 100                                  | 50                        | 460                  |                        |
| 8/11/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 320                                  | 100                       | 165                  |                        |
| 8/18/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 800                                  | 800                       | 180                  |                        |
| 8/25/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 1200                                 | 190                       | 480                  |                        |
| 9/2/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 215                  |                        |
| 9/22/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 120                                  | 0                         | 1539                 |                        |
| 9/29/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 180                                  | 50                        | 515                  |                        |
| 10/6/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 1815                 |                        |
| 10/13/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 1331                 |                        |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardnes<br>s<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidit<br>y (NTU) | Dept<br>h (m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Colifor<br>m<br>(per 100<br>mL) | E.Coli<br>(per<br>100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |  |
|----------------------------|-----------|------------|-------------------------------|------------------------------------|------------------------------------------|---------------|---------------|--------------|---------|--------------|----------------|---------------------|---------------|------|---------------|------------|-------|------------------------------------------|------------------------------|----------------------|------------------------|--|
| SITE 1 - WEST CANADA CREEK |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       |                                          |                              |                      |                        |  |
| 10/20/1998                 |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       | 110                                      | 0                            | 160                  |                        |  |
| 10/27/1998                 |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       | 20                                       | 20                           | 1184                 |                        |  |
| 12/15/1998                 |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       | 0                                        | 0                            | 470                  |                        |  |
| Mean                       |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       | 186                                      | 86                           | 540                  |                        |  |
| StDev                      |           |            |                               |                                    |                                          |               |               |              |         |              |                |                     |               |      |               |            |       | 305                                      | 199                          | 444                  |                        |  |
| 1999                       | 4/27/1999 | 1:49 PM    |                               |                                    |                                          |               |               | 8.91         | 111     | 12.36        | 110.9          | 0                   | -0.1          | 7.55 | 2.51          | 0.055      | 2.19  | 10                                       | 0                            | 754                  |                        |  |
|                            | 5/6/1999  | 1:42 PM    |                               |                                    |                                          |               |               | 15.55        | 106     | 10.21        | 29             | 0                   | 0.19          | 6.88 | 4.46          | 0.142      | 3.18  | 110                                      | 10                           | 626                  |                        |  |
|                            | 5/11/1999 | 1:55 PM    |                               |                                    |                                          |               |               | 13.14        | 106     | 10.83        | 27.2           | 0                   | 0.25          | 6.54 | 5.41          | 0.169      | 3.12  | 30                                       | 10                           | 242                  |                        |  |
|                            | 5/18/1999 | 1:49 PM    |                               |                                    |                                          |               |               | 20.5         | 111     | 10.15        | 91.4           | 0                   | 0.08          | 7.11 | 1.92          | 0.061      | 3.18  | 70                                       | 60                           | 2000                 |                        |  |
|                            | 5/25/1999 | 1:45 PM    |                               |                                    |                                          |               |               | 14.89        | 102     | 10.44        | 140.2          | 15.9                | 0.22          | 7.01 | 4.99          | 0.173      | 3.47  | 140                                      | 30                           | 385                  |                        |  |
|                            | 6/2/1999  | 1:47 PM    |                               |                                    |                                          |               |               | 22.29        | 108     | 9.48         | 142.9          | 0                   | 0.07          | 7.48 | 2.25          | 0.06       | 2.67  | 240                                      | 0                            | 9680                 |                        |  |
|                            | 6/8/1999  | 1:39 PM    |                               |                                    |                                          |               |               | 24.13        | 103     | 8.75         | 139.4          | 0                   | 0.31          | 7.78 | 2.87          | 0.063      | 2.2   | 70                                       | 0                            | 2000                 |                        |  |
|                            | 6/15/1999 | 1:44 PM    |                               |                                    |                                          |               |               | 18.3         | 108     | 10.36        | 127.8          | 0                   | 0.26          | 7.89 | 2.35          | 0.076      | 3.23  | 70                                       | 30                           | 920                  |                        |  |
|                            | 6/21/1999 | 1:54 PM    | 0.19                          |                                    |                                          |               |               | 17.05        | 108     | 10.59        | 162.1          | 0                   | 0.15          | 8.08 | 1.65          | 0.041      | 2.48  | 30                                       | 0                            | 7920                 |                        |  |
|                            | 6/29/1999 | 1:30 PM    | 0.35                          | 33                                 | 36                                       |               |               | 22.22        | 108     | 9.54         | 149            | 0                   | 0.23          | 8.7  | 1.84          | 0.052      | 2.83  | 160                                      | 30                           | 1116                 |                        |  |
|                            | 7/13/1999 | 1:15 PM    | 0.3                           | 35                                 | 24                                       | 28            | 0.105         | 0.1          | 22.24   | 108          | 9.57           | 45.1                | 1.8           | 0.25 | 8.1           | 1.83       | 0.058 | 3.17                                     | 480                          | 40                   | 2000                   |  |
|                            | 7/20/1999 | 1:49 PM    | 0.33                          | 26                                 | 28                                       | 36            | 0.017         | 0.2          | 22.56   | 103          | 8.99           | 43.8                | 0             | 0.31 | 7.88          | 3          | 0.03  | 1                                        | 130                          | 60                   | 1455                   |  |
|                            | 7/27/1999 | 1:45 PM    | 0.31                          | 30                                 | 31                                       | 40            | 0.27          | 0.3          | 26.61   | 104          | 8.49           | 57.3                | 8.7           | 0.27 | 8.53          | 2.11       | 0.061 | 2.89                                     | 90                           | 20                   | 2000                   |  |
|                            | 8/3/1999  | 1:25 PM    | 0.39                          | 12                                 | 14                                       | 19            | 0.19          | 0.3          | 22.32   | 100          | 8.83           | 64.8                | 2.7           | 0.14 | 8.32          | 1.55       | 0.049 | 3.16                                     | 10                           | 10                   | 2000                   |  |
|                            | 8/17/1999 | 1:37 PM    | 0.1                           | 38                                 | 36                                       | 44            | 0.27          | 0.3          | 22.84   | 100          | 8.72           | 63.6                | 0             | 0.14 | 9.16          | 1.63       | 0.034 | 2.09                                     | 40                           | 30                   | 1008                   |  |
|                            | 8/24/1999 | 1:27 PM    | 0.1                           | 36                                 | 32                                       | 44            | 0.45          |              | 23.36   | 99.5         | 8.6            | 64.5                | 0             | 0.12 | 8.99          | 1.63       | 0.051 | 3.13                                     | 140                          | 10                   | 899                    |  |
| 8/31/1999                  | 1:27 PM   | 0.11       | 62                            | 36                                 | 48                                       | 0.35          |               | 20.57        | 93.5    | 8.53         | 60.1           | 0                   | 0.12          | 8.69 | 1.59          | 0.048      | 3.02  | 190                                      | 100                          | 911                  |                        |  |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 9/8/1999                   | 1:33 PM   | 0.14       | 14                                         | 30                                              | 48                                                | 0.59                      | 0.2                       | 22.05        | 91.5    | 8.11         | 60.2           | 0                  | 0.15         | 8.89 |               |            |      | 170                                  | 90                        | 595                  |                        |
| 9/15/1999                  | 1:30 PM   | 0.26       | 50                                         | 60                                              | 70                                                | 0.96                      | 0.1                       | 17.76        | 89.6    | 8.65         | 57.7           | 0                  | 0.27         | 8.77 | 3.35          | 0.106      | 3.16 | 220                                  | 190                       | 380                  |                        |
| 9/21/1999                  | 1:53 PM   | 0.14       | 20                                         | 26                                              | 38                                                | 1.15                      | 0.1                       | 13.71        | 81.4    | 8.57         | 32.6           | 5.9                | 0.29         | 6.65 | 7.74          | 0.243      | 3.14 | 200                                  | 40                        | 595                  |                        |
| 9/28/1999                  | 1:30 PM   | 0.44       | 48                                         | 34                                              | 222                                               | 0.41                      | 0.2                       | 14.42        | 82.5    | 8.54         | 34.4           | 0                  | 0.28         | 7.16 | 2.49          | 0.078      | 3.13 | 90                                   | 0                         | 355                  |                        |
| 10/5/1999                  | 1:40 PM   | 0.39       | 26                                         | 12                                              | 16                                                | 1.09                      | 0.2                       | 9.34         | 77.5    | 9.02         | 29.6           | 11.4               | 0.37         | 5.32 | 6.92          | 0.258      | 3.73 | 70                                   | 20                        | 213                  |                        |
| 10/19/1999                 | 1:30 PM   | 0.48       | 32                                         | 40                                              | 36                                                | 0.32                      | 0.1                       | 7.4          | 72.2    | 8.8          | 30.7           | 3.3                | 0.22         | 6.54 | 2.86          | 0.094      | 3.29 | 0                                    | 0                         | 962                  |                        |
| 10/26/1999                 | 1:45 PM   | 0.51       | 32                                         | 27                                              | 29                                                | 0.66                      | 0.3                       | 5.34         | 64      | 8.22         | 29.4           | 1.2                | 0.27         | 6.61 | 3.62          | 0.121      | 3.34 | 490                                  | 200                       | 636                  |                        |
| Mean                       |           | 0.28       | 33                                         | 31                                              | 51                                                | 0.49                      | 0.2                       | 17.81        | 97.4    | 9.35         | 74.7           | 2.1                | 0.2          | 7.69 | 3.07          | 0.092      | 2.9  | 135                                  | 41                        | 1652                 |                        |
| StDev                      |           | 0.14       | 13.29                                      | 11.2                                            | 50.93                                             | 0.36                      | 0.09                      | 5.85         | 13.1    | 1.03         | 45.51          | 4.21               | 0.1          | 0.98 | 1.73          | 0.06       | 0.59 | 127.62                               | 54.92                     | 2296.51              |                        |
| 2000                       | 1/4/2000  | 1:52 PM    | 20                                         | 21                                              | 21                                                | 2.03                      | 0.7                       | -0.03        | 115     | 17.08        | 26.3           | 36.8               | 0.4          | 6.11 | 6.6           | 0.212      | 3.21 | 10                                   | 0                         | 754                  |                        |
|                            | 3/21/2000 | 1:36 PM    | 0.84                                       | 12                                              | 14                                                | 0.56                      | 0.7                       | 3.89         | 15.2    | 2.03         | 31.1           | 0                  | 0.02         | 7.18 | 3.48          |            |      | 39                                   | 0                         |                      |                        |
|                            | 4/5/2000  | 1:40 PM    | 20                                         | 18                                              | 18                                                | 1.67                      | 0.4                       | 1.74         | 87.7    | 12.12        | 33.6           | 63.2               | 0.45         | 5.3  | 6.72          | 0.236      | 3.51 | 308                                  | 1                         | 2000                 |                        |
|                            | 4/13/2000 | 10:43 AM   | 0.23                                       | 21                                              | 26                                                | 0.14                      | 0.1                       | 2.49         | 88.4    | 11.96        | 55.1           | 12                 | 0.41         | 4.46 | 3.01          | 0.111      | 3.69 | 79                                   | 1                         | 46                   |                        |
|                            | 4/18/2000 | 1:37 PM    | 0.17                                       | 30                                              | 31                                                | 0.72                      | 0.2                       | 5.1          | 92.1    | 11.64        | 25.8           | 0.7                | 0.57         | 4.44 | 3.38          | 0.137      | 4.05 | 172                                  | 2                         |                      |                        |
|                            | 4/25/2000 | 1:27 PM    | 0.38                                       | 20                                              | 22                                                | 0.87                      | 0.1                       | 8.18         | 90.7    | 10.6         | 26.9           | 2.3                | 0.56         | 4.38 | 4.02          | 0.154      | 3.83 | 145                                  | 0                         | 582                  |                        |
|                            | 5/4/2000  | 12:33 PM   | 0.29                                       | 14                                              | 25                                                | 0.51                      | 0.1                       | 11.87        | 96.1    | 10.3         | 22.8           | 0.9                | 0.37         | 5.81 | 3.5           | 0.124      | 3.54 | 172                                  | 1                         | 528                  |                        |
|                            | 5/9/2000  | 1:27 PM    | 0.46                                       | 11                                              | 4                                                 | 0.82                      | 0.2                       | 18.28        | 95.5    | 8.85         | 30.8           | 1.3                | 0.3          | 6.26 | 4.33          | 0.163      | 3.76 | 722                                  | 14                        | 868                  | 0/0                    |
|                            | 5/16/2000 | 1:50 PM    | 0.44                                       | 17                                              | 22                                                | 1.51                      | 0.3                       | 10.33        | 86.6    | 9.61         | 67.8           | 2.1                | 0.81         | 6.21 | 5.23          | 0.203      | 3.88 | 2419                                 | 5                         | 4000                 |                        |
|                            | 5/30/2000 | 1:36 PM    | 0.37                                       | 14                                              | 15                                                | 0.9                       | 0.4                       | 15.67        | 93.8    | 9.24         | 26.4           | 4.2                | 0.23         | 6.34 | 4.33          | 0.144      | 3.33 | 488                                  | 0                         | 3150                 |                        |
|                            | 6/6/2000  | 1:44 PM    | 0.41                                       | 26                                              | 31                                                | 1.26                      | 0.4                       | 12.32        | 92.1    | 9.77         | 35.7           | 1.1                | 0.23         | 6.53 | 6.42          | 0.259      | 4.03 | 816                                  | 23                        | 2230                 |                        |
|                            | 6/13/2000 | 1:46 PM    | 0.41                                       | 15                                              | 17                                                | 0.7                       | 0.2                       | 15.68        | 89      | 7.78         | 32.3           | 1.2                | 0.21         | 6.74 | 4.58          | 0.145      | 3.17 | 1203                                 | 25                        | 820                  | 0/0                    |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 6/20/2000                  | 1:30 PM   | 0.45       | 35                                         | 41                                              | 41                                                | 0.35                      | 0.1                       | 21.36        | 91.7    | 8.05         | 35.1           | 0.7                | 0.09         | 6.61 | 2.37          | 0.085      | 3.59 | 457                                  | 3                         | 3350                 |                        |
| 6/27/2000                  | 11:15 AM  | 0.41       | 40                                         | 34                                              | 42                                                | 0.77                      | 0.3                       | 21.4         | 87.6    | 7.69         | 36.8           | 1.3                | 0.25         | 7.36 | 3.38          | 0.125      | 3.7  | 1553                                 | 25                        | 1950                 |                        |
| 7/11/2000                  | 12:09 PM  | 0.6        | 11                                         | 11                                              | 13                                                | 1.02                      | 0.2                       | 18.08        | 79.9    | 7.49         | 25.2           | 1.2                | 0.29         | 5.93 | 5.78          | 0.204      | 3.53 | 1987                                 | 36                        | 3060                 |                        |
| 7/18/2000                  | 2:25 PM   | 0.43       | 10                                         | 9                                               | 10                                                | 1.19                      | 0.5                       | 17.94        | 81.1    | 7.62         | 22.7           | 0.8                | 0.64         | 6.43 | 7.32          | 0.29       | 3.96 | 1986                                 | 68                        | 2420                 | 0/0                    |
| 7/25/2000                  | 12:55 PM  | 0.45       | 35                                         | 38                                              | 42                                                | 0.21                      | 0.2                       | 18.61        | 83.7    | 7.76         | 28.6           | 2.3                | 0.35         |      | 2.22          | 0.063      | 2.84 | 1203                                 | 9                         | 3300                 |                        |
| 8/1/2000                   | 12:20 PM  |            | 15                                         | 16                                              | 18                                                | 1.53                      | 0.3                       |              |         |              | 52.5           | 0.6                |              | 7.94 | 7.8           | 0.316      | 4.05 | 2419                                 | 116                       | 3330                 |                        |
| 8/8/2000                   | 1:28 PM   | 0.4        | 15                                         | 15                                              | 20                                                | 0.98                      | 0.2                       | 19.73        | 91      | 8.39         | 0.8            | 1.1                | 0.33         | 7.36 | 5.3           | 0.198      | 3.74 | 1414                                 | 10                        | 2020                 |                        |
| 8/22/2000                  | 11:25 AM  | 0.22       | 23                                         | 16                                              | 20                                                | 0.67                      | 0.2                       | 16.35        | 93.7    | 9.19         | 4.9            | 0.7                | 0.29         | 6.86 | 4.47          | 0.158      | 3.53 | 1120                                 | 1                         | 1990                 | 0/0                    |
| 8/29/2000                  | 2:23 PM   | 0.4        | 9                                          | 10                                              | 12                                                | 0.79                      | 0.3                       | 20.79        | 125     | 11.21        | 39.2           | 0.9                | 0.33         | 7.37 | 4.84          | 0.174      | 3.6  | 1986                                 | 3                         |                      |                        |
| 9/19/2000                  | 10:04 AM  | 0.34       | 22                                         | 9                                               | 14                                                | 0.22                      | 0.2                       | 13.9         | 123     | 12.66        | 1.5            | 0.7                | 0            | 7.29 | 5.04          | 0.182      | 3.61 | 1046                                 | 6                         | 1690                 |                        |
| 10/24/2000                 | 10:50 AM  |            | 8                                          | 10                                              | 13                                                | 0.27                      | 0.2                       | 6.41         |         |              | 53.8           | 0.6                | 0.4          | 5.78 | 4.53          | 0.161      | 3.55 | 1300                                 | 3                         | 1460                 |                        |
| Mean                       |           | 0.4        | 19                                         | 19                                              | 23                                                | 0.86                      | 0.3                       | 12.73        | 90.4    | 9.57         | 31.1           | 5.9                | 0.34         | 6.3  | 4.72          | 0.175      | 3.62 | 1002                                 | 15                        | 1977                 |                        |
| StDev                      |           | 0.14       | 8.88                                       | 9.67                                            | 9.85                                              | 0.5                       | 0.17                      | 6.93         | 21.1    | 2.88         | 16.22          | 14.66              | 0.19         | 0.99 | 1.52          | 0.06       | 0.3  | 786.62                               | 27.17                     | 1136.92              |                        |
| 2001                       | 4/26/2001 |            | 5                                          | 8                                               | 12                                                | 0.31                      | 0.8                       |              |         |              |                | 5.22               |              |      | 5.08          | 0.165      | 3.25 |                                      |                           |                      |                        |
|                            | 5/31/2001 |            | 20                                         | 20                                              | 34                                                | 0.15                      | 0.3                       | 9.51         | 88.4    | 10.19        | 21.5           | 1.09               |              | 6.49 | 4.94          | 0.170      | 3.44 | 1203                                 | 8                         |                      |                        |
|                            | 6/27/2001 | 11:26 AM   | 5                                          | 8                                               | 10                                                | 0.12                      | 0.3                       | 19.55        | 93.0    | 8.64         | 22.1           | 0.65               | 0.49         | 6.64 | 6.34          | 0.256      | 4.04 | 2419                                 | 35                        |                      |                        |
|                            | 7/31/2001 | 10:47 AM   | 26                                         | 28                                              | 30                                                | 0.32                      | 0.3                       | 20.27        | 59.8    | 5.41         | 45.9           |                    | 0.14         | 7.76 | 1.99          | 0.067      | 3.37 | 649                                  | 7                         |                      |                        |
|                            | 8/22/2001 | 11:00 AM   | 26                                         | 26                                              | 34                                                | 0.52                      | 0.2                       | 19.96        | 15.3    | 1.41         | 42.0           | 2.85               |              | 7.68 | 2.97          | 0.119      | 4.01 | 1733                                 | 1                         |                      |                        |



| Date                       | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 9/26/2001                  |            |            | 14                                         | 16                                              | 20                                                | 0.19                      | 0.3                       | 12.80        | 111.9   | 11.8         | 47.0           |                    |              | 7.40 | 2.69          | 0.248      | 9.22 | 2419                                 | 105                       |                      |                        |
| 10/29/2001                 | 12:4 PM 7  |            | 41                                         | 40                                              | 48                                                | 0.16                      | 0.3                       | 5.33         | 111.4   | 14.24        | 0.0            | 1.46               | 0.00         |      | 2.02          | 0.055      | 2.72 | 488                                  | 2                         |                      |                        |
| Mean                       |            |            | 20                                         | 21                                              | 27                                                | 0.25                      | 0.4                       | 14.57        | 80.0    | 8.62         | 29.8           | 2.3                | 0.21         | 7.19 | 3.72          | 0.154      | 4.29 | 1485                                 | 26                        |                      |                        |
| StDev                      |            |            | 12.90                                      | 11.54                                           | 13.61                                             | 0.14                      | 0.20                      | 6.33         | 36.98   | 4.61         | 18.55          | 1.85               | 0.25         | 0.59 | 1.72          | 0.08       | 2.22 | 846.05                               | 40.48                     |                      |                        |
| 2002                       | 4/30/2002  | 12:0 PM 8  | 18                                         | 18                                              | 22                                                | 0.20                      | 0.4                       | 5.14         | 109.9   | 14.09        | 52.7           | 1.83               | 0.25         | 5.67 | 5.02          | 0.192      | 3.82 | 435                                  | 1                         |                      |                        |
|                            | 5/29/2002  | 12:2 PM 4  | 10                                         | 8                                               | 12                                                | 0.34                      | 0.2                       | 17.52        | 119.9   | 11.54        | 35.7           | 0.90               | 0.00         | 7.22 | 3.39          | 0.116      | 3.42 | 921                                  | 2                         |                      |                        |
|                            | 7/2/2002   | 10:2 AM 5  | 13                                         | 12                                              | 14                                                | 0.20                      | 0.3                       | 22.12        | 99.6    | 8.79         | 46.7           | 0.73               | 0.05         | 7.46 | 4.83          | 0.184      | 3.81 | 2419                                 | 17                        |                      |                        |
|                            | 8/1/2002   |            | 36                                         | 36                                              | 44                                                | 0.10                      | 0.4                       | 23.03        | 126.6   | 10.88        | 55.0           | 1.49               | 0.19         | 8.25 | 2.39          | 0.058      | 2.43 | 1986                                 | 13                        |                      |                        |
|                            | 8/29/2002  |            | 38                                         | 38                                              | 40                                                | 0.24                      | 0.4                       | 10.20        |         | 8.2          | 130.0          | 1.27               |              | 7.54 | 1.6           | 0.028      | 1.75 | 980                                  | 21                        |                      |                        |
|                            | 9/25/2002  | 0:00 AM    | 38                                         | 36                                              | 42                                                | 0.18                      | 0.4                       | 11.83        | 104.6   | 11.31        | 69.0           | 0.95               | 0.00         | 7.21 | 2.28          | 0.076      | 3.33 | 816                                  | 4                         |                      |                        |
|                            | 10/24/2002 | 11:4 AM 0  | 28                                         | 30                                              | 38                                                | 0.79                      | 0.5                       | 3.76         | 94.4    | 12.45        | 62.0           | 1.06               | 1.09         | 6.71 | 5.05          | 0.188      | 3.72 | 1553                                 | 23                        |                      |                        |
|                            | Mean       |            | 26                                         | 25                                              | 30                                                | 0.29                      | 0.4                       | 13.37        | 109.2   | 11.04        | 64.4           | 1.2                | 0.26         | 7.15 | 3.51          | 0.120      | 3.18 | 1301                                 | 12                        |                      |                        |
|                            | StDev      |            | 12.12                                      | 12.53                                           | 13.83                                             | 0.23                      | 0.10                      | 7.74         | 12.25   | 2.03         | 30.80          | 0.38               | 0.42         | 0.80 | 1.46          | 0.07       | 0.80 | 708.90                               | 9.24                      |                      |                        |
| 2003                       | 4/28/2003  | 13:0 PM 9  | 16                                         | 18                                              | 20                                                | 0.063                     | 0.5                       | 9.34         | 111.9   | 12.83        | 24.0           | 1.87               | 1.680        | 7.06 | 4.56          | 0.165      | 3.62 | 195.6                                | 0                         |                      |                        |
|                            | 5/27/2003  | 12:4 PM 1  | 12                                         | 14                                              | 17                                                | 0.146                     | 0.4                       | 13.15        | 104.2   | 10.94        | 42.0           | 1.56               | 0.677        | 8.57 | 4.96          | 0.193      | 3.89 | 1413.6                               | 6.3                       |                      |                        |
|                            | 6/23/2003  | 12:4 PM 8  | 14                                         | 18                                              | 20                                                | 0.067                     | 0.4                       | 18.35        | 95.0    | 8.93         | 40.0           | 0.72               | 0.858        | 6.63 | 5.65          | 0.220      | 3.89 | >2419                                | 27.5                      |                      |                        |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/ Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|---------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                     |
| 7/17/2003                  | 11:40 AM  |            | 14                                         | 14                                              | 18                                                | 0.038                     | 0.4                       | 20.25        | 106.4   | 9.63         | 51.0           | 1.68               | 0.661        | 7.66 | 4.89          | 0.187      | 3.82 | 2419.17                              | 18.3                      |                      |                     |
| 8/18/2003                  | 14:37 PM  |            | 10                                         | 10                                              | 10                                                | 0.017                     | 0.4                       | 20.87        | 110.1   | 9.84         | 24.0           | 1.23               | 1.728        | 6.90 | 8.23          | 0.338      | 4.11 | >2419                                | 63.1                      |                      |                     |
| 9/24/2003                  | 12:12 PM  |            | 12                                         | 11                                              | 13                                                | 0.018                     | 0.4                       | 13.23        | 98      | 10.27        | 32.0           | 2.12               | 1.239        | 7.28 | 8.52          | 0.36       | 4.26 | >2419                                | 59.2                      |                      |                     |
| 10/15/2003                 | 11:46 AM  |            | 28                                         | 28                                              | 32                                                |                           |                           | 8.9          | 94.3    | 10.93        | 77.0           | 0.69               | 0.728        | 6.94 | 3.09          | 0.122      | 3.94 | 420                                  | 2                         |                      |                     |
| Mean                       |           |            | 15                                         | 16                                              | 19                                                | 0.06                      | 0.4                       | 14.87        | 102.8   | 10.48        | 41.4           | 1.4                | 1.08         | 7.29 | 5.70          | 0.226      | 3.93 | 1112                                 | 25                        |                      |                     |
| StDev                      |           |            | 5.98                                       | 6.07                                            | 6.97                                              | 0.05                      | 0.04                      | 4.98         | 7.15    | 1.26         | 18.51          | 0.55               | 0.47         | 0.65 | 1.99          | 0.09       | 0.20 | 1019.53                              | 26.38                     |                      |                     |
| 2004                       | 4/19/2004 | 11:07 AM   | 6                                          | 7                                               | 8                                                 |                           |                           | 7.23         | 99.1    | 11.96        | 32.0           | 1.070              | 0.320        | 6.16 | 4.40          | 0.168      | 3.82 | 185                                  | 0                         |                      |                     |
|                            | 5/25/2004 | 13:38 PM   | 5                                          | 4                                               | 8                                                 | 0.009                     | 0.308                     | 14.57        | 75.0    | 7.63         | 18.0           | 7.160              | 0.059        | 5.9  | 10.30         | 0.415      | 4.03 | >2419.2                              | 345                       |                      |                     |
|                            | 6/14/2004 | 10:54 AM   | 20                                         | 20                                              | 26                                                | 0.007                     | 0.155                     | 16.69        | 97.1    | 9.45         | 43.0           | 0.490              | 0.179        | 6.1  | 2.98          | 0.101      | 3.39 | 629                                  | 5                         |                      |                     |
|                            | 7/19/2004 | 9:43 AM    | 24                                         | 26                                              | 30                                                | 0.022                     | 0.214                     | 18.64        | 110.2   | 10.48        | 52.0           | 1.490              | 0.244        | 7.3  | 5.12          | 0.203      | 3.96 | 1203                                 | 13                        |                      |                     |
|                            | 8/24/2004 | 11:32 AM   | 16                                         | 16                                              | 24                                                | 0.032                     | 0.166                     | 15.54        | 105.7   | 10.53        | 31.0           | 1.140              | 0.925        | 7.55 | 6.08          | 0.295      | 4.85 | 1986                                 | 10                        |                      |                     |
|                            | 9/14/2004 | 12:27 PM   | 9                                          | 10                                              | 14                                                | 0.088                     | 0.080                     | 16.70        | 100.0   | 9.72         | 43.0           | 1.110              | 0.917        | 6.74 | 6.60          | 0.259      | 3.92 | >2419                                | 16                        |                      |                     |
|                            | 10/4/2004 | 12:02 PM   | 20                                         | 22                                              | 32                                                | 0.003                     | 0.145                     | 9.91         | 95.20   | 10.77        | 55.0           | 1.030              | 0.234        | 7.22 | 2.95          | 0.113      | 3.83 | 2419                                 | 0                         |                      |                     |
|                            | Mean      |            | 14                                         | 15                                              | 20                                                | 0.027                     | 0.178                     | 14.18        | 97.47   | 10.08        | 39.1           | 1.927              | 0.411        | 6.71 | 5.49          | 0.222      | 3.97 | 1285                                 | 56                        |                      |                     |
|                            | StDev     |            | 7.59                                       | 8.23                                            | 10.16                                             | 0.03                      | 0.08                      | 4.10         | 11.17   | 1.35         | 12.98          | 2.33               | 0.36         | 0.66 | 2.54          | 0.11       | 0.44 | 925.29                               | 127.69                    |                      |                     |
| 4/24/2006                  |           |            | 8                                          | 8                                               | 8                                                 | <0.025                    | 0.31                      | 5.83         | 99.6    | 12.46        | 24             | 1.5                |              | 5.56 | 5.36          | 0.226      | 4.22 | 1046.24                              | 6.3                       |                      |                     |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 5/15/2006                  |           |            | 4                                          | 10                                              | 22                                                | <0.025                    | <0.25                     | 12.21        | 97.8    | 10.49        | 28             | 1.86               |              | 6.41 | 5.22          | 0.222      | 4.25 | 1119.85                              | 10.8                      |                      |                        |
| 6/8/2006                   |           |            | 10                                         | 12                                              | 13                                                | <0.025                    | <0.25                     | 13.64        | 93.8    | 9.74         | 42             | 1.13               |              | 6.84 |               |            |      | 1553.07                              | 17.5                      |                      |                        |
| 7/17/2006                  |           |            | 14                                         | 16                                              | 18                                                | <0.025                    | <0.25                     | 19.34        | 92.4    | 8.51         | 51             | 1                  |              | 6.91 |               |            |      | >2419.2                              | 23.5                      |                      |                        |
| 8/14/2006                  |           |            | 14                                         | 14                                              | 16                                                | <0.025                    | <0.25                     | 17.57        | 101.5   | 9.7          | 51             | 0.73               |              | 6.94 |               |            |      | 980                                  | 6.3                       |                      |                        |
| 9/5/2006                   |           |            | 12                                         | 11                                              | 14                                                | <0.025                    | <0.25                     | 10.8         | 100.3   | 11.11        | 93             | 0.79               |              | 7.16 |               |            |      | 1046                                 | 2                         |                      |                        |
| 10/16/2006                 |           |            | 8                                          | 14                                              | 26                                                | <0.025                    | <0.25                     | 6.32         | 94.2    | 11.63        | 80             | 2.35               |              | 6.42 |               |            |      | 517                                  | 4.1                       |                      |                        |
| Mean                       |           |            | 10                                         | 12                                              | 17                                                | <0.025                    |                           | 12           | 97      | 11           | 53             | 1                  |              | 7    | 5             | 0          |      | 1044                                 | 10                        |                      |                        |
| StDev                      |           |            | 3.65                                       | 2.73                                            | 5.96                                              |                           |                           | 5.15         | 3.60    | 1.33         | 25.57          | 0.60               |              | 0.54 | 0.10          | 0.00       |      | 330.68                               | 7.80                      |                      |                        |
| 2007                       | 4/23/2007 |            | 1                                          | 6                                               | 6                                                 | <0.025                    | 0.4455                    | 4.21         | 101.9   | 13.28        | 26             | 2.36               |              | 5.73 | 4.62          | 0.148      |      | 488.4                                | 0                         |                      |                        |
|                            | 5/4/2007  |            | 4                                          | 10                                              | 12                                                | 0.0957                    | <0.25                     | 11.77        | 111.8   | 12.11        | 32             | 0.93               |              | 6.39 | 4.42          | 0.157      |      | 579.0                                | <1                        |                      |                        |
|                            | 6/4/2007  |            | 16                                         | 30                                              | 60                                                | <0.025                    | <0.25                     | 12.61        | 129.8   | 13.79        | 89             | 2.49               |              | 7.48 | 3.29          | 0.140      |      | >2419.2                              | 35.5                      |                      |                        |
|                            | 7/2/2007  |            | 34                                         | 34                                              | 38                                                | <0.025                    | 0.2505                    | 15.36        | 109.6   | 10.97        | 73             | 0.85               |              | 6.79 | 1.74          | 0.067      |      | 1046                                 | 15                        |                      |                        |
|                            | 8/20/2007 |            | 23                                         | 26                                              | 76                                                | <0.025                    | <0.25                     |              | 103.2   | 11.53        | 0.112          | 0.68               |              | 6.61 | 2.74          | 0.076      |      | 1732.87                              | 7                         |                      |                        |
|                            | 9/17/2007 |            | 11.4                                       | 25                                              | 50                                                | <0.025                    | <0.25                     | 9.5          | 99.1    | 11.31        | 0.085          | 0.79               |              | 7.38 | 4.4           | 0.126      |      | 68.6                                 | 6.3                       |                      |                        |
|                            | 10/9/2007 |            | 30                                         | 11                                              | 26                                                | <0.025                    | <0.25                     | 14.94        | 120     | 12.12        | 0.079          | 2.35               |              | 8.27 | 3.4           | 0.101      |      | 1046.24                              | 47.2                      |                      |                        |
|                            | Mean      |            | 17                                         | 20                                              | 38                                                |                           |                           | 11.40        | 110.7   | 12.16        | 31.47          | 1.49               |              | 6.95 | 3.52          | 0.12       |      | 826.85                               | 18.50                     |                      |                        |
|                            | StDev     |            | 13                                         | 11                                              | 26                                                |                           |                           | 4.13         | 10.97   | 1.04         | 36.56          | 0.85               |              | 0.83 | 1.05          | 0.04       |      | 577.57                               | 18.70                     |                      |                        |
| 4/21/2008                  |           |            | 10.4                                       | 6.3                                             | 6.9                                               | <0.025                    | <0.25                     | 7.74         | 92.3    | 11           | 0.024          | 0.72               |              | 5.77 | 5.57          | 0.172      |      | 920.8                                | 0                         |                      |                        |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 5/19/2008                  |           |            | 15.2                                       | 15                                              | 19.7                                              | <0.025                    | <0.25                     | 8.40         | 95.1    | 11.15        | 0.055          | 0.66               |              | 6.96 | 3.89          | 0.133      |      | 1203.31                              | 19.5                      |                      |                        |
| 6/16/2008                  |           |            | 15                                         | 21                                              | 24                                                | <0.025                    | <0.25                     | 15.62        | 95.3    | 9.45         | 0.083          | 0.7                |              | 7.52 | 4.43          | 0.14       |      | >2419.2                              | 13.4                      |                      |                        |
| 7/17/2008                  |           |            | 10.2                                       | 14.9                                            | 34.2                                              | <0.025                    | <0.25                     | 17.31        | 98.1    | 9.42         | 0.038          | 1.66               |              | 6.38 | 12.3          | 0.41       |      | >2419.2                              | 920.8                     |                      |                        |
| 8/4/2008                   |           |            | 25                                         | 21                                              | 25                                                | <0.025                    | <0.25                     | 16.83        | 103.1   | 10           | 0.064          | 1.38               |              | 7.14 | 6.9           | 0.246      |      | 2419.2                               | 18.7                      |                      |                        |
| 8/26/2008                  |           |            | 19                                         | 13                                              | 14                                                | <0.025                    | <0.25                     | 18.39        | 97.1    | 9.12         | 0.053          | 1.48               |              | 6.92 | 5.4           | 0.2        |      | >2419.2                              | 24                        |                      |                        |
| 9/23/2008                  |           |            | 26                                         | 23                                              | 37                                                | <0.025                    | <0.25                     | 10.40        | 111.1   | 12.42        | 0.079          | 0.79               |              | 7.57 | 3.08          | 0.099      |      | 1986                                 | 5.2                       |                      |                        |
| 10/14/2008                 |           |            | 14                                         | 80                                              | 123                                               | <0.025                    | <0.25                     | 9.70         | 102.3   | 11.63        | 0.049          | 0.8                |              | 7.74 | 5.32          | 0.16       |      | 1119.85                              | <1                        |                      |                        |
| Mean                       |           |            | 16.9                                       | 24.3                                            | 35.5                                              |                           |                           | 13.05        | 99.30   | 10.52        | 0.06           | 1.02               |              | 7.00 | 5.86          | 0.20       |      | 1529.83                              | 143.1                     |                      |                        |
| StDev                      |           |            | 5.6                                        | 21.7                                            | 34.3                                              |                           |                           | 4.12         | 5.61    | 1.12         | 0.02           | 0.38               |              | 0.62 | 2.66          | 0.09       |      | 573.53                               | 317.6                     |                      |                        |
| 2009                       | 4/13/2009 |            | 30.6                                       | 26                                              | 35                                                | <0.025                    | 0.28                      | 5.48         | 100.5   | 12.67        | 0.054          | 0.4                |              | 6.64 |               |            |      | 152.3                                | 0                         |                      |                        |
|                            | 5/11/2009 |            | 15                                         | 9                                               | 12                                                | <0.025                    | <0.25                     | 10.95        | 97.5    | 10.76        | 0.042          | 0.65               |              | 6.76 |               |            |      | 1553.07                              | 0                         |                      |                        |
|                            | 5/27/2009 |            | 16                                         | 12                                              | 18                                                | <0.025                    | <0.25                     | 14.53        | 98.3    | 10.01        | 0.044          | 0.52               |              | 6.96 |               |            |      | >2419.2                              | 5.2                       |                      |                        |
|                            | 6/8/2009  |            | 17                                         | 16                                              | 21                                                | <0.025                    | <0.25                     | 13.3         | 105.6   | 11.03        | 0.076          | 0.46               |              | 7.15 |               |            |      | 2419.17                              | 4                         |                      |                        |
|                            | 6/22/2009 |            | 15                                         | 11.8                                            | 17.1                                              | <0.025                    | <0.25                     | 14.26        | 96.9    | 9.92         | 0.073          | 0.76               |              | 7.49 |               |            |      | >2419.2                              | 24                        |                      |                        |
|                            | 7/6/2009  |            | 16                                         | 12                                              | 21                                                | <0.025                    | <0.25                     | 14.94        | 99.3    | 10.03        | 0.049          | 0.66               |              | 6.98 |               |            |      | >2419.2                              | 22.3                      |                      |                        |
|                            | 7/20/2009 |            | 21                                         | 22                                              | 26                                                | <0.025                    | <0.25                     | 18.7         | 119.4   | 11.14        | 0.037          | 0.62               |              | 7.3  |               |            |      | 2419                                 | 12.1                      |                      |                        |
|                            | 8/4/2009  |            | 9                                          | 5                                               | 16                                                | <0.025                    | <0.25                     | 17.06        | 97.2    | 9.38         | 0.027          | 1.25               |              | 6.73 |               |            |      | >2419.2                              | 218.7                     |                      |                        |
|                            | 8/18/2009 |            | 10                                         | 14                                              | 20                                                | <0.025                    | <0.25                     | 16.72        | 100     | 9.72         | 0.076          | 0.75               |              | 7.4  |               |            |      | >2419.2                              | 9.8                       |                      |                        |
|                            | 8/31/2009 |            | 15                                         | 19                                              | 23                                                | <0.025                    | <0.25                     | 14.13        | 80.9    | 8.31         | 0.05           | 0.98               |              | 6.73 |               |            |      | 2419                                 | 62.4                      |                      |                        |
|                            | 9/14/2009 |            | 9                                          | 21                                              | 26                                                | <0.025                    | <0.25                     | 16.09        | 108.9   | 10.73        | 0.053          | 0.47               |              | 6.59 |               |            |      | 1553.07                              | 5.2                       |                      |                        |

| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 9/28/2009                  |           |            | 16                                         | 18                                              | 26                                                | <0.025                    | <0.25                     | 12.11        | 96.1    | 10.33        | 0.052          | 1.95               |              | 6.24 |               |            |      | >2419.2                              | 275.5                     |                      |                        |
| 10/14/2009                 |           |            | 9                                          | 9                                               | 11                                                | <0.025                    | <0.25                     | 5.96         | 100.2   | 12.49        | 0.066          | 0.61               |              | 6.61 |               |            |      | 1299.65                              | 3                         |                      |                        |
| Mean                       |           |            | 15.3                                       | 15.0                                            | 20.9                                              | <0.025                    | <0.25                     | 13.40        | 100.1   | 10.50        | 0.05           | 0.78               |              | 6.89 |               |            |      | 1687.89                              | 49.4                      |                      |                        |
| StDev                      |           |            | 5.9                                        | 6.0                                             | 6.5                                               | <0.025                    | <0.25                     | 3.98         | 8.6     | 1.19         | 0.02           | 0.42               |              | 0.36 |               |            |      | 831.56                               | 90.0                      |                      |                        |
| 2010                       | 5/3/2010  |            | 11                                         | 7                                               | 8                                                 | <0.025                    | <0.25                     | 16.27        | 101.8   | 9.99         | 0.041          | 0.54               |              | 6.96 |               |            |      | 2419                                 | 13.2                      |                      |                        |
|                            | 5/17/2010 |            | 7                                          | 8                                               | 11                                                | <0.025                    | <0.25                     | 12.91        | 102.3   | 10.8         | 0.055          | 0.54               |              | 6.29 |               |            |      | 2419.17                              | 0                         |                      |                        |
|                            | 6/1/2010  |            | 30                                         | 28                                              | 36                                                | <0.025                    | <0.25                     | 11.89        | 90      | 9.72         | 0.1            | 2.69               |              | 6.23 |               |            |      | >2419                                | 186                       |                      |                        |
|                            | 6/14/2010 |            | 13                                         | 15                                              | 19                                                | <0.025                    | <0.25                     | 14.79        | 97.2    | 9.84         | 0.05           | 0.68               |              | 7.13 |               |            |      | >2419.2                              | 43.5                      |                      |                        |
|                            | 6/29/2010 |            | 14                                         | 8                                               | 15                                                | <0.025                    | <0.25                     | 18.89        | 97.7    | 9.69         | 0.028          | 1.34               |              | 6.26 |               |            |      | >2419                                | 1203                      |                      |                        |
|                            | 7/12/2010 |            | 53                                         | 55                                              | 77                                                | <0.025                    | <0.25                     | 24.43        | 113.7   | 9.49         | 0.036          | 0.58               |              | 7.94 |               |            |      | >2419.2                              | 275.5                     |                      |                        |
|                            | 8/9/2010  |            | 24.8                                       | 27.2                                            | 34.1                                              | <0.025                    | <0.25                     | 18.97        | 112.7   | 10.46        | 0.051          | 0.94               |              | 7.38 |               |            |      | 2419.17                              | 21.6                      |                      |                        |
|                            | 8/23/2010 |            | 5                                          | 14                                              | 16                                                | <0.025                    | <0.25                     | 16.08        |         |              | 0.021          | 1.82               |              | 6.03 |               |            |      | >2419.2                              | 920.8                     |                      |                        |
|                            | 9/7/2010  |            | 10                                         | 13                                              | 22                                                | <0.025                    | <0.25                     | 16.66        | 99.5    | 9.68         | 0.051          | 1.08               |              | 6.96 |               |            |      | 1553                                 | 8.4                       |                      |                        |
|                            | 9/20/2010 |            | 14                                         | 10                                              | 25                                                | <0.025                    | <0.25                     | 13.62        | 108.9   | 11.31        | 0.043          | 0.71               |              | 6.78 |               |            |      | 1299.65                              | 9.7                       |                      |                        |
|                            | 10/4/2010 |            | 12                                         | 10                                              | 13                                                | <0.025                    | <0.25                     | 10.25        | 97.3    | 10.91        | 0.033          | 0.98               |              | 6.03 |               |            |      | >2419                                | 27.8                      |                      |                        |
|                            | Mean      |            | 17.6                                       | 17.7                                            | 25.1                                              | <0.025                    | <0.25                     | 15.89        | 102.1   | 10.2         | 0.05           | 1.08               |              | 6.73 |               |            |      | 2022.0                               | 246.3                     |                      |                        |
|                            | StDev     |            | 13.8                                       | 14.3                                            | 19.4                                              | <0.025                    | <0.25                     | 3.94         | 7.5     | 0.6          | 0.02           | 0.66               |              | 0.62 |               |            |      | 551.1                                | 417.3                     |                      |                        |
| 2011                       | 5/9/2011  |            | 11                                         | 6                                               | 18                                                | <0.025                    | <0.25                     | 9.74         | 104.2   | 11.83        | 0.631          | 0.69               |              | 6.03 |               |            |      | 488                                  | 1                         |                      |                        |
|                            | 5/23/2011 |            | 13                                         | 10                                              | 12                                                | <0.025                    | <0.25                     | 14.1         |         |              | 0.027          | 0.92               |              | 6.06 |               |            |      | 2419                                 | 13.4                      |                      |                        |



| Date                       | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/ Crypto |
|----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|---------------------|
| SITE 1 - WEST CANADA CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                     |
| 6/6/2011                   |           |            | 30                                         | 15                                              | 18                                                | <0.025                    | <0.25                     | 12.24        | 99.2    | 10.64        | 0.081          | 0.69               |              | 6.74 |               |            |      | 1986                                 | 14.6                      |                      |                     |
| 6/19/2011                  |           |            | 19                                         | 18                                              | 26                                                | <0.025                    | <0.25                     | 15.09        | 95.6    | 9.62         | 0.08           | 0.6                |              | 7.1  |               |            |      | 2419                                 | 6                         |                      |                     |
| 7/11/2011                  |           |            | 18                                         | 13                                              | 19                                                | <0.025                    | <0.25                     | 20.49        | 98.4    | 8.86         | 0.055          | 0.58               |              | 7.03 |               |            |      | 2419                                 | 17.3                      |                      |                     |
| 7/25/2011                  |           |            | 28                                         | 26                                              | 33                                                | <0.025                    | <0.25                     | 12.07        | 110.5   | 11.89        | 0.086          | 1.17               |              | 6.73 |               |            |      | >2419                                | 172.3                     |                      |                     |
| 8/8/2011                   |           |            | 20                                         | 18                                              | 25                                                | <0.025                    | <0.25                     | 21.07        |         |              | 0.047          | 0.65               |              | 8.01 |               |            |      | >2419                                | 62                        |                      |                     |
| 9/12/2011                  |           |            | 12                                         | 11                                              | 17                                                |                           | <0.25                     | 15.82        | 105.9   | 10.49        | 0.039          | 0.69               |              | 6.9  |               |            |      | >2419.2                              | 22                        |                      |                     |
| 9/27/2011                  |           |            | 10                                         | 10                                              | 21                                                | <0.025                    | <0.25                     | 17.19        |         |              | 0.03           | 0.3                |              | 6.58 |               |            |      | 1299                                 | 13.5                      |                      |                     |
| 10/11/2011                 |           |            | 16                                         | 15                                              | 20                                                | <0.025                    | <0.25                     | 12.89        | 91.2    | 9.63         | 0.044          | 0.75               |              | 6.52 |               |            |      |                                      |                           |                      |                     |
| 10/24/2011                 |           |            | 8                                          | 8                                               | 10                                                | <0.025                    | <0.25                     | 6.67         |         |              | 0.028          | 0.61               |              | 7.92 |               |            |      |                                      |                           |                      |                     |
| Mean                       |           |            | 16.8                                       | 13.6                                            | 19.9                                              | <0.025                    | <0.25                     | 14.31        | 100.7   | 10.4         | 0.10           | 0.70               |              | 6.87 |               |            |      | 1838.3                               | 35.8                      |                      |                     |
| StDev                      |           |            | 7.2                                        | 5.6                                             | 6.4                                               | <0.025                    | <0.25                     | 4.31         | 6.6     | 1.1          | 0.18           | 0.22               |              | 0.64 |               |            |      | 793.4                                | 54.1                      |                      |                     |
| 2012                       | 4/23/2012 |            | 10                                         | 8                                               | 10                                                | <0.025                    | 0.19                      | 8.1          |         |              | 23.5           | 3.35               |              | 6.81 |               |            |      | >2419                                | 79                        |                      |                     |
|                            | 5/7/2012  |            | 1                                          | 1                                               | 7                                                 | <0.025                    | 0.24                      | 15.3         |         |              |                | 1.02               |              | 7.05 |               |            |      | 1046.24                              | 1                         |                      |                     |
|                            | 7/10/2012 |            | 18                                         | 18                                              | 22                                                | <0.025                    | 0.1                       | 17.9         |         |              | 61.3           | 0.92               |              | 7.74 |               |            |      |                                      |                           |                      |                     |
|                            | 8/1/2012  |            | 30                                         | 30                                              | 36                                                | <0.025                    | 0.14                      | 17           |         |              | 88.8           | 1.32               |              | 7.74 |               |            |      |                                      |                           |                      |                     |
|                            | 8/13/2012 |            | 22                                         | 20                                              | 28                                                | <0.025                    | 0.12                      | 18.3         |         |              | 72.1           | 1.65               |              | 7.87 |               |            |      |                                      |                           |                      |                     |
|                            | 9/17/2012 |            | 30                                         | 22                                              | 26                                                | <0.025                    | 0.08                      | 14.9         |         |              | 108            | 0.52               |              | 7.15 |               |            |      |                                      |                           |                      |                     |
|                            | 10/1/2012 |            | 7                                          | 7                                               | 22                                                | <0.025                    | 0.1                       | 11.3         |         |              | 33.2           | 4.03               |              | 6.84 |               |            |      | >2419.2                              | 156.5                     |                      |                     |
|                            | Mean      |            | 16.9                                       | 15.1                                            | 21.6                                              |                           | 0.1                       | 14.7         |         |              | 64.5           | 1.8                |              | 7.31 |               |            |      | 1046.24                              | 65.3                      |                      |                     |
|                            | StDev     |            | 11.3                                       | 10.1                                            | 10.1                                              |                           | 0.1                       | 3.7          |         |              | 32.3           | 1.3                |              | 0.46 |               |            |      |                                      | 58.4                      |                      |                     |
| 5/20/2013                  |           |            | 24                                         | 30                                              | 36                                                |                           | 0.26                      | 12.1         |         | 10           | 93.6           | 1.47               |              | 7.18 |               |            |      | 365                                  | 6.7                       |                      |                     |

| Date                       | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 6/3/2013                   |      |            | 20                                         | 16                                              | 20                                                | <0.025                    | 0.14                      | 16           |         | 9.3          | 51.7           | 1.05               |              | 7.32 |               |            |      | 1046.24                              | 21.6                      |                      |                        |
| 6/25/2013                  |      |            | 18                                         | 18                                              | 22                                                | <0.025                    | 0.11                      | 19.5         |         |              | 51.4           | 1.47               |              | 6.96 |               |            |      | >2419                                | 39.9                      |                      |                        |
| 7/15/2013                  |      |            | 20                                         | 22                                              | 22                                                | <0.025                    | 0.16                      | 21.3         |         | 7.1          | 57.8           | 0.95               |              | 7.12 |               |            |      | >2419                                | 21.1                      |                      |                        |
| 7/29/2013                  |      |            | 22                                         | 20                                              | 24                                                | <0.025                    | 0.16                      | 17.9         |         | 8.9          | 63.6           | 1.22               |              | 7.45 |               |            |      | 2419                                 | 25.9                      |                      |                        |
| 8/12/2013                  |      |            | 30                                         | 30                                              | 40                                                | <0.025                    | 0.21                      | 16.5         |         | 10.6         | 91.2           | 0.73               |              | 7.52 |               |            |      | 1986.28                              | 36.4                      |                      |                        |
| 9/9/2013                   |      |            | 36                                         | 36                                              | 38                                                | <0.025                    | 0.29                      | 9.1          |         | 10.2         | 102.8          | 1.49               |              | 7.68 |               |            |      | 1299.65                              | 63.7                      |                      |                        |
| 9/24/2013                  |      |            | 42                                         | 42                                              | 50                                                | <0.025                    | 0.32                      | 8.3          |         | 9.2          | 113.4          | 0.93               |              | 7.63 |               |            |      | 770.1                                | 4                         |                      |                        |
| Mean                       |      |            | 26.5                                       | 26.8                                            | 31.5                                              | <0.025                    | 0.2                       | 15.1         |         | 9.3          | 78.2           | 1.2                |              | 7.36 |               |            |      | 1314.4                               | 27.4                      |                      |                        |
| StDev                      |      |            | 8.7                                        | 9.3                                             | 11.0                                              | <0.025                    | 0.1                       | 4.8          |         | 1.2          | 24.8           | 0.3                |              | 0.26 |               |            |      | 767.0                                | 19.3                      |                      |                        |
| 5/20/2014                  |      |            | 14                                         | 13                                              | 18                                                | <0.025                    | 0.13                      | 12.8         |         |              | 39.9           | 0.55               |              | 7.07 |               |            |      | 1413.6                               | 3                         |                      |                        |
| 6/17/2014                  |      |            | 12                                         | 16                                              | 18                                                | <0.025                    | 0.12                      | 18.9         |         |              | 37.5           | 1.24               |              | 6.91 |               |            |      | >2419                                | 60.1                      |                      |                        |
| 7/17/2014                  |      |            | 16                                         | 20                                              | 24                                                | <0.025                    | 0.17                      | 17.8         |         |              | 60.2           | 0.64               |              | 7.62 |               |            |      | 1413                                 | 16                        |                      |                        |
| 8/19/2014                  |      |            | 16                                         | 16                                              | 18                                                | <0.025                    | 0.09                      | 16.1         |         |              | 46             | 0.71               |              | 7.56 |               |            |      | 1553.07                              | 8.5                       |                      |                        |
| 9/23/2014                  |      |            | 34                                         | 38                                              | 46                                                | <0.025                    | 0.33                      | 8.6          |         |              | 117            | 1.08               |              | 7.56 |               |            |      | 1119                                 | 6.3                       |                      |                        |
| Mean                       |      |            | 18.4                                       | 20.6                                            | 24.8                                              | <0.025                    | 0.2                       | 14.8         |         |              | 60.1           | 0.8                |              | 7.34 |               |            |      | 1374.7                               | 18.8                      |                      |                        |
| StDev                      |      |            | 8.9                                        | 10.0                                            | 12.1                                              | <0.025                    | 0.1                       | 4.2          |         |              | 33.0           | 0.3                |              | 0.33 |               |            |      | 182.7                                | 23.6                      |                      |                        |
| 4/26/2015                  |      |            | 30                                         | 32                                              | 36                                                | <0.025                    | 0.29                      | 6.8          |         |              | 94.9           | 1.07               |              | 7.36 |               |            |      | 261                                  | 9                         |                      |                        |
| 5/21/2015                  |      |            | 26                                         | 35                                              | 42                                                | <0.025                    | 0.26                      | 11.5         |         |              | 100.3          | 0.78               |              | 7.74 |               |            |      | 1413.6                               | 12.2                      |                      |                        |
| 7/28/2015                  |      |            | 30                                         | 24                                              | 26                                                | 0.04                      | 0.1                       | 21.6         |         |              | 72.1           | 0.64               |              | 8.99 |               |            |      | >2419                                | 59                        |                      |                        |
| 8/31/2015                  |      |            | 40                                         | 42                                              | 54                                                | <0.025                    | 0.31                      | 13.8         |         |              | 137.6          | 0.96               |              | 7.66 |               |            |      | 1119.85                              | 17.5                      |                      |                        |
| 9/21/2015                  |      |            | 28                                         | 32                                              | 36                                                | <0.025                    | <0.05                     | 10.3         |         |              | 99.4           | 4.83               |              | 7.68 |               |            |      | 866                                  | 24                        |                      |                        |
| Mean                       |      |            | 30.8                                       | 33.0                                            | 38.8                                              |                           |                           | 12.8         |         |              | 100.9          | 1.7                |              | 7.89 |               |            |      | 915.1                                | 24.3                      |                      |                        |
| StDev                      |      |            | 5.4                                        | 6.5                                             | 10.3                                              |                           |                           | 5.5          |         |              | 23.5           | 1.8                |              | 0.63 |               |            |      | 490.1                                | 20.2                      |                      |                        |
| 5/10/2016                  |      |            | 24                                         | 22                                              | 26                                                | <0.025                    | 0.16                      | 9.8          |         |              | 71.7           | 0.62               |              | 7.56 |               |            |      | 461                                  | 2                         |                      |                        |

| Date                       | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO<br>% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia<br>/<br>Crypto |
|----------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|---------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|------------------------|
| SITE 1 - WEST CANADA CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |         |              |                |                    |              |      |               |            |      |                                      |                           |                      |                        |
| 6/13/2016                  |      |            | 34                                         | 32                                              | 42                                                | <0.025                    | 0.14                      | 10.6         |         |              | 70.5           | 0.95               |              | 7.48 |               |            |      | 1203.3                               | 16.1                      |                      |                        |
| 7/6/2016                   |      |            | 24                                         | 20                                              | 28                                                | <0.025                    | 0.13                      | 20.5         |         |              | 55.9           | 0.44               |              | 7.63 |               |            |      | 1553                                 | 11.9                      |                      |                        |
| 8/13/2016                  |      |            | 20                                         | 20                                              | 22                                                | <0.025                    | 0.11                      |              |         |              | 51.5           | 1.06               |              | 6.71 |               |            |      | 2419.17                              | 44.8                      |                      |                        |
| 9/13/2016                  |      |            | 30                                         | 28                                              | 36                                                | <0.025                    | 0.18                      | 14.7         |         |              | 79.4           | 0.93               |              | 7.75 |               |            |      | 1203                                 | 23.1                      |                      |                        |
| Mean                       |      |            | 26.4                                       | 24.4                                            | 30.8                                              | <0.025                    |                           | 13.9         |         |              | 65.8           | 0.8                |              | 7.43 |               |            |      | 1367.9                               | 19.6                      |                      |                        |
| StDev                      |      |            | 5.5                                        | 5.4                                             | 8.1                                               | <0.025                    |                           | 4.9          |         |              | 11.7           | 0.3                |              | 0.41 |               |            |      | 710.0                                | 16.0                      |                      |                        |

[EPA, 2001; MVWA, 2016](#)

Table C-5: Tributary Sampling Results – Kreskern Creek, Site 2

| Date                    | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 4/28/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 435                       |                      |                    |
| 5/5/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 150                                  | 0                         | 400                  |                    |
| 5/13/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20                                   | 10                        | 315                  |                    |
| 5/19/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 200                                  | 30                        | 3600                 |                    |
| 5/26/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 80                                   | 10                        | 295                  |                    |
| 6/1/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 150                                  | 150                       | 255                  |                    |
| 6/9/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 70                                   | 40                        | 445                  |                    |
| 6/16/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 230                                  | 150                       | 460                  |                    |
| 6/22/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 190                                  | 20                        | 665                  |                    |
| 6/29/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20                                   | 10                        | 275                  |                    |
| 7/7/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 300                  |                    |
| 7/13/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 200                  |                    |
| 7/28/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 195                  |                    |
| 8/4/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20                                   | 20                        | 480                  |                    |
| 8/11/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 350                                  | 230                       | 265                  |                    |
| 8/18/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 220                                  | 220                       | 230                  |                    |
| 8/25/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 290                                  | 210                       | 530                  |                    |
| 9/2/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 130                                  | 70                        | 205                  |                    |
| 9/22/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 120                                  | 10                        | 1197                 |                    |
| 9/29/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 780                                  | 360                       | 912                  |                    |
| 10/6/1998               |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 30                                   | 10                        | 847                  |                    |
| 10/13/1998              |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 460                                  | 350                       | 72000                |                    |
| 10/20/1998              |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 110                                  | 0                         | 126                  |                    |
| 10/27/1998              |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 270                                  | 90                        | 395                  |                    |

| Date                    | Time    | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|---------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 12/15/1998              |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |      | 0                                    | 0                         | 160                  |                    |
| Mean                    |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |      | 157                                  | 80                        | 3407                 |                    |
| StDev                   |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |      | 178                                  | 112                       | 14307                |                    |
| 4/27/1999               | 2:02 PM |            |                               |                                    |                                      |               |               | 8.24         | 100.6 | 11.46        | 42.9           | 0                  | 1.36         | 7.29 | 5.65          | 0.16       | 2.83 | 40                                   | 0                         | 560                  |                    |
| 5/6/1999                | 1:54 PM |            |                               |                                    |                                      |               |               | 14           | 95.9  | 9.57         | 51.4           | 1.2                | 1.42         | 6.95 | 5.66          | 0.173      | 3.06 | 260                                  | 120                       | 350                  |                    |
| 5/11/1999               | 2:06 PM |            |                               |                                    |                                      |               |               | 9.51         | 99    | 10.92        | 54.4           | 0                  | 1.47         | 6.75 | 6.68          | 0.215      | 3.22 | 180                                  | 90                        | 363                  |                    |
| 5/18/1999               | 2:04 PM |            |                               |                                    |                                      |               |               | 16.36        | 97.6  | 9.7          | 54.6           | 1.8                | 1.24         | 6.89 | 5.81          | 0.191      | 3.29 | 460                                  | 10                        | 456                  |                    |
| 5/25/1999               | 1:57 PM |            |                               |                                    |                                      |               |               | 11.96        | 96.4  | 10.55        | 118            | 0                  | 1.4          | 7.01 | 6.38          | 0.212      | 3.32 | 1460                                 | 280                       | 1615                 |                    |
| 6/2/1999                | 1:59 PM |            |                               |                                    |                                      |               |               | 19.61        | 87.6  | 8.14         | 77.2           | 0.9                | 1.22         | 6.84 | 2.81          | 0.239      | 8.51 | 360                                  | 0                         | 5150                 |                    |
| 6/8/1999                | 1:54 PM |            |                               |                                    |                                      |               |               | 23.63        | 74.8  | 6.47         | 99.4           | 0                  | 0.69         | 6.97 | 7.66          | 0.262      | 3.42 | 50                                   | 40                        | 1600                 |                    |
| 6/15/1999               | 1:55 PM |            |                               |                                    |                                      |               |               | 18.95        | 97.5  | 9.18         | 65.1           | 0                  | 0.22         | 7.42 | 5.5           | 0.19       | 3.45 | 230                                  | 200                       | 862                  |                    |
| 6/21/1999               | 2:08 PM | 0.17       |                               |                                    |                                      |               |               | 20.31        | 100   | 9.17         | 64.7           | 0                  | 0.22         | 7.6  | 3.74          | 0.119      | 3.18 | 820                                  | 0                         | 2190                 |                    |
| 6/29/1999               | 1:47 PM | 0.79       | 25                            | 29                                 |                                      |               |               | 19.71        | 96.8  | 8.97         | 129.7          | 0                  | 0            | 7.66 | 5.64          | 0.191      | 3.39 | 280                                  | 49                        | 850                  |                    |
| 7/13/1999               | 1:38 PM | 0.29       | 11                            | 16                                 | 36                                   | 0.076         | 0.2           | 22.24        | 104.2 | 9.19         | 71             | 0                  | 0.19         | 7.65 | 5.24          | 0.178      | 3.4  | 160                                  | 10                        | 1112                 |                    |
| 7/20/1999               | 2:02 PM | 0.05       | 14                            | 16                                 | 20                                   | 0.006         | 0.3           | 22.36        | 99    | 8.7          | 64.3           | 0                  | 0.05         | 7.57 | 6.11          | 0.16       | 2.62 | 2000                                 | 2000                      | 672                  |                    |
| 7/27/1999               | 2:02 PM | 0.13       | 16                            | 14                                 | 23                                   | 0.51          | 0.3           | 25.38        | 98.9  | 8.23         | 67.3           | 0                  | 0.05         | 7.74 | 4.07          | 0.143      | 3.51 | 460                                  | 340                       | 340                  |                    |
| 8/3/1999                | 1:41 PM | 0.14       | 6                             | 7.5                                | 11                                   | 0.54          | 0.2           | 20.49        | 95.9  | 8.76         | 71.5           | 0                  | 0.07         | 7.82 | 3.48          | 0.13       | 3.74 | 330                                  | 10                        | 913                  |                    |
| 8/17/1999               | 1:55 PM | 0.12       | 22                            | 18                                 | 30                                   | 0.47          | 0.2           | 21.9         | 89.6  | 7.95         | 60.5           | 0                  | 0.12         | 7.89 | 3.52          | 0.106      | 3.01 | 250                                  | 180                       | 1848                 |                    |
| 8/24/1999               | 1:43 PM | 0.12       | 18                            | 18                                 | 24                                   |               | 0.74          | 21.9         | 87.8  | 7.8          | 58             | 0                  | 0.05         | 7.48 | 3.21          | 0.102      | 3.18 | 120                                  | 10                        | 1224                 |                    |
| 8/31/1999               | 1:43 PM | 0.08       | 20                            | 19                                 | 28                                   |               | 0.66          | 18.92        | 84.8  | 7.99         | 59.8           | 0                  | 0.1          | 7.86 | 3.17          | 0.087      | 2.74 | 100                                  | 30                        | 580                  |                    |
| 9/8/1999                | 1:48 PM | 0.12       | 10                            | 22                                 | 32                                   | 0.62          | 0.2           | 22.71        | 84    | 7.35         | 68.9           | 7.1                | 0.12         | 7.83 | 3.66          | 0.114      | 3.11 | 350                                  | 190                       | 675                  |                    |
| 9/15/1999               | 2:00 PM | 0.16       | 16                            | 10                                 | 35                                   | 1.42          | 0.1           | 17.06        | 78.9  | 7.73         | 74.7           | 0                  | 0.11         | 7.85 | 5.22          | 0.159      | 3.05 | 210                                  | 50                        | 468                  |                    |
| 9/21/1999               | 2:12 PM | 0.64       | 16                            | 26                                 | 50                                   | 1.25          | 0.2           | 12.47        | 78.4  | 8.44         | 69.6           | 3.1                | 0.08         | 7.36 | 7.62          | 0.234      | 3.07 | 290                                  | 50                        | 675                  |                    |
| 9/28/1999               | 1:43 PM | 0.28       | 22                            | 18                                 | 108                                  | 0.86          | 0.1           | 16.09        | 76.8  | 7.68         | 61.3           | 0                  | 0.15         | 7.48 | 4.83          | 0.168      | 3.48 | 130                                  | 0                         | 323                  |                    |
| 10/5/1999               | 1:53 PM | 0.81       | 12                            | 18                                 | 20                                   | 1.32          | 0.3           | 10.41        | 75.8  | 8.59         | 57.6           | 0                  | 0.19         | 7.03 | 7.27          | 0.258      | 3.55 | 120                                  | 20                        | 411                  |                    |



| Date                    | Time     | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |          |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 10/19/1999              | 1:43 PM  | 0.52       | 14                                         | 24                                              | 28                                                | 0.94                      | 0.2                       | 8.08         | 68.6  | 8.22         | 57             | 8.2                | 0.17         | 7.42 | 5.47          | 0.184      | 3.36 | 70                                   | 0                         | 897                  |                    |
| 10/26/1999              | 1:58 PM  | 0.12       | 13                                         | 18                                              | 21                                                | 0.71                      | 0.2                       | 8.02         | 62.9  | 7.55         | 60             | 0                  | 0.16         | 7.28 | 4.89          | 0.169      | 3.46 | 330                                  | 0                         | 584                  |                    |
| Mean                    |          | 0.28       | 16                                         | 18                                              | 33                                                | 0.72                      | 0.2                       | 17.1         | 88.8  | 8.68         | 69.1           | 0.9                | 0.45         | 7.4  | 5.14          | 0.173      | 3.46 | 378                                  | 153                       | 1030                 |                    |
| StDev                   |          | 0.26       | 5.11                                       | 5.58                                            | 23.42                                             | 0.42                      | 0.07                      | 5.47         | 11.47 | 1.17         | 20.09          | 2.21               | 0.55         | 0.36 | 1.43          | 0.05       | 1.11 | 456.32                               | 404.96                    | 1015.25              |                    |
| 1/4/2000                | 2:06 PM  | 3.91       | 11                                         | 12                                              | 15                                                | 2.1                       | 0.5                       | 1.23         | 62.8  | 9            | 33.2           | 16.4               | 0.18         | 7.08 | 9.21          | 0.294      | 3.19 | 40                                   | 0                         | 560                  |                    |
| 2/29/2000               | 1:48 PM  | 1.55       |                                            |                                                 |                                                   |                           |                           | 1.21         | 28.8  | 4.13         | 41             | 140.3              | 0.16         | 4.8  | 5.11          | 0.175      | 3.42 | 1553                                 | 2                         |                      |                    |
| 3/21/2000               | 1:56 PM  | 1.16       | 14                                         | 11                                              | 16                                                | 0.76                      | 0.5                       | 4.47         | 16.2  | 2.13         | 0              | 0                  | 0.15         | 5.17 | 4.45          |            |      | 248                                  | 0                         |                      |                    |
| 4/5/2000                | 1:54 PM  | 0.08       | 14                                         | 12                                              | 14                                                | 1.4                       | 0.3                       | 3.01         | 85.4  | 11.42        | 30             | 1.4                | 2.64         | 5.59 | 7.88          | 0.283      | 3.59 | 326                                  | 4                         | 2000                 |                    |
| 4/13/2000               | 11:17 AM | 0.07       | 6                                          | 11                                              | 14                                                | 0.67                      | 0.2                       | 3.34         | 89.8  | 11.88        | 37.3           | 0.5                | 1.83         | 6.03 | 5.98          | 0.219      | 3.66 | 165                                  | 0                         | 92                   |                    |
| 4/18/2000               | 1:49 PM  |            | 9                                          | 12                                              | 16                                                | 1.12                      | 0.3                       | 4.79         | 88.4  | 11.26        | 40.2           | 1.4                | 1.83         | 6.23 | 6.05          | 0.224      | 3.7  | 119                                  | 0                         |                      |                    |
| 4/25/2000               | 1:42 PM  |            | 7                                          | 13                                              | 15                                                | 0.96                      | 0.1                       | 6.92         | 86.9  | 10.48        | 36             | 1.4                | 1.94         | 5.68 | 6.24          | 0.232      | 3.72 | 248                                  | 0                         | 558                  |                    |
| 5/4/2000                | 12:46 PM | 0.04       | 8                                          | 14                                              | 18                                                | 1.14                      | 0.2                       | 8.68         | 95.9  | 11.05        | 41             | 2.2                | 1.17         | 6.24 | 5.97          | 0.207      | 3.47 | 687                                  | 0                         | 492                  | 0/0                |
| 5/9/2000                | 2:06 PM  |            | 11                                         | 13                                              | 17                                                | 1.31                      | 0.2                       | 13.92        | 86.3  | 8.84         | 44.3           | 1.5                | 1.33         | 6.48 | 6.08          | 0.208      | 3.42 | 756                                  | 1                         | 1158                 |                    |
| 5/16/2000               | 2:07 PM  |            | 11                                         | 13                                              | 15                                                | 2.03                      | 0.3                       | 9.12         | 78.7  | 9            | 32.1           | 2.8                | 2.27         | 6.1  | 9.34          | 0.361      | 3.87 | 2419                                 | 16                        | 5010                 |                    |
| 5/30/2000               | 1:49 PM  |            | 9                                          | 12                                              | 15                                                | 1.62                      | 0.3                       | 10.98        | 80.6  | 8.82         | 40.3           | 2.2                | 1.51         | 6.26 | 8.64          | 0.324      | 3.75 | 2419                                 | 3                         | 3600                 |                    |
| 6/6/2000                | 1:57 PM  | 0.14       | 11                                         | 14                                              | 19                                                | 1.45                      | 0.3                       | 11.12        | 82.3  | 8.97         | 43.6           | 1.9                | 1.06         | 6.57 | 9.35          | 0.363      | 3.88 | 2419                                 | 435                       | 3690                 |                    |
| 6/13/2000               | 2:00 PM  | 0.08       | 12                                         | 16                                              | 21                                                | 1.51                      | 0.3                       | 13.44        | 77    | 7.97         | 54.9           | 1.7                | 1.05         | 6.68 | 8.02          | 0.315      | 3.93 | 2419                                 | 11                        | 1730                 | 0/0                |
| 6/20/2000               | 1:37 PM  | 0.1        | 15                                         | 14                                              | 17                                                | 1.6                       | 0.2                       | 16.25        | 71.3  | 6.95         | 48.9           | 1.9                | 1.07         | 6.53 | 7.49          | 0.323      | 4.31 | 437                                  | 4                         | 1930                 |                    |
| 6/27/2000               | 11:32 AM | 0.06       | 14                                         | 15                                              | 16                                                | 1.83                      | 0.3                       | 18.13        | 67.9  | 6.36         | 57.2           | 2                  | 1            | 6.78 | 7.78          | 0.298      | 3.83 | 2419                                 | 10                        | 1120                 |                    |
| 7/11/2000               | 12:26 PM | 0.09       | 16                                         | 16                                              | 17                                                | 1.16                      | 0.3                       | 17.58        | 75.3  | 7.13         | 43.9           | 2.1                | 0.41         | 7.05 | 7.17          | 0.274      | 3.82 | 2419                                 | 120                       | 2760                 |                    |
| 7/18/2000               | 2:11 PM  |            | 15                                         | 16                                              | 19                                                | 1.26                      | 0.3                       | 16.89        | 66.3  | 6.38         | 45.9           | 1.7                | 1.58         | 6.84 | 6.97          | 0.243      | 3.49 | 2419                                 | 80                        | 3430                 | 0/0                |
| 7/25/2000               | 12:40 PM | 0.1        | 14                                         | 18                                              | 20                                                | 1.02                      | 0.2                       | 15.91        | 68.7  | 6.76         | 52.4           | 1.9                | 1.12         | 6.93 | 7.23          | 0.223      | 3.08 | 1553                                 | 7                         | 1370                 |                    |
| 8/1/2000                | 12:30 PM | 0.11       | 17                                         | 16                                              | 17                                                | 1.34                      | 0.2                       |              |       |              | 49.4           | 2.3                |              | 7.96 | 7.38          | 0.236      | 3.2  | 2419                                 | 17                        | 1980                 |                    |
| 8/8/2000                | 1:19 PM  | 0.06       | 15                                         | 14                                              | 18                                                | 2.07                      | 0.4                       | 15.62        | 72.8  | 7.24         | 16.9           | 2.6                | 1.47         | 7.32 | 9.94          | 0.358      | 3.6  | 1046                                 | 1                         | 1310                 |                    |
| 8/22/2000               | 11:39 AM | 0.04       | 12                                         | 17                                              | 20                                                | 2.2                       | 0.5                       | 13.52        | 70.7  | 7.37         | 23.1           | 4.4                | 1.11         | 6.79 | 10.3          | 0.395      | 3.83 | 2419                                 | 1                         | 4990                 | 0/0                |

| Date                    | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |       |                                      |                           |                      |                    |
| 8/29/2000               | 2:11 PM    | 0.06       | 12                                         | 15                                              | 17                                                | 1.74                      | 0.4                       | 18.16        | 101.7 | 9.56         | 52.5           | 1.8                | 1.05         | 6.98 | 8.92          | 0.341      | 3.82  | 2419                                 | 1                         |                      |                    |
| 9/19/2000               | 10:17 AM   | 0.21       | 17                                         | 18                                              | 20                                                | 0.01                      | 0.4                       | 13.93        | 121.3 | 12.52        | 58.6           | 1.8                | 0.07         | 7.3  | 6.53          | 0.249      | 3.81  | 1414                                 | 56                        | 2820                 |                    |
| 10/24/2000              | 11:04 AM   |            | 15                                         | 18                                              | 23                                                | 0.02                      | 0.4                       | 7.33         | 68.7  | 1.9          | 0.2            | 6.86               | 6.94         | 0.24 | 3.52          | 2419       | 4     | 700                                  |                           |                      |                    |
| Mean                    |            | 0.46       | 12                                         |                                                 | 14                                                | 17                        | 1.32                      | 0.3          | 10.68 | 76.1         | 8.42           | 41.3               | 8.3          | 1.14 | 6.51          | 7.46       | 0.278 | 3.65                                 | 1467                      | 32                   | 2065               |
| StDev                   |            | 0.99       | 3.12                                       | 2.23                                            | 2.37                                              | 0.59                      | 0.11                      | 5.7          | 21.92 | 2.54         | 14.53          | 28.29              | 0.71         | 0.71 | 1.54          | 0.06       | 0.28  | 981.6                                | 90.68                     | 1465.73              |                    |
| 2001                    | 4/26/2001  |            | 6                                          | 10                                              | 14                                                | 0.19                      | 0.4                       |              |       |              |                | 3.67               |              |      | 6.20          | 0.23       | 3.73  |                                      |                           |                      |                    |
|                         | 5/31/2001  |            | 10                                         | 18                                              | 26                                                | 0.08                      | 0.3                       | 10.86        | 70.6  | 7.88         | 35.00          | 1.52               |              | 7.06 | 7.77          | 0.28       | 3.55  | 2419.0                               | 95                        |                      |                    |
|                         | 6/27/2001  | 11:50 AM   | 12                                         | 14                                              | 18                                                | 0.04                      | 0.4                       | 16.36        | 67.0  | 6.64         | 40.20          | 1.81               | 1.63         | 6.58 | 9.75          | 0.38       | 3.85  | 2419.0                               | 31                        |                      |                    |
|                         | 7/31/2001  | 10:47 AM   | 18                                         | 22                                              | 30                                                | 0.66                      | 0.3                       | 18.00        | 55.0  | 5.22         | 54.20          |                    | 0.07         | 7.46 | 3.91          | 0.15       | 3.71  | 2419.0                               | 39                        |                      |                    |
|                         | 8/22/2001  | 11:20 AM   | 22                                         | 20                                              | 32                                                | 0.98                      | 0.3                       | 19.52        | 16.0  | 1.47         | 55.10          | 2.85               |              | 7.48 | 4.64          | 0.18       | 3.77  | 2419.0                               | 59                        |                      |                    |
|                         | 9/20/2001  |            | 16                                         | 20                                              | 22                                                | 0.17                      | 0.2                       | 12.19        | 111.8 | 11.98        | 51.60          |                    |              | 7.31 | 8.34          | 0.28       | 3.32  | 2419.0                               | 93                        |                      |                    |
|                         | 10/29/2001 | 13:35 PM   | 19                                         | 19                                              | 24                                                | 0.59                      | 0.2                       | 6.10         | 111.8 | 14.12        | 58.10          | 1.38               | 0.00         | 7.25 | 4.63          | 0.15       | 3.30  | 866.0                                | 3                         |                      |                    |
|                         | Mean       |            | 15                                         | 18                                              | 24                                                | 0.39                      | 0.3                       | 13.84        | 72.0  | 7.89         | 49.03          | 2.25               | 0.57         | 7.19 | 6.46          | 0.23       | 3.60  | 2160.2                               | 53                        |                      |                    |
|                         | StDev      |            | 6                                          | 4                                               | 6                                                 | 0.36                      | 0.08                      | 5.05         | 36.4  | 4.59         | 9.24           | 0.98               | 0.92         | 0.34 | 2.21          | 0.08       | 0.22  | 634.0                                | 36                        |                      |                    |
| 2002                    | 4/30/2002  | 12:20 PM   | 9                                          | 12                                              | 14                                                | 0.25                      | 0.3                       | 4.61         | 109.5 | 14.31        | 31.30          | 1.12               | 0.85         | 6.10 | 6.23          | 0.24       | 3.88  | 1120.0                               | 1                         |                      |                    |
|                         | 5/29/2002  | 13:35 PM   | 14                                         | 14                                              | 16                                                | 0.26                      | 0.2                       | 15.69        | 98.8  | 9.88         | 55.40          | 2.49               | 1.08         | 6.41 | 5.97          | 0.20       | 3.35  | 2419.0                               | 3                         |                      |                    |
|                         | 7/2/2002   | 10:37 AM   | 15                                         | 15                                              | 17                                                | 0.07                      | 0.3                       | 21.41        | 79.0  | 7.06         | 59.90          | 1.36               | 1.63         | 6.83 | 6.66          | 0.23       | 3.41  | 1414.0                               | 16                        |                      |                    |
|                         | 8/1/2002   |            | 22                                         | 22                                              | 26                                                | 0.54                      | 0.4                       | 21.72        | 122.9 | 10.83        | 60.00          | 4.22               | 0.02         | 7.51 | 3.31          | 0.10       | 3.05  | 2419.0                               | 31                        |                      |                    |
|                         | 8/29/2002  |            | 24                                         | 26                                              | 32                                                | 0.31                      | 0.3                       | 15.30        |       | 7.80         | 80.00          | 1.16               |              | 7.50 | 3.12          | 0.08       | 2.53  | 1733.0                               | 19                        |                      |                    |
|                         | 9/25/2002  | 12:00 PM   | 22                                         | 22                                              | 28                                                | 0.29                      | 0.2                       | 14.21        | 105.1 | 10.78        | 57.00          | 1.30               | 0.00         | 7.18 | 3.76          | 0.12       | 3.14  | 1986.0                               | 32                        |                      |                    |
|                         | 10/24/2002 | 11:52 AM   | 14                                         | 18                                              | 22                                                | 0.98                      | 0.3                       | 4.78         | 101.6 | 13.06        | 44.00          | 0.88               | 1.01         | 6.73 | 6.62          | 0.23       | 3.49  | 1046.0                               | 10                        |                      | 1.7                |
|                         | Mean       |            | 17                                         | 18                                              | 22                                                | 0.39                      | 0.3                       | 13.96        | 102.8 | 10.53        | 55.37          | 1.79               | 0.76         | 6.89 | 5.10          | 0.17       | 3.26  | 1733.9                               | 16                        |                      |                    |
|                         | StDev      |            | 6                                          | 5                                               | 7                                                 | 0.30                      | 0.07                      | 6.98         | 14.4  | 2.61         | 15.05          | 1.19               | 0.64         | 0.54 | 1.62          | 0.07       | 0.42  | 570.8                                | 12                        |                      |                    |
| 4/28/2003               | 13:23 PM   |            | 8                                          | 12                                              | 12                                                | 0.04                      | 0.3                       | 9.26         | 106.8 | 12.27        | 36.00          | 2.23               | 3.54         | 6.57 | 5.64          | 0.21       | 3.65  | 275.5                                | 0                         |                      | 1.3                |
| 5/27/2003               | 12:53 PM   |            | 10                                         | 12                                              | 16                                                | 0.09                      | 0.3                       | 13.42        | 93.6  | 9.77         | 38.00          | 1.16               | 2.31         | 8.15 | 7.41          | 0.26       | 3.51  | >2419.2                              | 13                        |                      | 2.4                |

| Date                    | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2003                    | 6/23/2003  | 13:04 PM   | 16                                         | 14                                              | 18                                                | 0.04                      | 0.3                       | 21.55        | 88.2  | 7.78         | 38.00          | 1.52               | 2.01         | 6.92 | 7.34          | 0.27       | 3.68 | 2419.0                               | 60                        |                      | 1.9                |
|                         | 7/17/2003  | 11:52 AM   | 18                                         | 18                                              | 24                                                | 0.05                      | 0.4                       | 18.71        | 100.7 | 9.40         | 51.00          | 0.87               | 0.63         | 7.27 | 6.67          | 0.25       | 3.79 | 1986.3                               | 72                        |                      | 1.5                |
|                         | 8/18/2003  | 12:48 PM   | 20                                         | 19                                              | 22                                                | 0.05                      | 0.3                       | 25.15        | 108.1 | 8.91         | 50.00          | 1.94               | 1.47         | 6.97 | 8.97          | 0.31       | 3.41 | >2419                                | 55                        |                      | 2.2                |
|                         | 9/24/2003  | 12:23 PM   | 12                                         | 12                                              | 16                                                | 0.01                      | 0.4                       | 14.48        | 99.0  | 10.10        | 32.00          | 1.90               | 0.63         | 6.97 | 9.49          | 0.38       | 3.97 | 2419.0                               | 46                        |                      | 4.7                |
|                         | 10/15/2003 | 11:58 AM   | 16                                         | 14                                              | 18                                                |                           |                           | 12.39        | 86.5  | 9.25         | 47.00          | 1.26               | 0.32         | 6.75 | 7.66          | 0.29       | 3.79 | 1733.0                               | 3                         |                      | 2.5                |
|                         | Mean       |            | 14                                         | 14                                              | 18                                                | 0.04                      | 0.3                       | 16.42        | 97.6  | 9.64         | 41.71          | 1.55               | 1.56         | 7.09 | 7.60          | 0.28       | 3.69 | 1766.6                               | 36                        |                      | 2.4                |
|                         | StDev      |            | 4                                          | 3                                               | 4                                                 | 0.02                      | 0.05                      | 5.60         | 8.5   | 1.38         | 7.50           | 0.49               | 1.15         | 0.52 | 1.31          | 0.05       | 0.19 | 883.7                                | 30                        |                      | 1.13               |
| 2004                    | 4/19/2004  | 11:20 AM   | 10                                         | 10                                              | 12                                                |                           |                           | 6.88         | 92.7  | 11.29        | 29.00          | 2.20               | 1.29         | 6.31 | 5.70          | 0.23       | 3.96 | LE                                   | LE                        |                      | 2.4                |
|                         | 5/25/2004  | 13:48 PM   | 14                                         | 14                                              | 18                                                | 0.05                      | 0.1                       | 15.87        | 74.0  | 7.32         | 23.00          | 5.30               | 0.83         | 6.15 | 10.60         | 0.42       | 3.97 | >2419.2                              | 1203                      |                      | 5.3                |
|                         | 6/14/2004  | 11:06 AM   | 16                                         | 18                                              | 20                                                | 0.01                      | 0.0                       | 15.72        | 90.8  | 9.02         | 54.00          | 3.44               | 0.15         | 6.49 | 7.65          | 0.27       | 3.56 | 501.2                                | 4                         |                      | 1.5                |
|                         | 7/19/2004  | 9:54 AM    | 17                                         | 20                                              | 22                                                | 0.01                      | 0.1                       | 17.79        | 110.2 | 10.48        | 52.00          | 11.40              | 0.10         | 7.50 | 6.32          | 0.25       | 4.02 | 1732.9                               | 63                        |                      | 1.6                |
|                         | 8/30/2004  | 11:47 AM   | 18                                         | 17                                              | 22                                                | 0.01                      | 0.1                       | 18.14        | 81.4  | 7.69         | 46.00          | 1.58               | 2.85         | 7.03 | 8.07          | 0.33       | 4.13 | >2419.2                              | 15                        |                      | 2.2                |
|                         | 9/14/2004  | 12:43 PM   | 16                                         | 18                                              | 20                                                | 0.02                      | 0.1                       | 18.45        | 94.5  | 8.86         | 47.00          | 2.46               | 0.41         | 6.71 | 9.92          | 0.39       | 3.95 | >2419                                | 21                        |                      | 2.3                |
|                         | 10/4/2004  | 14:29 PM   | 18                                         | 22                                              | 26                                                | 0.01                      | 0.1                       | 12.88        | 98.4  | 10.40        | 51.00          | 1.58               | 0.12         | 7.62 | 6.30          | 0.24       | 3.87 | 1986.3                               | 18                        |                      | 0.8                |
|                         | Mean       |            | 16                                         | 17                                              | 20                                                | 0.02                      | 0.1                       | 15.10        | 91.7  | 9.29         | 43.14          | 3.99               | 0.82         | 6.83 | 7.79          | 0.31       | 3.92 | 1406.8                               | 221                       |                      | 2.3                |
|                         | StDev      |            | 3                                          | 4                                               | 4                                                 | 0.02                      | 0.05                      | 4.11         | 11.7  | 1.49         | 12.16          | 3.51               | 1.00         | 0.57 | 1.88          | 0.08       | 0.18 | 794.4                                | 482                       |                      | 1.44               |
| 2006                    | 4/24/2006  |            | 8                                          | 8                                               | 10                                                | <0.025                    | <0.25                     | 6.22         | 93.0  | 11.51        | 34.00          | 1.16               |              | 6.08 | 5.74          | 0.25       | 4.36 | >2419.2                              | 23                        |                      |                    |
|                         | 5/15/2006  |            | 12                                         | 18                                              | 32                                                | <0.025                    | <0.25                     | 15.39        | 89.4  | 8.94         | 45.00          | 1.99               |              | 6.61 | 4.90          | 0.19       | 3.84 | 1119.9                               | 36                        |                      |                    |
|                         | 6/8/2006   |            | 18                                         | 16                                              | 18                                                | <0.025                    | <0.25                     | 17.50        | 76.2  | 7.29         | 54.00          | 1.51               |              | 6.72 |               |            |      | 1986.3                               | 28                        |                      |                    |
|                         | 7/17/2006  |            | 12                                         | 16                                              | 18                                                | <0.025                    | <0.25                     | 25.81        | 99.4  | 8.10         | 38.00          | 2.02               |              | 6.93 |               |            |      | 1119.9                               | <1                        |                      |                    |
|                         | 8/14/2006  |            | 18                                         | 20                                              | 24                                                | <0.025                    | <0.25                     | 15.54        | 100.6 | 10.02        | 62.00          | 3.43               |              | 6.96 |               |            |      | 1986.0                               | 26                        |                      |                    |
|                         | 9/5/2006   |            | 18                                         | 20                                              | 20                                                | <0.025                    | <0.25                     | 14.99        | 104.8 | 10.57        | 53.00          | 1.59               |              | 7.29 |               |            |      | 1119.9                               | 20                        |                      |                    |
|                         | 10/16/2006 |            | 14                                         | 18                                              | 22                                                | <0.025                    | <0.25                     | 7.64         | 96.2  | 11.50        | 49.00          | 3.99               |              | 6.73 |               |            |      | 727.0                                | 6                         |                      |                    |
|                         | Mean       |            | 14                                         | 17                                              | 21                                                | <0.025                    | <0.25                     | 14.73        | 94.2  | 9.70         | 47.86          | 2.24               |              | 6.76 | 5.32          | 0.22       |      | 1343.1                               | 23                        |                      |                    |
|                         | StDev      |            | 4                                          | 4                                               | 7                                                 | <0.025                    | <0.25                     | 6.51         | 9.4   | 1.65         | 9.69           | 1.06               |              | 0.37 | 0.59          | 0.04       |      | 520.8                                | 10                        |                      |                    |

| Date                    | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2007                    | 4/23/2007  |            | 4                                          | 10                                              | 11                                                | <0.025                    | <0.25                     | 4.51         | 96.6  | 12.49        | 25.00          | 1.64               |              | 6.03 | 6.54          | 0.21       |      | 435.2                                | 0                         |                      |                    |
|                         | 5/4/2007   |            | 7                                          | 12                                              | 14                                                | <0.025                    | <0.25                     | 13.75        | 97.9  | 10.15        | 41.00          | 1.72               |              | 6.41 | 5.94          | 0.17       |      | >2419                                | <1                        |                      |                    |
|                         | 6/4/2007   |            | 9                                          | 20                                              | 32                                                | <0.025                    | <0.25                     | 22.58        | 93.6  | 8.09         | 55.00          | 2.28               |              | 6.36 | 6.59          | 0.19       |      | 1553.1                               | 3                         |                      |                    |
|                         | 7/2/2007   |            | 20                                         | 20                                              | 26                                                | <0.025                    | <0.25                     | 16.24        | 118.2 | 11.61        | 55.00          | 0.95               |              | 7.09 | 3.05          | 0.10       |      | 1414.0                               | 68                        |                      | -1.8               |
|                         | 8/20/2007  |            | 18                                         | 10                                              | 36                                                | <0.025                    | <0.25                     |              | 103.9 | 10.66        | 0.07           | 0.92               |              | 7.12 | 3.24          | 0.09       |      | 1413.6                               | 19                        |                      |                    |
|                         | 9/17/2007  |            | 9                                          | 27                                              | 54                                                | <0.025                    | <0.25                     | 12.67        | 105.1 | 11.16        | 0.06           | 0.87               |              | 7.37 | 4.80          | 0.14       |      | 1986.0                               | 10                        |                      |                    |
|                         | 10/9/2007  |            | 21                                         | 13                                              | 39                                                | <0.025                    | <0.25                     | 15.82        | 114.6 | 11.36        | 0.07           | 1.07               |              | 7.74 | 5.77          | 0.19       |      | 2419.2                               | 10                        |                      |                    |
|                         | Mean       |            | 13                                         | 16                                              | 30                                                | <0.025                    | <0.25                     | 14.26        | 104.3 | 10.79        | 25.17          | 1.35               |              | 6.87 | 5.13          | 0.16       |      | 1536.8                               | 18                        |                      |                    |
|                         | StDev      |            | 7                                          | 6                                               | 15                                                | <0.025                    | <0.25                     | 5.89         | 9.3   | 1.40         | 25.56          | 0.54               |              | 0.62 | 1.48          | 0.05       |      | 667.0                                | 25                        |                      |                    |
| 2008                    | 4/21/2008  |            | 11                                         | 10                                              | 10                                                | <0.025                    | <0.25                     | 11.68        | 83.8  | 9.10         | 0.03           | 1.95               |              | 6.07 | 5.87          | 0.20       |      | 1553.1                               | 0                         |                      |                    |
|                         | 5/19/2008  |            | 16                                         | 14                                              | 17                                                | <0.025                    | <0.25                     | 12.33        | 78.5  | 8.40         | 0.04           | 1.21               |              | 6.72 | 6.04          | 0.19       |      | >2419.2                              | 0                         |                      |                    |
|                         | 6/16/2008  |            | 19                                         | 23                                              | 58                                                | <0.025                    | <0.25                     | 17.66        | 84.5  | 8.05         | 0.06           | 1.12               |              | 6.98 | 8.82          | 0.27       |      | 1986.3                               | 11                        |                      |                    |
|                         | 7/14/2008  |            | 11                                         | 14                                              | 32                                                | <0.025                    | <0.25                     | 18.52        | 96.1  | 9.00         | 0.04           | 1.75               |              | 6.48 | 12.90         | 0.47       |      | >2419.2                              | 276                       |                      |                    |
|                         | 8/4/2008   |            | 13                                         | 14                                              | 22                                                | <0.025                    | <0.25                     | 16.80        | 81.0  | 7.83         | 0.03           | 1.32               |              | 6.49 | 9.02          | 0.34       |      | >2419.2                              | 81                        |                      |                    |
|                         | 8/26/2008  |            | 16                                         | 17                                              | 20                                                | <0.025                    | <0.25                     | 19.66        | 79.4  | 7.26         | 0.05           | 1.03               |              | 6.49 | 9.97          | 0.36       |      | >2419.2                              | 2                         |                      |                    |
|                         | 9/23/2008  |            | 16                                         | 20                                              | 21                                                | <0.025                    | <0.25                     | 10.80        | 111.2 | 12.31        | 0.06           | 1.29               |              | 7.40 | 5.61          | 0.45       |      | >2419                                | 33                        |                      |                    |
|                         | 10/14/2008 |            | 19                                         | 59                                              | 140                                               | <0.025                    | <0.25                     | 10.86        | 101.6 | 11.25        | 0.06           | 0.91               |              | 6.98 | 5.78          | 0.19       |      | 1413.6                               | 12                        |                      |                    |
|                         | Mean       |            | 15                                         | 21                                              | 40                                                | <0.025                    | <0.25                     | 14.79        | 89.5  | 9.15         | 0.05           | 1.32               |              | 6.70 | 8.00          | 0.31       |      | 1651.0                               | 52                        |                      |                    |
|                         | StDev      |            | 3                                          | 16                                              | 43                                                | <0.025                    | <0.25                     | 3.72         | 12.0  | 1.75         | 0.01           | 0.36               |              | 0.41 | 2.64          | 0.11       |      | 298.6                                | 94                        |                      |                    |
| 2009                    | 4/13/2009  |            | 8                                          | 14                                              | 18                                                | <0.025                    | <0.25                     | 4.30         | 99.2  | 12.90        | 0.03           | 0.40               |              | 6.68 |               |            |      | 195.6                                | 0                         |                      |                    |
|                         | 5/11/2009  |            | 15                                         | 13                                              | 16                                                | <0.025                    | <0.25                     | 11.22        | 87.5  | 9.59         | 0.03           | 0.87               |              | 6.72 |               |            |      | >2419.2                              | 39                        |                      |                    |
|                         | 5/27/2009  |            | 18                                         | 13                                              | 17                                                | <0.025                    | <0.25                     | 14.71        | 69.4  | 7.04         | 0.05           | 1.96               |              | 6.45 |               |            |      | >2419                                | 1                         |                      |                    |
|                         | 6/8/2009   |            | 16                                         | 15                                              | 19                                                | <0.025                    | <0.25                     | 15.44        | 74.2  | 7.41         | 0.05           | 0.81               |              | 6.90 |               |            |      | >2419.2                              | 6                         |                      |                    |
|                         | 6/22/2009  |            | 16                                         | 3                                               | 18                                                | <0.025                    | <0.25                     | 16.91        | 79.5  | 7.69         | 0.04           | 0.98               |              | 6.78 |               |            |      | >2419.2                              | 17                        |                      |                    |
|                         | 7/6/2009   |            | 22                                         | 19                                              | 24                                                | <0.025                    | <0.25                     | 18.12        | 82.3  | 7.77         | 0.05           | 1.26               |              | 6.81 |               |            |      | 1986.3                               | 6                         |                      |                    |

| Date                    | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 7/20/2009               |           |            | 18                                         | 18                                              | 28                                                | <0.025                    | <0.25                     | 16.01        | 89.8  | 8.87         | 0.05           | 1.29               |              | 6.85 |               |            |      | 1413.0                               | 2                         |                      |                    |
| 8/4/2009                |           |            | 18                                         | 17                                              | 24                                                | <0.025                    | <0.25                     | 16.04        | 83.1  | 8.19         | 0.04           | 1.47               |              | 6.60 |               |            |      | >2419.2                              | 23                        |                      |                    |
| 8/18/2009               |           |            | 17                                         | 18                                              | 28                                                | <0.025                    | <0.25                     | 21.24        | 71.6  | 6.35         | 0.05           | 1.03               |              | 6.71 |               |            |      | 2419.2                               | 10                        |                      |                    |
| 8/31/2009               |           |            | 17                                         | 18                                              | 19                                                | <0.025                    | <0.25                     | 15.62        | 78.6  | 7.82         | 0.05           | 1.99               |              | 6.89 |               |            |      | >2419.2                              | 76                        |                      |                    |
| 9/14/2009               |           |            | 19                                         | 17                                              | 19                                                | <0.025                    | <0.25                     | 14.32        | 93.1  | 9.53         | 0.07           | 1.62               |              | 6.77 |               |            |      | >2419.2                              | 22                        |                      |                    |
| 9/28/2009               |           |            | 28                                         | 15                                              | 22                                                | <0.025                    | <0.25                     | 13.27        | 97.8  | 10.24        | 0.04           | 1.86               |              | 6.85 |               |            |      | >2419.2                              | 166                       |                      |                    |
| 10/14/2009              |           |            | 18                                         | 12                                              | 14                                                | <0.025                    | <0.25                     | 6.46         | 99.8  | 12.28        | 0.04           | 0.57               |              | 6.90 |               |            |      | >2419.2                              | 16                        |                      |                    |
| Mean                    |           |            | 18                                         | 15                                              | 20                                                | <0.025                    | <0.25                     | 14.13        | 85.1  | 8.90         | 0.05           | 1.24               |              | 6.76 |               |            |      | 1503.5                               | 30                        |                      |                    |
| StDev                   |           |            | 4                                          | 4                                               | 4                                                 | <0.025                    | <0.25                     | 4.57         | 10.4  | 1.97         | 0.01           | 0.52               |              | 0.13 |               |            |      | 964.4                                | 46                        |                      |                    |
| 2010                    | 5/3/2010  |            | 20                                         | 7                                               | 18                                                | <0.025                    | <0.25                     | 16.21        | 94.4  | 9.27         | 0.05           | 2.14               |              | 7.17 |               |            |      | >2419.2                              | 47                        |                      |                    |
|                         | 5/17/2010 |            | 14                                         | 16                                              | 17                                                | <0.025                    | <0.25                     | 12.48        | 98.7  | 10.52        | 0.05           | 0.93               |              | 6.23 |               |            |      | 1732.9                               | 16                        |                      |                    |
|                         | 6/1/2010  |            | 22                                         | 22                                              | 30                                                | <0.025                    | <0.25                     | 17.02        | 91.2  | 8.81         | 0.06           | 8.15               |              | 6.96 |               |            |      | >2419                                | 411                       |                      |                    |
|                         | 6/14/2010 |            | 11                                         | 15                                              | 27                                                | <0.025                    | <0.25                     | 15.94        | 94.6  | 9.35         | 0.04           | 1.31               |              | 6.96 |               |            |      | 2419.2                               | 26                        |                      |                    |
|                         | 6/29/2010 |            | 13                                         | 13                                              | 20                                                | <0.025                    | <0.25                     | 17.82        | 93.7  | 8.91         | 0.03           | 0.33               |              | 6.21 |               |            |      | >2419                                | >2419                     |                      |                    |
|                         | 7/12/2010 |            | 15                                         | 16                                              | 19                                                | <0.025                    | <0.25                     | 27.96        | 90.6  | 7.10         | 0.04           | 0.95               |              | 6.83 |               |            |      | >2419                                | 23                        |                      |                    |
|                         | 8/9/2010  |            | 15                                         | 16                                              | 23                                                | <0.025                    | <0.25                     | 24.43        | 94.8  | 7.92         | 0.04           | 1.32               |              | 7.07 |               |            |      | 1986.3                               | 3                         |                      |                    |
|                         | 8/23/2010 |            | 9                                          | 15                                              | 19                                                | <0.025                    | <0.25                     | 16.84        |       |              | 0.03           | 1.63               |              | 6.62 |               |            |      | >2419.2                              | 326                       |                      |                    |
|                         | 9/7/2010  |            | 20                                         | 21                                              | 25                                                | <0.025                    | <0.25                     | 16.88        | 78.3  | 7.59         | 0.05           | 1.15               |              | 6.66 |               |            |      | >2419                                | 2                         |                      |                    |
|                         | 9/20/2010 |            | 20                                         | 20                                              | 29                                                | <0.025                    | <0.25                     | 13.54        | 101.5 | 10.57        | 0.05           | 1.33               |              | 7.09 |               |            |      | >2419.2                              | 10                        |                      |                    |
|                         | Mean      |            | 16                                         | 16                                              | 23                                                | <0.025                    | <0.25                     | 17.91        | 93.1  | 8.89         | 0.04           | 1.92               |              | 6.78 |               |            |      | 2046.1                               | 96                        |                      |                    |
|                         | StDev     |            | 4                                          | 4                                               | 5                                                 | <0.025                    | <0.25                     | 4.74         | 6.5   | 1.21         | 0.01           | 2.24               |              | 0.34 |               |            |      | 347.0                                | 156                       |                      |                    |
| 2011                    | 5/9/2011  |            | 10                                         | 12                                              | 20                                                | <0.025                    | <0.025                    | 11.91        | 103.1 | 11.14        | 0.03           | 0.74               |              | 6.71 |               |            |      | 727.0                                | <1                        |                      |                    |
|                         | 5/23/2011 |            | 14                                         | 11                                              | 14                                                | <0.025                    | <0.025                    | 15.51        | 85.7  | 8.55         | 0.03           | 5.63               |              | 6.57 |               |            |      | 1986.0                               | 5                         |                      |                    |
|                         | 6/6/2011  |            | 17                                         | 9                                               | 12                                                | <0.025                    | <0.025                    | 18.30        | 79.1  | 7.44         | 0.04           | 1.13               |              | 7.05 |               |            |      | 866.0                                | 3                         |                      |                    |
|                         | 6/19/2011 |            | 17                                         | 16                                              | 19                                                | <0.025                    | <0.025                    | 23.05        | 79.5  | 6.81         | 0.05           | 1.50               |              | 7.01 |               |            |      | >2419                                | 1                         |                      |                    |



| Date                    | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 7/25/2011               |           |            | 20                                         | 18                                              | 22                                                | <0.025                    | <0.025                    | 17.28        | 103.1 | 9.91         | 0.05           | 2.21               |              | 6.90 |               |            |      | >2419                                | 112                       |                      |                    |
| 8/8/2011                |           |            | 14                                         | 19                                              | 23                                                | <0.025                    | <0.025                    | 20.45        | 116.0 | 10.45        | 0.05           | 0.65               |              | 8.37 |               |            |      | >2419                                | 84                        |                      |                    |
| 9/12/2011               |           |            | 10                                         | 9                                               | 17                                                |                           | <0.025                    | 18.68        | 92.0  | 8.59         | 0.03           | 1.48               |              | 6.86 |               |            |      | >2419.2                              | 96                        |                      |                    |
| 9/27/2011               |           |            | 15                                         | 17                                              | 22                                                | <0.025                    | <0.025                    | 19.73        | 90.6  | 8.28         | 0.04           | 1.33               |              | 6.92 |               |            |      | 816.0                                | 4                         |                      |                    |
| 10/11/2011              |           |            | 16                                         | 15                                              | 18                                                | <0.025                    | <0.025                    | 15.67        | 88.3  | 8.78         | 0.04           | 1.46               |              | 6.62 |               |            |      | 1986.2                               | 4                         |                      |                    |
| 10/24/2011              |           |            | 14                                         | 18                                              | 22                                                | <0.025                    | <0.025                    | 8.02         |       |              | 0.04           | 1.01               |              | 7.75 |               |            |      | 2419.1                               | 16                        |                      |                    |
| Mean                    |           |            | 15                                         | 14                                              | 19                                                | <0.025                    | <0.025                    | 16.86        | 93.0  | 8.88         | 0.04           | 1.71               |              | 7.08 |               |            |      | 1466.7                               | 36                        |                      |                    |
| StDev                   |           |            | 3                                          | 4                                               | 4                                                 | <0.025                    | <0.025                    | 4.36         | 12.2  | 1.39         | 0.01           | 1.45               |              | 0.56 |               |            |      | 745.4                                | 47                        |                      |                    |
| 2012                    | 4/23/2012 |            | 12                                         | 10                                              | 12                                                | <0.025                    | <0.05                     | 7.60         |       |              | 24.40          | 1.01               |              | 6.68 |               |            |      | 2419.0                               | 59                        |                      |                    |
|                         | 5/7/2012  |            | 14                                         | 12                                              | 12                                                | <0.025                    | 0.1                       | 18.10        |       |              |                | 2.31               |              | 7.00 |               |            |      | 2419.0                               | 7                         |                      |                    |
|                         | 7/10/2012 |            | 24                                         | 20                                              | 24                                                | <0.025                    | 0.3                       | 19.80        |       |              | 62.90          | 2.26               |              | 7.55 |               |            |      |                                      |                           |                      |                    |
|                         | 8/1/2012  |            | 18                                         | 18                                              | 22                                                | <0.025                    | <0.05                     | 19.90        |       |              | 51.90          | 1.73               |              | 7.22 |               |            |      |                                      |                           |                      |                    |
|                         | 8/13/2012 |            | 22                                         | 20                                              | 26                                                | <0.025                    | 0.1                       | 20.30        |       |              | 62.30          | 2.88               |              | 7.50 |               |            |      |                                      |                           |                      |                    |
|                         | 9/17/2012 |            | 26                                         | 24                                              | 26                                                | <0.025                    | 0.2                       | 14.10        |       |              | 73.70          | 1.45               |              | 7.16 |               |            |      |                                      |                           |                      |                    |
|                         | 10/1/2012 |            | 20                                         | 20                                              | 22                                                | <0.025                    | 0.1                       | 12.40        |       |              | 53.70          | 1.46               |              | 7.26 |               |            |      | >2419                                | 29                        |                      |                    |
|                         | Mean      |            | 19                                         | 18                                              | 21                                                | <0.025                    | 0.1                       | 16.03        |       |              | 54.82          | 1.87               |              | 7.20 |               |            |      | 2419.0                               | 32                        |                      |                    |
|                         | StDev     |            | 5                                          | 5                                               | 6                                                 | <0.025                    | 0.08                      | 4.82         |       |              | 16.81          | 0.64               |              | 0.30 |               |            |      | 0.0                                  | 26                        |                      |                    |
| 2013                    | 5/20/2013 |            | 18                                         | 20                                              | 22                                                |                           | 0.2                       | 15.40        |       | 9.90         | 51.40          | 1.20               |              | 7.17 |               |            |      | 1986.0                               | 13                        |                      |                    |
|                         | 6/3/2013  |            | 16                                         | 12                                              | 16                                                | <0.025                    | <0.05                     | 21.40        |       | 9.10         | 38.80          | 1.11               |              | 7.07 |               |            |      | 980.4                                | 4                         |                      |                    |
|                         | 6/25/2013 |            | 14                                         | 14                                              | 16                                                | <0.025                    | <0.05                     | 23.80        |       |              | 38.20          | 1.49               |              | 6.90 |               |            |      | >2419                                | 194                       |                      |                    |
|                         | 7/15/2013 |            | 14                                         | 12                                              | 16                                                | <0.025                    | 0.1                       | 28.60        |       | 6.90         | 31.20          | 1.11               |              | 6.76 |               |            |      | 2419.2                               | 16                        |                      |                    |
|                         | 7/29/2013 |            | 20                                         | 16                                              | le                                                | <0.025                    | 0.1                       | 19.20        |       | 8.60         | 45.40          | 1.78               |              | 7.28 |               |            |      | 2419.0                               | 29                        |                      |                    |
|                         | 8/12/2013 |            | 20                                         | 18                                              | 24                                                | <0.025                    | 0.1                       | 18.80        |       | 10.40        | 73.30          | 1.29               |              | 7.28 |               |            |      | >2419                                | 35                        |                      |                    |
|                         | 9/9/2013  |            | 24                                         | 22                                              | 26                                                | <0.025                    | 0.2                       | 12.30        |       | 7.40         | 53.50          | 2.03               |              | 7.46 |               |            |      | 1986.3                               | 144                       |                      |                    |
|                         | 9/24/2013 |            | 22                                         | 18                                              | 22                                                | <0.025                    | 0.1                       | 10.10        |       | 9.10         | 51.40          | 1.54               |              | 7.34 |               |            |      | 1553.1                               | 19                        |                      |                    |

| Date                    | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 2 – KRESKERN CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2014                    | Mean      |            | 19                                         | 17                                              | 20                                                | <0.025                    | 0.1                       | 18.70        |     | 8.77         | 47.90          | 1.44               |              | 7.16 |               |            |      | 1890.7                               | 57                        |                      |                    |
|                         | StDev     |            | 4                                          | 4                                               | 4                                                 | <0.025                    | 0.04                      | 6.06         |     | 1.26         | 12.89          | 0.33               |              | 0.24 |               |            |      | 551.2                                | 71                        |                      |                    |
|                         | 5/20/2014 |            | 10                                         | 10                                              | 14                                                | <0.025                    | <0.05                     | 15.70        |     |              | 25.70          | 1.09               |              | 6.70 |               |            |      | >2419                                | 109                       |                      |                    |
|                         | 6/17/2014 |            | 12                                         | 16                                              | 18                                                | <0.025                    | 0.1                       | 22.40        |     |              | 29.10          | 1.24               |              | 6.73 |               |            |      | 1732.0                               | 50                        |                      |                    |
|                         | 7/17/2014 |            | 18                                         | 16                                              | 20                                                | <0.025                    | <0.05                     | 23.30        |     |              | 39.50          | 1.17               |              | 7.12 |               |            |      | >2419                                | 6                         |                      |                    |
|                         | 8/19/2014 |            | 18                                         | 16                                              | 20                                                | <0.025                    | 0.1                       | 17.70        |     |              | 44.40          | 1.39               |              | 7.40 |               |            |      | 2419.1                               | 17                        |                      |                    |
|                         | 9/23/2014 |            | 18                                         | 20                                              | 20                                                | <0.025                    | 0.1                       | 10.70        |     |              | 44.70          | 1.68               |              | 7.26 |               |            |      | 1553.0                               | 12                        |                      |                    |
|                         | StDev     |            | 4                                          | 4                                               | 3                                                 | <0.025                    | 0.03                      | 5.15         |     |              | 8.80           | 0.23               |              | 0.31 |               |            |      | 457.2                                | 43                        |                      |                    |
| 2015                    | 4/26/2015 |            | 10                                         | 10                                              | 12                                                | <0.025                    | 0.1                       | 6.90         |     |              | 29.00          | 1.06               |              | 6.77 |               |            |      | 345.0                                | 1                         |                      |                    |
|                         | 5/21/2015 |            | 18                                         | 18                                              | 22                                                | <0.025                    | 0.1                       | 15.50        |     |              | 45.30          | 0.64               |              | 7.47 |               |            |      | 1413.6                               | 3                         |                      |                    |
|                         | 7/28/2015 |            | 20                                         | 20                                              | 24                                                | <0.025                    | 0.2                       | 22.50        |     |              | 56.60          | 1.80               |              | 7.89 |               |            |      | 2419.0                               | 25                        |                      |                    |
|                         | 8/31/2015 |            | 22                                         | 22                                              | 24                                                | <0.025                    | 0.2                       | 18.80        |     |              | 60.20          | 1.24               |              | 7.57 |               |            |      | 1986.0                               | 18                        |                      |                    |
|                         | 9/21/2015 |            | 20                                         | 20                                              | 26                                                | <0.025                    | <0.05                     | 12.40        |     |              | 99.40          | 9.42               |              | 7.52 |               |            |      | 1300.0                               | 38                        |                      |                    |
|                         | Mean      |            | 18                                         | 18                                              | 22                                                | <0.025                    | 0.1                       | 15.22        |     |              | 58.10          | 2.83               |              | 7.44 |               |            |      | 1492.7                               | 17                        |                      |                    |
|                         | StDev     |            | 5                                          | 5                                               | 6                                                 | <0.025                    | 0.03                      | 5.98         |     |              | 26.09          | 3.71               |              | 0.41 |               |            |      | 784.5                                | 15                        |                      |                    |
|                         |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2016                    | 5/10/2016 |            | 14                                         | 14                                              | 16                                                | <0.025                    | 0.1                       | 10.70        |     |              | 40.10          | 1.64               |              | 7.28 |               |            |      | 649.0                                | 26                        |                      |                    |
|                         | 6/13/2016 |            | 20                                         | 20                                              | 34                                                | <0.025                    | 0.1                       | 12.30        |     |              | 39.80          | 1.15               |              | 7.32 |               |            |      | 816.4                                | 32                        |                      |                    |
|                         | 7/6/2016  |            | 26                                         | 20                                              | 24                                                | <0.025                    | 0.2                       | 20.80        |     |              | 51.50          | 0.89               |              | 7.55 |               |            |      | 1732.0                               | 96                        |                      |                    |
|                         | 8/13/2016 |            | 20                                         | 20                                              | 24                                                | <0.025                    | 0.1                       |              |     |              | 43.10          | 1.36               |              | 6.73 |               |            |      | >2419                                | 84                        |                      |                    |
|                         | 9/13/2016 |            | 24                                         | 24                                              | 36                                                | <0.025                    | 0.2                       | 17.20        |     |              | 57.80          | 1.07               |              | 7.58 |               |            |      | 2419.0                               | 47                        |                      |                    |
|                         | Mean      |            | 21                                         | 20                                              | 27                                                | <0.025                    | 0.1                       | 15.25        |     |              | 46.46          | 1.22               |              | 7.29 |               |            |      | 1404.1                               | 57                        |                      |                    |
|                         | StDev     |            | 5                                          | 4                                               | 8                                                 | <0.025                    | 0.05                      | 4.62         |     |              | 7.91           | 0.29               |              | 0.34 |               |            |      | 827.3                                | 31                        |                      |                    |
|                         |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |

[EPA, 2001; MVWA, 2016](#)

Table C-6: Tributary Sampling Results – Thomas Pond Outlet, Site 3

| Date                        | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 4/28/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 30                                   | 0                         | 345                  |                    |
| 5/5/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 210                                  | 110                       | 450                  |                    |
| 5/13/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 30                                   | 10                        | 580                  |                    |
| 5/19/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 410                                  | 160                       | 1800                 |                    |
| 5/26/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 73                                   | 0                         | 115                  |                    |
| 6/1/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 60                                   | 60                        | 180                  |                    |
| 6/9/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 360                  |                    |
| 6/16/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90                                   | 20                        | 590                  |                    |
| 6/22/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 210                                  | 30                        | 605                  |                    |
| 6/29/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90                                   | 10                        | 98                   |                    |
| 7/7/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 30                                   | 0                         | 136                  |                    |
| 7/13/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 200                                  | 20                        | 115                  |                    |
| 7/28/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 110                                  | 10                        | 120                  |                    |
| 8/4/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 300                  |                    |
| 8/11/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 1010                                 | 210                       | 95                   |                    |
| 8/18/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 50                                   | 0                         | 690                  |                    |
| 8/25/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 360                                  | 190                       | 310                  |                    |
| 9/2/1998                    |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 116                  |                    |
| 9/22/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 170                                  | 30                        | 1026                 |                    |
| 9/29/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 1100                                 | 320                       | 340                  |                    |
| 10/6/1998                   |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 968                  |                    |
| 10/13/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 640                                  | 50                        | 1452                 |                    |
| 10/20/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90                                   | 0                         | 395                  |                    |
| 10/27/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90                                   | 30                        | 1331                 |                    |

| Date                        | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |  |
|-----------------------------|-----------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|--|
| SITE 3 – THOMAS POND OUTLET |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       |                                      |                           |                      |                    |  |
| 12/15/1998                  |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 0                                    | 0                         | 57                   |                    |  |
| Mean                        |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 203                                  | 50                        | 503                  |                    |  |
| StDev                       |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 298                                  | 83                        | 472                  |                    |  |
| 1999                        | 4/27/1999 | 2:15 PM    |                               |                                    |                                      |               |               | 5.78         | 101.3 | 12.28        | 38.7           | 0                  | 0.25         | 7.17 | 4.42          | 0.12       | 2.71  | 0                                    | 0                         | 296                  |                    |  |
|                             | 5/6/1999  | 2:03 PM    |                               |                                    |                                      |               |               | 17.11        | 106   | 9.9          | 51.6           | 24.2               | 0.42         | 7.06 | 4.5           | 0.152      | 3.38  | 30                                   | 0                         | 416                  |                    |  |
|                             | 5/11/1999 | 2:16 PM    |                               |                                    |                                      |               |               | 14.47        | 100.5 | 9.93         | 37.3           | 2.8                | 0.38         | 7.03 | 5.07          | 0.153      | 3.02  | 20                                   | 0                         | 210                  |                    |  |
|                             | 5/18/1999 | 2:14 PM    |                               |                                    |                                      |               |               | 19.32        | 102   | 9.54         | 48.3           | 0                  | 0.38         | 7.18 | 4.21          | 0.165      | 3.92  | 120                                  | 0                         | 415                  |                    |  |
|                             | 5/25/1999 | 2:08 PM    |                               |                                    |                                      |               |               | 17.83        | 92.6  | 8.93         | 109.9          | 11                 | 0.36         | 7.29 | 4.73          | 0.17       | 3.59  | 450                                  | 300                       | 345                  |                    |  |
|                             | 6/2/1999  | 2:10 PM    |                               |                                    |                                      |               |               | 22.87        | 107.3 | 9.36         | 46.9           | 2.5                | 0.42         | 7.22 | 4.72          | 0.158      | 3.35  | 280                                  | 0                         | 2950                 |                    |  |
|                             | 6/8/1999  | 2:03 PM    |                               |                                    |                                      |               |               | 21.95        | 92.2  | 8.19         | 59.3           | 0                  | 0.32         | 7.28 | 4.31          | 0.148      | 3.43  | 100                                  | 0                         | 2700                 |                    |  |
|                             | 6/15/1999 | 2:07 PM    |                               |                                    |                                      |               |               | 22.15        | 92.9  | 8.22         | 83.6           | 0                  | 0.43         | 7.45 | 4.05          | 0.134      | 3.31  | 20                                   | 10                        | 760                  |                    |  |
|                             | 6/21/1999 | 2:20 PM    | 0.08                          |                                    |                                      |               |               | 23.75        | 101.3 | 8.7          | 72.5           | 12.6               | 0.44         | 7.6  | 4.01          | 0.111      | 2.77  | 630                                  | 40                        | 1270                 |                    |  |
|                             | 6/29/1999 | 2:00 PM    | 0.08                          | 12                                 | 18                                   |               |               | 24.5         | 102.3 | 8.65         | 103.4          | 18                 | 0.32         | 7.73 | 4.19          | 0.122      | 2.91  | 450                                  | 3                         | 228                  |                    |  |
|                             | 7/13/1999 | 1:50 PM    |                               | 13                                 | 11                                   | 20            | 0.059         | 0.3          | 26.06 | 99.4         | 8.17           | 71.2               | 6.7          | 0.45 | 7.7           | 4.85       | 0.251 | 5.18                                 | 290                       | 70                   | 416                |  |
|                             | 7/20/1999 | 2:15 PM    |                               | 16                                 | 16                                   | 20            | 0.015         | 0.1          | 25.74 | 99.8         | 8.25           | 71.3               | 13.5         | 0.4  | 7.79          | 4.81       | 0.097 | 2.02                                 | 60                        | 20                   | 116                |  |
|                             | 7/27/1999 | 2:15 PM    |                               | 20                                 | 22                                   | 28            | 0.56          | 0.2          | 26.95 | 93.8         | 7.59           | 62.4               | 15.2         | 0.36 | 7.78          | 4.92       | 0.144 | 2.93                                 | 20                        | 10                   | 288                |  |
|                             | 8/3/1999  | 1:52 PM    |                               | 15                                 | 15                                   | 25            | 0.87          | 0.2          | 23.91 | 107.6        | 9.19           | 287.1              | 0            | 0.35 | 8.41          | 4.26       | 0.137 | 3.22                                 | 50                        | 30                   | 1128               |  |
|                             | 8/17/1999 | 2:10 PM    | 0.05                          | 32                                 | 18                                   | 38            | 0.65          | 0.1          | 25.21 | 119.6        | 9.97           | 394                | 0            | 0    | 9.3           | 4.13       | 0.128 | 3.1                                  | 20                        | 20                   | 1370               |  |
|                             | 8/24/1999 | 1:57 PM    |                               | 22                                 | 23                                   | 24            | 2.91          |              | 25.81 | 99.3         | 8.2            | 195.3              | 33.7         | 0.41 | 9.08          | 4.38       | 0.126 | 2.88                                 | 40                        | 20                   | 1350               |  |
|                             | 8/31/1999 | 1:53 PM    |                               | 72                                 | 58                                   | 70            | 1.07          |              | 23.62 | 111.2        | 9.56           | 291.3              | 0            | 0.12 | 9.12          | 4.04       | 0.116 | 2.87                                 | 20                        | 10                   | 869                |  |
|                             | 9/8/1999  | 1:59 PM    |                               | 40                                 | 78                                   | 122           | 0.37          | 0.1          |       |              |                |                    |              |      | 3.88          | 0.113      | 2.91  | 630                                  | 210                       | 576                  |                    |  |
|                             | 9/15/1999 |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       |                                      |                           |                      |                    |  |
|                             | 9/21/1999 | 2:21 PM    |                               | 34                                 | 73                                   | 96            | 0.86          | 0.2          | 12.12 | 80.4         | 8.76           | 188.4              | 0            | 0    | 7.96          | 9.29       | 0.265 | 2.85                                 | 530                       | 80                   | 576                |  |
| 9/28/1999                   | 1:53 PM   | 0.21       | 68                            | 90                                 | 152                                  | 0.58          | 0             | 15.47        | 80.3  | 8.13         | 268.7          | 0                  | 0            | 8.39 | 5.47          | 0.173      | 3.16  | 160                                  | 20                        | 2000                 |                    |  |
| 10/5/1999                   | 2:03 PM   | 0.48       | 38                            | 64                                 | 68                                   | 0.81          | 0.2           | 9.61         | 76    | 8.77         | 166.7          | 0                  | 0            | 7.53 | 9.06          | 0.291      | 3.21  | 550                                  | 90                        | 640                  |                    |  |

| Date                        | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |     |
|-----------------------------|-----------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|-----|
| SITE 3 – THOMAS POND OUTLET |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       |                                      |                           |                      |                    |     |
| 10/19/1999                  | 1:54 PM   | 0.3        | 58                            | 74                                 | 82                                   | 1.45          | 0.2           | 7.55         | 68.8  | 8.36         | 209            | 0                  | 0            | 7.68 | 6.55          | 0.194      | 2.96  | 90                                   | 10                        | 639                  |                    |     |
| 10/26/1999                  | 2:09 PM   | 0.38       | 49                            | 69                                 | 74                                   | 0.65          | 0.1           | 7.49         | 64.5  | 7.84         | 194.1          | 0                  | 0            | 7.58 | 6.63          | 0.197      | 2.97  | 190                                  | 100                       | 737                  |                    |     |
| Mean                        |           | 0.23       | 35                            | 45                                 | 63                                   | 0.83          | 0.2           | 19.06        | 95.4  | 8.93         | 138.7          | 6.4                | 0.26         | 7.79 | 5.06          | 0.159      | 3.16  | 207                                  | 45                        | 882                  |                    |     |
| StDev                       |           | 0.17       | 20.37                         | 29.37                              | 42.39                                | 0.73          | 0.08          | 6.86         | 13.79 | 1.02         | 101.66         | 9.52               | 0.18         | 0.67 | 1.48          | 0.05       | 0.57  | 220.38                               | 74.07                     | 767.05               |                    |     |
| 2000                        | 1/4/2000  | 2:18 PM    | 0.78                          | 24                                 | 28                                   | 32            | 2.05          | 0.5          | 0.16  | 59.2         | 8.75           | 75.1               | 25           | 0.08 | 7.57          | 9.8        | 0.314 | 3.2                                  | 0                         | 0                    | 296                |     |
|                             | 3/21/2000 | 2:06 PM    | 0.27                          | 41                                 | 42                                   | 50            | 1.41          | 0.5          | 2.19  | 17.9         | 2.5            | 125.7              | 0            | 0.04 | 6.69          | 4.82       |       |                                      | 921                       | 14                   |                    |     |
|                             | 4/5/2000  | 2:04 PM    | 0                             | 16                                 | 14                                   | 16            | 0.63          | 0.4          | 2.09  | 84.5         | 11.57          | 83.9               | 2.1          | 2.07 | 6.39          | 5.24       | 0.18  | 3.44                                 | 411                       | 16                   | 2000               |     |
|                             | 4/13/2000 | 11:21 AM   | 0                             | 25                                 | 32                                   | 34            | 0.6           | 0.1          | 0.9   | 88.2         | 12.47          | 124.8              | 0            | 1.16 | 6.6           | 5.42       | 0.193 | 3.56                                 | 66                        | 4                    | 2000               |     |
|                             | 4/18/2000 | 2:00 PM    |                               | 6                                  | 8                                    | 12            | 0.94          | 0.3          | 5.95  | 88.5         | 10.93          | 36.6               | 2.7          | 0.43 | 6.26          | 4.53       | 0.164 | 3.62                                 | 33                        | 0                    |                    |     |
|                             | 4/25/2000 | 1:56 PM    |                               | 8                                  | 11                                   | 15            | 0.94          | 0.2          | 7.85  | 84.5         | 9.93           | 34.8               | 2.6          | 0.59 | 6.23          | 4.81       | 0.172 | 3.58                                 | 91                        | 0                    | 368                |     |
|                             | 5/4/2000  | 12:55 PM   |                               | 11                                 | 15                                   | 18            | 1.05          | 0.2          | 12.15 | 90.1         | 9.6            | 28.1               | 2.7          | 0.6  | 5.92          | 4.4        | 0.16  | 3.64                                 | 160                       | 0                    | 396                |     |
|                             | 5/9/2000  | 2:14 PM    |                               | 98                                 | 12                                   | 14            | 1.11          | 0.2          | 17.93 | 86.1         | 8.1            | 68.5               | 2.1          | 0.38 | 6.85          | 4.75       | 0.171 | 3.6                                  | 354                       | 3                    | 806                |     |
|                             | 5/16/2000 | 2:16 PM    |                               | 5                                  | 8                                    | 11            | 1.13          | 0.2          | 14.7  | 84.5         | 8.51           | 25.6               | 3.2          | 0.72 | 6.18          | 6.19       | 0.24  | 3.88                                 | 2419                      | 41                   | 4140               | 0/0 |
|                             | 5/30/2000 | 1:56 PM    |                               | 10                                 | 11                                   | 16            | 1.64          | 0.3          | 17.51 | 88.8         | 8.4            | 38.3               | 9.9          | 0.89 | 6.36          | 5.91       | 0.226 | 3.82                                 | 1414                      | 3                    | 3020               |     |
|                             | 6/6/2000  | 2:04 PM    |                               | 7                                  | 8                                    | 12            | 0.89          | 0.2          | 16.73 | 81.1         | 7.82           | 41.8               | 2.4          | 0.64 | 6.77          | 5.45       | 0.214 | 3.93                                 | 2419                      | 2                    | 2090               |     |
|                             | 6/13/2000 | 2:12 PM    |                               | 10                                 | 12                                   | 15            | 0.89          | 0.2          | 17.61 | 81           | 7.67           | 45.1               | 2.3          | 1.1  | 6.91          | 5.53       | 0.196 | 3.54                                 | 345                       | 0                    | 7100               |     |
|                             | 6/20/2000 | 1:56 PM    |                               | 9                                  | 10                                   | 13            | 0.65          | 0.1          | 18.8  | 78           | 7.2            | 38.9               | 1.3          | 1.58 | 6.74          | 5.22       | 0.189 | 3.62                                 | 435                       | 1                    | 1910               | 0/0 |
|                             | 6/27/2000 | 11:41 AM   |                               | 12                                 | 10                                   | 13            | 0.96          | 0.2          | 21.33 | 82.1         | 7.21           | 63.5               | 1.3          | 1.42 | 7.16          | 4.74       | 0.17  | 3.59                                 | 1300                      | 2                    | 1220               |     |
|                             | 7/11/2000 | 12:35 PM   |                               | 14                                 | 12                                   | 16            | 1.35          | 0.2          | 19.92 | 76.2         | 6.89           | 57.6               | 3.2          | 1.25 | 7.17          | 4.82       | 0.171 | 3.55                                 | 388                       | 0                    | 1940               |     |
|                             | 7/18/2000 | 2:02 PM    |                               | 14                                 | 14                                   | 17            | 0.78          | 0.4          | 21.46 | 81.7         | 7.16           | 41                 | 1.8          | 1.56 | 7.78          | 5.06       | 0.169 | 3.34                                 | 1986                      | 10                   | 2160               |     |
|                             | 7/25/2000 | 12:35 PM   |                               | 13                                 | 13                                   | 16            | 0.47          | 0.1          | 22.24 | 80.8         | 6.97           | 37.4               | 1.1          | 0.89 | 7.77          | 5.32       | 0.166 | 3.12                                 | 488                       | 1                    | 2970               | 0/0 |
|                             | 8/1/2000  | 12:45 PM   |                               | 16                                 | 16                                   | 17            | 1.04          | 0.2          |       |              |                | 45.2               | 3.4          | 7.98 | 5.26          | 0.184      | 3.5   | 1553                                 | 15                        | 1950                 |                    |     |
|                             | 8/8/2000  | 1:10 PM    |                               | 12                                 | 13                                   | 16            | 0.86          | 0.2          | 21.49 | 69.1         | 6.1            | 11.7               | 1.8          | 0.79 | 7.8           | 3.58       | 0.192 | 5.36                                 | 649                       | 3                    | 1230               |     |
|                             | 8/22/2000 | 11:49 AM   |                               | 11                                 | 14                                   | 18            | 1.03          | 0.3          | 20.61 | 66.9         | 6.01           | 13.8               | 1.2          | 0.54 | 7.02          | 5.83       | 0.215 | 3.69                                 | 1300                      | 0                    | 2850               |     |
|                             | 8/29/2000 | 1:57 PM    |                               | 10                                 | 14                                   | 18            | 1.02          | 0.2          | 23.26 | 99.8         | 8.52           | 49.4               | 1.8          | 1.18 | 8.08          | 5.88       | 0.211 | 3.59                                 | 1414                      | 0                    | 0/0                |     |



| Date                        | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 9/19/2000                   | 10:27 AM   |            | 16                                         | 17                                              | 20                                                | 0                         | 0.2                       | 13.63        | 110.3 | 11.46        | 207.5          | 2.4                | 0.48         | 7.58 | 5.59          | 0.217      | 3.88 | 866                                  | 2                         | 1570                 |                    |
| 10/24/2000                  | 11:14 AM   |            | 68                                         | 64                                              | 76                                                | 0.05                      | 0.2                       | 6.67         |       |              | 181.1          | 0.8                | 0.03         | 7.58 | 7.3           | 0.234      | 3.21 | 2419                                 | 3                         | 710                  |                    |
| Mean                        |            | 0.26       | 20                                         | 17                                              | 21                                                | 0.93                      | 0.2                       | 13.87        | 80    | 8.27         | 64.1           | 3.3                | 0.84         | 7.02 | 5.45          | 0.198      | 3.65 | 932                                  | 5                         | 2036                 |                    |
| StDev                       |            | 0.37       | 21.83                                      | 13.04                                           | 14.85                                             | 0.45                      | 0.11                      | 7.79         | 17.8  | 2.25         | 50.43          | 5.11               | 0.54         | 0.65 | 1.19          | 0.04       | 0.44 | 808.21                               | 9                         | 1554.8               |                    |
| 2001                        | 4/26/2001  |            | 2                                          | 7                                               | 10                                                | 0.150                     | 0.80                      |              |       |              |                | 1.92               |              |      | 4.62          | 0.17       | 3.59 |                                      |                           |                      |                    |
|                             | 5/31/2001  |            | 6                                          | 18                                              | 28                                                | 0.190                     | 0.40                      | 14.29        | 67.7  | 7.22         | 31.50          | 1.53               |              | 7.15 | 5.62          | 0.19       | 3.29 | 2419.0                               | 5                         |                      |                    |
|                             | 6/1/2001   | 12:01 PM   | 8                                          | 12                                              | 16                                                | 0.260                     | 0.30                      | 22.94        | 83.1  | 7.24         | 35.80          | 0.93               | 0.16         | 7.12 | 5.11          | 0.18       | 3.60 | 579.0                                | 10                        |                      |                    |
|                             | 7/31/2001  | 11:00 AM   | 14                                         | 16                                              | 18                                                | 0.770                     | 0.30                      | 24.27        | 35.3  | 2.96         | 40.70          |                    | 0.24         | 7.54 | 5.31          | 0.19       | 3.52 | 866.4                                | 4                         |                      |                    |
|                             | 8/22/2001  | 11:40 AM   | 20                                         | 18                                              | 26                                                | 1.130                     | 0.20                      | 24.15        | 12.8  | 1.08         | 47.60          | 2.07               |              | 7.56 | 4.87          | 0.17       | 3.39 | 980.4                                | 5                         |                      |                    |
|                             | 9/20/2001  |            | 42                                         | 56                                              | 62                                                | 0.130                     | 0.30                      | 11.84        | 118.4 | 12.64        | 138.60         |                    |              | 7.76 | 12.80         | 0.42       | 3.27 | 2419.0                               | 387                       |                      |                    |
|                             | 10/29/2001 | 1:26 PM    | 56                                         | 62                                              | 70                                                | 0.680                     | 0.20                      | 5.18         | 114.4 | 14.79        | 177.60         | 1.50               | 0.00         | 7.64 | 8.50          | 0.25       | 2.93 | 579.0                                | 4                         |                      |                    |
|                             | Mean       |            | 21                                         | 27                                              | 33                                                | 0.473                     | 0.36                      | 17.11        | 72.0  | 7.66         | 78.63          | 1.59               | 0.13         | 7.46 | 6.69          | 0.22       | 3.37 | 1307.1                               | 69                        |                      |                    |
|                             | StDev      |            | 20                                         | 22                                              | 24                                                | 0.389                     | 0.21                      | 7.91         | 42.3  | 5.32         | 63.01          | 0.44               | 0.12         | 0.26 | 2.99          | 0.09       | 0.24 | 875.7                                | 155                       |                      |                    |
| 2002                        | 4/30/2002  | 12:20 PM   | 5                                          | 9                                               | 11                                                | 0.420                     | 0.40                      | 7.70         | 102.8 | 12.40        | 26.90          | 2.20               | 0.19         | 6.21 | 4.94          | 0.18       | 3.60 | 116.0                                | 0                         |                      |                    |
|                             | 5/29/2002  | 13:43 PM   | 9                                          | 10                                              | 10                                                | 0.230                     | 0.30                      | 17.90        | 107.8 | 10.30        | 43.90          | 4.08               | 0.34         | 6.94 | 4.47          | 0.16       | 3.51 | 2419.0                               | 2                         |                      |                    |
|                             | 7/2/2002   | 10:49 AM   | 10                                         | 11                                              | 14                                                | 0.030                     | 0.30                      | 25.12        | 90.6  | 7.57         | 40.70          | 0.84               | 0.96         | 7.27 | 5.02          | 0.18       | 3.51 | 1553.0                               | 3                         |                      |                    |
|                             | 8/1/2002   |            | 18                                         | 18                                              | 22                                                | 0.660                     | 0.20                      | 25.87        | 105.0 | 8.60         | 48.00          | 1.15               | 0.11         | 7.51 | 4.59          | 0.15       | 3.29 | 1986.0                               | 1                         |                      |                    |
|                             | 8/29/2002  |            | 92                                         | 108                                             | 118                                               | 0.320                     | 0.20                      | 14.20        |       | 8.40         | 40.00          | 2.85               |              | 7.91 | 4.43          | 0.11       | 2.53 | 2419.0                               | 36                        |                      |                    |
|                             | 9/25/2002  | 12:00 PM   | 58                                         | 88                                              | 100                                               | 0.310                     | 0.10                      | 13.96        | 101.5 | 10.47        | 115.00         | 1.90               | 0.00         | 7.64 | 6.42          | 0.19       | 2.90 | 2419.0                               | 27                        |                      |                    |
|                             | 10/24/2002 | 12:01 PM   | 44                                         | 60                                              | 64                                                | 1.060                     | 0.30                      | 4.32         | 103.7 | 13.48        | 134.00         | 0.95               | 0.97         | 7.07 | 8.75          | 0.29       | 3.27 | 1553.0                               | 32                        |                      |                    |
|                             | Mean       |            | 34                                         | 43                                              | 48                                                | 0.433                     | 0.26                      | 15.58        | 101.9 | 10.17        | 64.07          | 2.00               | 0.43         | 7.22 | 5.52          | 0.18       | 3.23 | 1780.7                               | 14                        |                      |                    |
|                             | StDev      |            | 32                                         | 42                                              | 46                                                | 0.336                     | 0.10                      | 8.12         | 5.9   | 2.18         | 42.14          | 1.17               | 0.43         | 0.56 | 1.58          | 0.05       | 0.39 | 830.6                                | 16                        |                      |                    |
|                             | 4/28/2003  | 1:31 PM    | 11                                         | 14                                              | 16                                                | 0.050                     | 0.60                      | 8.55         | 117.3 | 13.70        | 38.00          | 1.25               | 0.90         | 6.92 | 4.73          | 0.17       | 3.66 | 56.3                                 | 0                         |                      |                    |
|                             | 5/27/2003  | 1:05 PM    | 8                                          | 9                                               | 14                                                | 0.053                     | 0.30                      | 16.75        | 94.0  | 9.62         | 36.00          | 1.20               | 0.82         | 8.05 | 4.79          | 0.16       | 3.42 | >2419.2                              | 0                         |                      |                    |
|                             | 6/23/2003  | 1:14 PM    | 14                                         | 14                                              | 14                                                | 0.033                     | 0.30                      | 21.10        | 91.8  | 8.17         | 30.00          | 0.76               | 1.74         | 7.19 | 4.53          | 0.16       | 3.53 | 727.0                                | 11                        |                      |                    |

| Date                        | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2003                        | 7/17/2003  | 12:02 PM   | 16                                         | 14                                              | 22                                                | 0.042                     | 0.20                      | 23.05        | 98.8  | 8.46         | 53.00          | 0.81               | 1.84         | 7.40 | 3.98          | 0.13       | 3.37 | 547.5                                | 1                         |                      |                    |
|                             | 8/18/2003  | 12:58 PM   | 16                                         | 16                                              | 19                                                | 0.033                     | 0.20                      | 25.15        | 109.2 | 9.00         | 38.00          | 1.28               | 1.88         | 7.31 | 5.62          | 0.19       | 3.29 | 2419.2                               | 12                        |                      |                    |
|                             | 9/24/2003  | 12:32 PM   | 60                                         | 60                                              | 66                                                | 0.003                     | 0.50                      | 14.14        | 97.9  | 10.05        | 125.00         | 2.38               | 0.65         | 7.57 | 13.10         | 0.49       | 3.74 | >2419                                | 70                        |                      |                    |
|                             | 10/15/2003 | 12:06 PM   | 14                                         | 14                                              | 16                                                |                           |                           | 14.02        | 97.4  | 10.03        | 47.00          | 1.18               | 0.71         | 7.02 | 6.24          | 0.24       | 3.88 | 1300.0                               | 980                       |                      |                    |
|                             | Mean       |            | 20                                         | 20                                              | 24                                                | 0.036                     | 0.35                      | 17.54        | 100.9 | 9.86         | 52.43          | 1.27               | 1.22         | 7.35 | 6.14          | 0.22       | 3.56 | 1010.0                               | 153                       |                      |                    |
|                             | StDev      |            | 18                                         | 18                                              | 19                                                | 0.018                     | 0.16                      | 5.86         | 9.1   | 1.84         | 32.88          | 0.53               | 0.57         | 0.38 | 3.16          | 0.12       | 0.21 | 904.6                                | 365                       |                      |                    |
| 2004                        | 4/19/2004  | 11:31 AM   | 12                                         | 13                                              | 16                                                |                           |                           | 7.95         | 100.9 | 11.97        | 41.00          | 2.16               | 0.85         | 6.67 | 4.71          | 0.18       | 3.74 | 146.0                                | 2                         |                      |                    |
|                             | 5/25/2004  | 1:57 PM    | 11                                         | 10                                              | 15                                                | 0.033                     | 0.27                      | 20.56        | 87.8  | 7.90         | 29.00          | 2.04               | 0.67         | 6.86 | 4.29          | 0.16       | 3.61 | 1299.7                               | 5                         |                      |                    |
|                             | 6/14/2004  | 11:18 AM   | 52                                         | 10                                              | 18                                                | 0.007                     | 0.15                      | 20.21        | 92.4  | 8.37         | 37.00          | 2.15               | 0.27         | 6.89 | 6.16          | 0.21       | 3.47 | 142.1                                | <1                        |                      |                    |
|                             | 7/19/2004  | 10:02 AM   | 14                                         | 19                                              | 20                                                | 0.006                     | 0.12                      | 22.63        | 119.0 | 10.28        | 52.00          | 3.27               | 0.15         | 7.68 | 4.71          | 0.17       | 3.61 | 365.4                                | 1                         |                      |                    |
|                             | 8/30/2004  | 11:57 AM   | 16                                         | 16                                              | 22                                                | 0.035                     | 0.10                      | 21.10        | 99.3  | 8.84         | 42.00          | 1.46               | 3.26         | 7.39 | 5.39          | 0.19       | 3.54 | 1119.9                               | 4                         |                      |                    |
|                             | 9/14/2004  | 12:53 PM   | 18                                         | 18                                              | 22                                                | 0.008                     | 0.10                      | 20.41        | 94.7  | 8.57         | 48.00          | 1.23               | 3.25         | 7.06 | 5.56          | 0.20       | 3.67 | 579.0                                | 6                         |                      |                    |
|                             | 10/4/2004  | 2:43 PM    | 78                                         | 80                                              | 84                                                | 0.002                     | 0.06                      | 11.43        | 97.6  | 10.66        | 185.00         | 2.94               | 0.14         | 7.89 | 9.63          | 0.32       | 3.28 | >2419.2                              | 75                        |                      |                    |
|                             | Mean       |            | 29                                         | 24                                              | 28                                                | 0.015                     | 0.13                      | 17.76        | 98.8  | 9.51         | 62.00          | 2.18               | 1.23         | 7.21 | 5.78          | 0.20       | 3.56 | 608.7                                | 15                        |                      |                    |
|                             | StDev      |            | 26                                         | 25                                              | 25                                                | 0.015                     | 0.07                      | 5.66         | 9.9   | 1.48         | 54.74          | 0.73               | 1.41         | 0.46 | 1.81          | 0.05       | 0.15 | 496.1                                | 29                        |                      |                    |
| 2006                        | 4/24/2006  |            | 14                                         | 16                                              | 16                                                | <0.025                    | 0.30                      | 8.41         | 98.3  | 11.53        | 48.00          | 3.30               |              | 6.52 | 3.66          | 0.17       | 4.54 | 920.8                                | 9                         |                      |                    |
|                             | 5/15/2006  |            | 10                                         | 20                                              | 24                                                | <0.025                    | <0.25                     | 15.46        | 94.9  | 9.29         | 51.00          | 12.30              |              | 7.92 | 3.81          | 0.17       | 4.33 | 2419.2                               | 3                         |                      |                    |
|                             | 6/8/2006   |            | 16                                         | 16                                              | 16                                                | <0.025                    | <0.25                     | 19.79        | 90.3  | 8.25         | 54.00          | 1.71               |              | 7.07 |               |            |      | 1203.3                               | 12                        |                      |                    |
|                             | 7/17/2006  |            | 10                                         | 14                                              | 16                                                | 0.030                     | <0.25                     | 25.14        | 95.7  | 7.89         | 33.00          | 1.50               |              | 7.11 |               |            |      | >2419.2                              | 10                        |                      |                    |
|                             | 8/14/2006  |            | 12                                         | 14                                              | 16                                                | <0.025                    | <0.25                     | 22.83        | 85.8  | 7.38         | 41.00          | 2.72               |              | 7.04 |               |            |      | 613.0                                | 1                         |                      |                    |
|                             | 9/5/2006   |            | 86                                         | 86                                              | 86                                                | <0.025                    | <0.25                     | 15.31        | 101.7 | 10.19        | 190.00         | 2.48               |              | 7.47 |               |            |      | >2419.2                              | 85                        |                      |                    |
|                             | 10/16/2006 |            | 73                                         | 80                                              | 88                                                | <0.025                    | <0.25                     | 7.49         | 97.9  | 11.74        | 176.00         | 0.92               |              | 7.17 |               |            |      | 770.0                                | 1                         |                      |                    |
|                             | Mean       |            | 32                                         | 35                                              | 37                                                |                           |                           | 16.35        | 94.9  | 9.47         | 84.71          | 3.56               |              | 7.19 | 3.74          | 0.17       | 4.43 | 1185.3                               | 17                        |                      |                    |
|                             | StDev      |            | 33                                         | 33                                              | 34                                                |                           |                           | 6.76         | 5.3   | 1.75         | 67.62          | 3.94               |              | 0.43 | 0.11          | 0.00       | 0.14 | 723.3                                | 30                        |                      |                    |
|                             | 4/23/2007  |            | 8                                          | 14                                              | 16                                                | <0.025                    | 0.43                      | 5.80         | 104.8 | 13.11        | 51.00          | 2.27               |              | 6.46 | 3.52          | 0.13       |      | 93.2                                 | 2                         |                      |                    |

| Date                        | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2007                        | 5/4/2007   |            | 2                                          | 8                                               | 12                                                | <0.025                    | 0.34                      | 15.21        | 107.3 | 10.77        | 27.00          | 1.37               |              | 6.65 | 5.13          | 0.15       |      | 260.0                                | 7                         |                      |                    |
|                             | 6/5/2007   |            | 4                                          | 14                                              | 18                                                | <0.025                    | <0.25                     | 22.47        | 104.2 | 9.03         | 46.00          | 3.14               |              | 6.97 | 3.78          | 0.13       |      | 816.4                                | 7                         |                      |                    |
|                             | 7/2/2007   |            | 28                                         | 32                                              | 34                                                | <0.025                    | <0.25                     | 21.53        | 111.7 | 9.85         | 47.00          | 1.58               |              | 7.31 | 3.83          | 0.12       |      | 770.0                                | 1                         |                      |                    |
|                             | 8/20/2007  |            | 39                                         | 136                                             | 140                                               | <0.025                    | <0.25                     |              | 106.3 | 10.92        | 0.44           | 0.74               |              | 7.38 | 7.18          | 0.16       |      | >2419.2                              | 38                        |                      |                    |
|                             | 9/17/2007  |            | 12                                         | 40                                              | 80                                                | <0.025                    | <0.25                     | 11.87        | 106.0 | 11.45        | 0.17           | 1.22               |              | 7.61 | 8.85          | 0.28       |      | 1732.0                               | 54                        |                      |                    |
|                             | 10/9/2007  |            | 49                                         | 43                                              | 60                                                | <0.025                    | <0.25                     | 15.34        | 112.9 | 11.29        | 0.22           | 0.91               |              | 7.87 | 8.15          | 0.22       |      | >2419.2                              | 6                         |                      |                    |
|                             | Mean       |            | 20                                         | 41                                              | 51                                                |                           |                           | 15.37        | 107.6 | 10.92        | 24.55          | 1.60               |              | 7.18 | 5.78          | 0.17       |      | 734.3                                | 17                        |                      |                    |
|                             | StDev      |            | 19                                         | 44                                              | 46                                                |                           |                           | 6.20         | 3.4   | 1.29         | 23.94          | 0.84               |              | 0.51 | 2.25          | 0.06       |      | 640.2                                | 21                        |                      |                    |
| 2008                        | 4/21/2008  |            | 11                                         | 13                                              | 14                                                | <0.025                    | <0.25                     | 11.81        | 91.2  | 9.88         | 0.04           | 0.94               |              | 6.42 | 5.54          | 0.17       |      | 816.4                                | 0                         |                      |                    |
|                             | 5/19/2008  |            | 11                                         | 12                                              | 14                                                | <0.025                    | <0.25                     | 13.57        | 92.3  | 9.60         | 0.04           | 0.88               |              | 6.95 | 4.55          | 0.15       |      | 235.9                                | 4                         |                      |                    |
|                             | 6/16/2008  |            | 13                                         | 13                                              | 16                                                | <0.025                    | <0.25                     | 24.02        | 94.0  | 7.91         | 0.04           | 1.41               |              | 7.14 | 5.02          | 0.16       |      | 686.7                                | 1                         |                      |                    |
|                             | 7/14/2008  |            | 16                                         | 9                                               | 11                                                | <0.025                    | <0.25                     | 22.88        | 98.6  | 8.48         | 0.05           | 1.17               |              | 7.20 | 5.35          | 0.16       |      | 2419.7                               | 49                        |                      |                    |
|                             | 8/4/2008   |            | 17                                         | 15                                              | 19                                                | <0.025                    | <0.25                     | 22.60        | 110.8 | 9.58         | 0.05           | 0.96               |              | 7.18 | 5.52          | 0.18       |      | 2419.2                               | 13                        |                      |                    |
|                             | 8/26/2008  |            | 25                                         | 21                                              | 22                                                | <0.025                    | <0.25                     | 22.37        | 81.8  | 7.10         | 0.07           | 0.98               |              | 7.14 | 6.45          | 0.20       |      | >2419.2                              | 5                         |                      |                    |
|                             | 9/23/2008  |            | 16                                         | 17                                              | 21                                                | <0.025                    | <0.25                     | 13.90        | 101.8 | 10.51        | 0.20           | 1.54               |              | 7.65 | 5.45          | 0.20       |      | 461.0                                | 3                         |                      |                    |
|                             | 10/14/2008 |            | 74                                         | 122                                             | 128                                               | <0.025                    | <0.25                     | 11.97        | 103.0 | 11.10        | 0.19           | 0.76               |              | 7.86 | 10.00         | 0.24       |      | 770.1                                | 3                         |                      |                    |
|                             | Mean       |            | 23                                         | 28                                              | 31                                                |                           |                           | 17.89        | 96.7  | 9.27         | 0.09           | 1.08               |              | 7.19 | 5.99          | 0.18       |      | 1115.6                               | 10                        |                      |                    |
|                             | StDev      |            | 21                                         | 38                                              | 40                                                |                           |                           | 5.49         | 8.8   | 1.34         | 0.07           | 0.27               |              | 0.43 | 1.71          | 0.03       |      | 912.4                                | 16                        |                      |                    |
| 2009                        | 4/13/2009  |            | 11                                         | 18                                              | 19                                                | <0.025                    | <0.25                     | 4.81         | 106.8 | 13.70        | 0.04           | 1.01               |              | 6.64 |               |            |      | 123.6                                | 0                         |                      |                    |
|                             | 5/11/2009  |            | 9                                          | 8                                               | 12                                                | <0.025                    | <0.25                     | 14.18        | 107.9 | 11.08        | 0.02           | 0.82               |              | 6.83 |               |            |      | 816.4                                | 1                         |                      |                    |
|                             | 5/27/2009  |            | 9                                          | 8                                               | 13                                                | <0.025                    | <0.25                     | 16.70        | 97.4  | 9.47         | 0.03           | 1.51               |              | 6.80 |               |            |      | 387.0                                | <1                        |                      |                    |
|                             | 6/8/2009   |            | 16                                         | 10                                              | 13                                                | <0.025                    | <0.25                     | 19.54        | 109.4 | 10.01        | 0.03           | 1.58               |              | 7.14 |               |            |      | 290.9                                | 1                         |                      |                    |
|                             | 6/22/2009  |            | 13                                         | 3                                               | 13                                                | <0.025                    | <0.25                     | 21.09        | 94.7  | 8.43         | 0.04           | 0.79               |              | 6.99 |               |            |      | >2419.2                              | 2                         |                      |                    |
|                             | 7/6/2009   |            | 16                                         | 13                                              | 19                                                | <0.025                    | <0.25                     | 20.66        | 92.0  | 8.26         | 0.04           | 0.82               |              | 7.12 |               |            |      | 1986.3                               | 6                         |                      |                    |
|                             | 7/20/2009  |            | 13                                         | 15                                              | 30                                                | <0.025                    | <0.25                     | 22.93        | 117.7 | 10.11        | 0.04           | 1.21               |              | 7.31 |               |            |      | 275.5                                | <1                        |                      |                    |

| Date                        | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 8/4/2009                    |           |            | 15                                         | 18                                              | 25                                                | <0.025                    | <0.25                     | 23.75        | 92.6  | 7.83         | 0.05           | 0.86               |              | 7.21 |               |            |      | 1986.3                               | 20                        |                      |                    |
| 8/18/2009                   |           |            | 18                                         | 18                                              | 26                                                | <0.025                    | <0.25                     | 27.18        | 103.7 | 8.23         | 0.05           | 1.16               |              | 7.49 |               |            |      | 980.4                                | 2                         |                      |                    |
| 8/31/2009                   |           |            | 15                                         | 17                                              | 23                                                | <0.025                    | <0.25                     | 20.42        | 68.4  | 6.16         | 0.25           | 1.49               |              | 7.28 |               |            |      | 855.0                                | 7                         |                      |                    |
| 9/14/2009                   |           |            | 17                                         | 19                                              | 25                                                | <0.025                    | <0.25                     | 19.62        | 80.2  | 7.35         | 0.06           | 0.75               |              | 7.05 |               |            |      | 307.6                                | 37                        |                      |                    |
| 9/28/2009                   |           |            | 16                                         | 62                                              | 69                                                | <0.025                    | <0.25                     | 13.52        | 97.9  | 10.19        | 0.13           | 2.45               |              | 7.59 |               |            |      | >2419.2                              | 261                       |                      |                    |
| 10/14/2009                  |           |            | 15                                         | 16                                              | 19                                                | <0.025                    | <0.25                     | 10.63        | 97.3  | 10.83        | 0.04           | 1.02               |              | 6.97 |               |            |      | 866.4                                | 11                        |                      |                    |
| Mean                        |           |            | 14                                         | 17                                              | 24                                                |                           |                           | 18.08        | 97.4  | 9.36         | 0.06           | 1.19               |              | 7.11 |               |            |      | 806.9                                | 32                        |                      |                    |
| StDev                       |           |            | 3                                          | 14                                              | 15                                                |                           |                           | 6.01         | 12.9  | 1.95         | 0.06           | 0.48               |              | 0.27 |               |            |      | 652.6                                | 77                        |                      |                    |
| 2010                        | 5/3/2010  |            | 67                                         | 10                                              | 19                                                | <0.025                    | <0.25                     | 15.40        | 95.3  | 9.53         | 0.14           | 2.96               |              | 7.46 |               |            |      | <2419                                | 517                       |                      |                    |
|                             | 5/17/2010 |            | 9                                          | 10                                              | 11                                                | <0.025                    | <0.25                     | 14.51        | 97.6  | 9.95         | 0.04           | 0.94               |              | 6.80 |               |            |      | 224.7                                | 0                         |                      |                    |
|                             | 6/1/2010  |            | 64                                         | 62                                              | 66                                                | <0.025                    | <0.25                     | 16.00        | 94.9  | 9.36         | 0.22           | 14.70              |              | 7.54 |               |            |      | >2419.2                              | 186                       |                      |                    |
|                             | 6/14/2010 |            | 14                                         | 15                                              | 23                                                | <0.025                    | <0.25                     | 20.05        | 91.7  | 8.78         | 0.05           | 0.71               |              | 7.27 |               |            |      | 770.1                                | 345                       |                      |                    |
|                             | 6/29/2010 |            | 23                                         | 15                                              | 21                                                | <0.025                    | <0.25                     | 21.95        | 98.3  | 8.61         | 0.04           | 1.09               |              | 6.92 |               |            |      | >2419.2                              | 261                       |                      |                    |
|                             | 7/12/2010 |            | 12                                         | 12                                              | 17                                                | <0.025                    | <0.25                     | 27.92        | 106.3 | 8.36         | 0.03           | 1.02               |              | 7.45 |               |            |      | 1986.3                               | 1                         |                      |                    |
|                             | 8/9/2010  |            | 14                                         | 15                                              | 20                                                | <0.025                    | <0.25                     | 25.01        | 103.6 | 8.56         | 0.04           | 0.83               |              | 7.25 |               |            |      | 1119.9                               | 1                         |                      |                    |
|                             | 8/23/2010 |            | 15                                         | 22                                              | 25                                                | <0.025                    | <0.25                     | 21.24        |       |              | 0.04           | 1.21               |              | 7.31 |               |            |      | 1413.6                               | 75                        |                      |                    |
|                             | 9/7/2010  |            | 18                                         | 17                                              | 31                                                | <0.025                    | <0.25                     | 21.95        |       |              | 0.04           | 0.91               |              | 7.60 |               |            |      | 2419.0                               | 1                         |                      |                    |
|                             | 9/20/2010 |            | 15                                         | 20                                              | 27                                                | <0.025                    | <0.25                     | 17.40        | 99.1  | 9.50         | 0.05           | 1.28               |              | 7.26 |               |            |      | 613.1                                | 2                         |                      |                    |
|                             | 10/4/2010 |            | 8                                          | 10                                              | 15                                                | <0.025                    | <0.25                     | 11.69        | 80.6  | 8.74         | 0.04           | 1.51               |              | 6.42 |               |            |      | <2419                                | 137                       |                      |                    |
|                             | Mean      |            | 24                                         | 19                                              | 25                                                |                           |                           | 19.57        | 96.4  | 9.04         | 0.07           | 2.47               |              | 7.21 |               |            |      | 1220.9                               | 139                       |                      |                    |
|                             | StDev     |            | 21                                         | 15                                              | 15                                                |                           |                           | 5.07         | 7.4   | 0.55         | 0.06           | 4.10               |              | 0.36 |               |            |      | 778.2                                | 174                       |                      |                    |
| 2011                        | 5/9/2011  |            | 8                                          | 10                                              | 15                                                | <0.025                    | <0.25                     | 10.38        | 108.2 | 12.10        | 0.03           | 1.30               |              | 6.65 |               |            |      | 727.0                                | <1                        |                      |                    |
|                             | 5/23/2011 |            | 12                                         | 15                                              | 16                                                | <0.025                    | 0.12                      | 17.23        | 97.1  | 9.34         | 0.03           | 0.97               |              | 6.90 |               |            |      | >2419                                | 9                         |                      |                    |
|                             | 6/6/2011  |            | 10                                         | 8                                               | 9                                                 | <0.025                    | 0.08                      | 19.73        | 92.3  | 8.43         | 0.03           | 0.87               |              | 7.04 |               |            |      | 2419.0                               | 59                        |                      |                    |
|                             | 6/19/2011 |            | 14                                         | 12                                              | 17                                                | <0.025                    | <0.05                     | 22.32        | 78.1  | 6.79         | 0.03           | 0.83               |              | 7.17 |               |            |      | 548.0                                | <1                        |                      |                    |

| Date                        | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2011                        | 7/11/2011  |            | 13                                         | 11                                              | 16                                                | <0.025                    | <0.05                     | 24.41        | 85.4  | 7.14         | 0.04           | 0.75               |              | 7.40 |               |            |      | 517.0                                | 2                         |                      |                    |
|                             | 7/25/2011  |            | 20                                         | 15                                              | 24                                                | <0.025                    | <0.05                     | 24.57        | 94.1  | 7.84         | 0.04           | 1.75               |              | 6.86 |               |            |      | 1203.0                               | 31                        |                      |                    |
|                             | 8/8/2011   |            | 21                                         | 17                                              | 22                                                | <0.025                    | <0.05                     | 23.58        |       |              | 0.07           | 1.40               |              | 7.42 |               |            |      | 1203.0                               | 6                         |                      |                    |
|                             | 9/12/2011  |            | 16                                         | 14                                              | 20                                                | <0.025                    | <0.05                     | 19.54        | 105.0 | 9.63         | 0.05           | 1.08               |              | 7.08 |               |            |      | >2419.2                              | 21                        |                      |                    |
|                             | 9/27/2011  |            | 13                                         | 14                                              | 22                                                | <0.025                    | 0.07                      | 19.61        |       |              | 0.04           | 4.53               |              | 6.25 |               |            |      | 686.0                                | 2                         |                      |                    |
|                             | 10/11/2011 |            | 14                                         | 17                                              | 20                                                | <0.025                    | <0.05                     | 16.38        | 96.2  | 9.42         | 0.04           | 1.57               |              | 6.82 |               |            |      | 235.9                                | 10                        |                      |                    |
|                             | 10/24/2011 |            | 15                                         | 15                                              | 23                                                | <0.025                    | <0.05                     | 11.42        |       |              | 0.04           | 1.08               |              | 7.56 |               |            |      | 1732.0                               | 129                       |                      |                    |
|                             | Mean       |            | 14                                         | 13                                              | 19                                                |                           |                           | 19.02        | 94.6  | 8.84         | 0.04           | 1.47               |              | 7.01 |               |            |      | 1030.1                               | 30                        |                      |                    |
|                             | StDev      |            | 4                                          | 3                                               | 4                                                 |                           |                           | 4.85         | 9.7   | 1.69         | 0.01           | 1.06               |              | 0.38 |               |            |      | 690.9                                | 42                        |                      |                    |
| 2012                        | 4/23/2012  |            | 32                                         | 32                                              | 36                                                | <0.025                    | 0.10                      | 9.30         |       |              | 74.80          | 10.80              |              | 7.52 |               |            |      | 1299.7                               | 33                        |                      |                    |
|                             | 5/7/2012   |            | 13                                         | 10                                              | 11                                                | <0.025                    | 0.29                      | 15.70        |       |              | 137.00         | 1.52               |              | 7.03 |               |            |      | 920.8                                | 10                        |                      |                    |
|                             | 7/10/2012  |            | 14                                         | 14                                              | 14                                                | <0.025                    | 0.10                      | 24.60        |       |              | 42.70          | 1.23               |              | 7.44 |               |            |      |                                      |                           |                      |                    |
|                             | 8/1/2012   |            | 20                                         | 18                                              | 18                                                | <0.025                    | <0.05                     | 26.80        |       |              | 53.60          | 4.46               |              | 7.60 |               |            |      |                                      |                           |                      |                    |
|                             | 8/13/2012  |            | 18                                         | 18                                              | 18                                                | <0.025                    | <0.05                     | 19.40        |       |              | 162.10         | 1.80               |              | 8.01 |               |            |      |                                      |                           |                      |                    |
|                             | 9/17/2012  |            | 88                                         | 84                                              | 94                                                | <0.025                    | 0.05                      | 15.90        |       |              | 247.00         | 0.93               |              | 7.69 |               |            |      |                                      |                           |                      |                    |
|                             | 10/1/2012  |            | 66                                         | 74                                              | 74                                                | <0.025                    | <0.05                     | 13.80        |       |              | 156.70         | 1.79               |              | 7.96 |               |            |      | >2419                                | 28                        |                      |                    |
|                             | Mean       |            | 36                                         | 36                                              | 38                                                |                           |                           | 17.93        |       |              | 124.84         | 3.22               |              | 7.61 |               |            |      | 1110.2                               | 23                        |                      |                    |
|                             | StDev      |            | 29                                         | 30                                              | 33                                                |                           |                           | 6.14         |       |              | 72.80          | 3.54               |              | 0.33 |               |            |      | 267.9                                | 12                        |                      |                    |
| 2013                        | 5/20/2013  |            | 12                                         | 12                                              | 12                                                |                           | 0.18                      | 17.50        |       | 9.00         | 33.10          | 1.34               |              | 7.00 |               |            |      | 275.0                                | <1                        |                      |                    |
|                             | 6/3/2013   |            | 12                                         | 12                                              | 14                                                | <0.025                    | <0.05                     | 19.30        |       | 9.10         | 34.70          | 0.76               |              | 7.07 |               |            |      | 365.4                                | 3                         |                      |                    |
|                             | 6/25/2013  |            | 8                                          | 8                                               | 12                                                | <0.025                    | <0.05                     | 25.00        |       |              | 29.90          | 1.84               |              | 7.04 |               |            |      | 420.0                                | 4                         |                      |                    |
|                             | 7/15/2013  |            | 10                                         | 12                                              | 12                                                | 0.130                     | <0.05                     | 28.20        |       | 6.20         | 28.50          | 1.09               |              | 6.89 |               |            |      | 435.0                                | 3                         |                      |                    |
|                             | 7/29/2013  |            | 16                                         | 16                                              | 18                                                | <0.025                    | <0.05                     | 24.60        |       | 6.20         | 41.80          | 1.87               |              | 7.12 |               |            |      | 461.0                                | <1                        |                      |                    |
|                             | 8/12/2013  |            | 10                                         | 14                                              | 18                                                | <0.025                    | <0.05                     | 23.50        |       | 7.00         | 42.10          | 1.10               |              | 6.96 |               |            |      | 355.5                                | 1                         |                      |                    |
|                             | 9/9/2013   |            | 94                                         | 100                                             | 106                                               | <0.025                    | 0.06                      | 11.70        |       | 5.70         | 256.00         | 1.36               |              | 8.05 |               |            |      | 1553.1                               | 41                        |                      |                    |

| Date                        | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|-----------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 3 – THOMAS POND OUTLET |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 9/24/2013                   |      |            | 82                                         | 78                                              | 80                                                | <0.025                    | <0.05                     | 10.80        |     | 9.50         | 198.20         | 1.02               |              | 8.02 |               |            |      | 816.4                                | 19                        |                      |                    |
| Mean                        |      |            | 31                                         | 32                                              | 34                                                |                           |                           | 20.08        |     | 7.53         | 83.04          | 1.30               |              | 7.27 |               |            |      | 585.2                                | 12                        |                      |                    |
| StDev                       |      |            | 36                                         | 36                                              | 37                                                |                           |                           | 6.39         |     | 1.62         | 90.38          | 0.39               |              | 0.48 |               |            |      | 423.1                                | 16                        |                      |                    |
| 5/20/2014                   |      |            | 4                                          | 8                                               | 12                                                | <0.025                    | 0.14                      | 18.30        |     |              | 25.30          | 1.00               |              | 6.95 |               |            |      | 1299.7                               | 43                        |                      |                    |
| 6/17/2014                   |      |            | 12                                         | 14                                              | 16                                                | <0.025                    | 0.11                      | 22.90        |     |              | 32.30          | 1.26               |              | 7.03 |               |            |      | 1986.0                               | 9                         |                      |                    |
| 7/17/2014                   |      |            | 20                                         | 12                                              | 20                                                | <0.025                    | 0.06                      | 24.00        |     |              | 33.20          | 0.90               |              | 7.23 |               |            |      | 125.9                                | <1                        |                      |                    |
| 8/19/2014                   |      |            | 16                                         | 16                                              | 18                                                | <0.025                    | <0.05                     | 21.60        |     |              | 43.50          | 1.10               |              | 7.50 |               |            |      | 235.9                                | 20                        |                      |                    |
| 9/23/2014                   |      |            | 76                                         | 76                                              | 78                                                | <0.025                    | <0.05                     | 13.60        |     |              | 184.50         | 1.63               |              | 7.96 |               |            |      | 1986.0                               | 5                         |                      |                    |
| Mean                        |      |            | 26                                         | 25                                              | 29                                                |                           |                           | 20.08        |     |              | 63.76          | 1.18               |              | 7.33 |               |            |      | 1126.7                               | 19                        |                      |                    |
| StDev                       |      |            | 29                                         | 29                                              | 28                                                |                           |                           | 4.21         |     |              | 67.81          | 0.29               |              | 0.41 |               |            |      | 908.5                                | 17                        |                      |                    |
| 4/26/2015                   |      |            | 16                                         | 10                                              | 12                                                | <0.025                    | 0.33                      | 6.10         |     |              | 30.10          | 1.05               |              | 6.47 |               |            |      | 152.0                                | 3                         |                      |                    |
| 5/21/2015                   |      |            | 10                                         | 10                                              | 12                                                | <0.025                    | 0.14                      | 18.90        |     |              | 31.20          | 1.11               |              | 7.16 |               |            |      | 290.9                                | 1                         |                      |                    |
| 7/28/2015                   |      |            | 106                                        | 94                                              | 98                                                | <0.025                    | 0.08                      | 21.40        |     |              | 271.00         | 0.94               |              | 8.15 |               |            |      | 2419.0                               | 96                        |                      |                    |
| 8/31/2015                   |      |            | 90                                         | 90                                              | 92                                                | <0.025                    | 0.10                      | 18.90        |     |              | 259.00         | 1.00               |              | 8.24 |               |            |      | 921.0                                | 26                        |                      |                    |
| 9/21/2015                   |      |            | 58                                         | 80                                              | 90                                                | <0.025                    | <0.05                     | 12.50        |     |              | 240.00         | 11.50              |              | 8.11 |               |            |      | 2419.0                               | 145                       |                      |                    |
| Mean                        |      |            | 66                                         | 57                                              | 61                                                |                           |                           | 15.56        |     |              | 166.26         | 3.12               |              | 7.63 |               |            |      | 1240.4                               | 54                        |                      |                    |
| StDev                       |      |            | 42                                         | 43                                              | 45                                                |                           |                           | 6.23         |     |              | 124.29         | 4.68               |              | 0.78 |               |            |      | 1114.3                               | 64                        |                      |                    |
| 5/10/2016                   |      |            | 68                                         | 62                                              | 66                                                | <0.025                    | <0.05                     | 10.60        |     |              | 169.90         | 1.23               |              | 8.07 |               |            |      | 579.0                                | 3                         |                      |                    |
| 6/13/2016                   |      |            | 70                                         | 56                                              | 80                                                | <0.025                    | <0.05                     | 11.60        |     |              | 156.60         | 1.09               |              | 7.99 |               |            |      | 2419.2                               | 39                        |                      |                    |
| 7/6/2016                    |      |            | 24                                         | 18                                              | 22                                                | <0.025                    | 0.06                      | 24.00        |     |              | 47.90          | 0.61               |              | 7.52 |               |            |      | 261.3                                | 5                         |                      |                    |
| 8/13/2016                   |      |            | 20                                         | 18                                              | 21                                                | 0.100                     | <0.05                     |              |     |              | 44.80          | 1.55               |              | 6.69 |               |            |      | 920.8                                | 19                        |                      |                    |
| 9/13/2016                   |      |            | 96                                         | 96                                              | 108                                               | <0.025                    | 0.07                      | 19.10        |     |              | 278.00         | 0.82               |              | 8.34 |               |            |      | 2419.0                               | 161                       |                      |                    |
| Mean                        |      |            | 56                                         | 50                                              | 59                                                |                           |                           | 16.33        |     |              | 139.44         | 1.06               |              | 7.72 |               |            |      | 1319.9                               | 45                        |                      |                    |
| StDev                       |      |            | 33                                         | 33                                              | 38                                                |                           |                           | 6.37         |     |              | 97.16          | 0.36               |              | 0.65 |               |            |      | 1030.2                               | 66                        |                      |                    |

[EPA, 2001; MVWA, 2016](#)



Table C-7: Tributary Sampling Results – Beaver Meadow Creek, Site 4

| Date                         | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-----|--------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 4/28/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 90                                   | 0                         | 684                  |                    |
| 5/5/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 220                                  | 120                       | 880                  |                    |
| 5/13/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 80                                   | 50                        | 415                  |                    |
| 5/19/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 0                                    | 0                         | 365                  |                    |
| 5/26/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 160                                  | 20                        | 570                  |                    |
| 6/1/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 160                                  | 160                       | 390                  |                    |
| 6/9/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 20                                   | 0                         | 520                  |                    |
| 6/16/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 80                                   | 60                        | 310                  |                    |
| 6/22/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 340                                  | 340                       | 505                  |                    |
| 6/29/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 130                                  | 0                         | 265                  |                    |
| 7/7/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 80                                   | 0                         | 348                  |                    |
| 7/13/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 260                                  | 260                       | 900                  |                    |
| 7/28/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 560                                  | 290                       | 320                  |                    |
| 8/4/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 120                                  | 0                         | 445                  |                    |
| 8/11/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 410                                  | 160                       | 2450                 |                    |
| 8/18/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 490                                  | 130                       | 126                  |                    |
| 8/25/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 280                                  | 110                       | 97                   |                    |
| 9/2/1998                     |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 100                                  | 20                        | 365                  |                    |
| 9/22/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 90                                   | 10                        | 565                  |                    |
| 9/29/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 490                                  | 290                       | 435                  |                    |
| 10/6/1998                    |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 10                                   | 0                         | 1452                 |                    |
| 10/13/1998                   |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 50                                   | 10                        | 1089                 |                    |
| 10/20/1998                   |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 110                                  | 0                         | 75                   |                    |
| 10/27/1998                   |      |            |                               |                                    |                                      |               |               |              |     |              |                |                    |              |    |               |            |      | 120                                  | 80                        | 72000                |                    |

| Date                         | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |  |
|------------------------------|-----------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|--|
| SITE 4 – BEAVER MEADOW CREEK |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       |                                      |                           |                      |                    |  |
| 12/15/1998                   |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 40                                   | 30                        | 1210                 |                    |  |
| Mean                         |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 180                                  | 86                        | 3471                 |                    |  |
| StDev                        |           |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |            |       | 161                                  | 107                       | 14286                |                    |  |
| 1999                         | 4/27/1999 | 2:30 PM    |                               |                                    |                                      |               |               | 13.09        | 100.4 | 10.21        | 208.2          | 0                  | 0.13         | 8.22 | 4.5           | 0.105      | 2.33  | 60                                   | 10                        | 397                  |                    |  |
|                              | 5/6/1999  | 2:18 PM    |                               |                                    |                                      |               |               | 17.03        | 98.6  | 9.18         | 255.4          | 8.1                | 0.38         | 7.97 | 4.19          | 0.121      | 2.89  | 110                                  | 10                        | 20                   |                    |  |
|                              | 5/11/1999 | 2:28 PM    |                               |                                    |                                      |               |               | 16.32        | 101.9 | 9.62         | 264.5          | 25.3               | 0.16         | 8.09 | 4.28          | 0.139      | 3.25  | 60                                   | 40                        | 335                  |                    |  |
|                              | 5/18/1999 | 2:28 PM    |                               |                                    |                                      |               |               | 18.89        | 101.4 | 9.56         | 268.9          | 0                  | 0.03         | 7.99 | 3.99          | 0.12       | 3.01  | 140                                  | 90                        | 684                  |                    |  |
|                              | 5/25/1999 | 2:30 PM    |                               |                                    |                                      |               |               | 16.27        | 99.6  | 9.91         | 312.7          | 11                 | 0.18         | 8.07 | 6.76          | 0.205      | 3.03  | 260                                  | 140                       | 265                  |                    |  |
|                              | 6/2/1999  | 2:26 PM    |                               |                                    |                                      |               |               | 19.42        | 103.4 | 9.64         | 268.9          | 0                  | 0            | 8.14 | 5.4           | 0.171      | 3.17  | 140                                  | 30                        | 2000                 |                    |  |
|                              | 6/8/1999  | 2:18 PM    |                               |                                    |                                      |               |               | 21.14        | 95.9  | 8.64         | 273.2          | 0                  | 0            | 8.23 | 5.97          | 0.163      | 2.73  | 70                                   | 40                        | 9683                 |                    |  |
|                              | 6/15/1999 | 2:24 PM    |                               |                                    |                                      |               |               | 18.32        | 94.4  | 9            | 346.2          | 4                  | 0            | 8.35 | 5.49          | 0.152      | 2.77  | 310                                  | 50                        | 1670                 |                    |  |
|                              | 6/21/1999 | 2:36 PM    | 0.26                          |                                    |                                      |               |               | 17.53        | 97.7  | 9.47         | 316.5          | 0                  | 0            | 8.38 | 3.45          | 0.088      | 2.55  | 190                                  | 60                        | 1186                 |                    |  |
|                              | 6/29/1999 | 2:18 PM    | 0.23                          | 117                                | 120                                  |               |               | 20.04        | 93.3  | 8.59         | 333.1          | 14.7               | 0            | 8.28 | 3.78          | 0.125      | 3.31  | 740                                  | 28                        | 912                  |                    |  |
|                              | 7/13/1999 | 2:08 PM    | 0.1                           | 110                                | 86                                   | 110           | 0.131         | 0.3          | 22.98 | 86.1         | 7.47           | 251.3              | 20           | 0    | 8.26          | 2.39       | 0.088 | 3.68                                 | 440                       | 30                   | 2000               |  |
|                              | 7/20/1999 | 2:35 PM    | 0.2                           | 134                                | 146                                  | 152           | 1.889         | 0.3          | 21.03 | 83.1         | 7.54           | 263.7              | 99.4         | 0.01 | 8.37          | 3.13       | 0.065 | 2.08                                 | 590                       | 80                   | 972                |  |
|                              | 7/27/1999 | 2:33 PM    | 0.14                          | 82                                 | 104                                  | 106           | 0.63          | 0.3          | 10.86 | 72.8         | 8.16           | 278.4              | 4            | 0.19 | 8.21          | 1.52       | 0.06  | 3.95                                 | 360                       | 50                   | 1704               |  |
|                              | 8/3/1999  | 2:06 PM    | 0.1                           | 47                                 | 48                                   | 62            | 0.26          | 0.3          | 9.39  | 76.7         | 8.9            | 286.3              | 14.7         | 0.18 | 8.11          | 1.58       | 0.06  | 3.8                                  | 270                       | 40                   | 2000               |  |
|                              | 8/17/1999 | 2:24 PM    | 0.12                          | 136                                | 112                                  | 146           | 0.24          | 0.3          | 10.86 | 65.8         | 7.38           | 279.2              | 20.4         | 0.22 | 8.21          | 1.49       | 0.053 | 3.56                                 | 270                       | 210                  | 803                |  |
|                              | 8/24/1999 | 2:15 PM    | 0.18                          | 142                                | 136                                  | 156           | 0.16          |              | 13.11 | 73.3         | 7.81           | 286.5              | 0            | 0.17 | 8.17          | 2.01       | 0.074 | 3.68                                 | 380                       | 70                   | 1384               |  |
|                              | 8/31/1999 | 2:08 PM    | 0.14                          | 140                                | 136                                  | 160           | 0.3           |              | 9.73  | 65.8         | 7.58           | 271.8              | 0            | 0.21 | 8.11          | 2.27       | 0.071 | 3.13                                 | 320                       | 70                   | 416                |  |
|                              | 9/8/1999  | 2:16 PM    | 0.27                          | 42                                 | 100                                  | 146           | 0.57          | 0.3          | 19.73 | 77.4         | 7.16           | 290.6              | 0            | 0    | 8.51          | 4.12       | 0.126 | 3.06                                 | 700                       | 30                   | 2000               |  |
|                              | 9/15/1999 | 2:18 PM    | 0.32                          | 130                                | 80                                   | 105           | 1.26          | 0.1          | 15.55 | 75.1         | 7.58           | 280.9              | 0            | 0.03 | 8.48          | 5.61       | 0.178 | 3.17                                 | 550                       | 530                  | 690                |  |
|                              | 9/21/1999 | 2:34 PM    | 0.21                          | 92                                 | 115                                  | 148           | 1.24          | 0.2          | 12.28 | 78           | 8.47           | 255                | 2.8          | 0    | 8.23          | 8.41       | 0.263 | 3.13                                 | 550                       | 60                   | 2000               |  |
|                              | 9/28/1999 | 2:13 PM    | 0.2                           | 124                                | 126                                  | 244           | 0.5           | 0.3          | 14.36 | 74.6         | 7.74           | 269.4              | 0            | 0.07 | 8.29          | 3.89       | 0.14  | 3.6                                  | 310                       | 30                   | 516                |  |
|                              | 10/5/1999 | 2:21 PM    | 0.39                          | 86                                 | 102                                  | 112           | 1.09          | 0.3          | 10.31 | 76           | 8.63           | 225.2              | 0            | 0.01 | 8.1           | 8.42       | 0.294 | 3.49                                 | 310                       | 60                   | 748                |  |

| Date                         | Time     | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |          |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 10/19/1999                   | 2:16 PM  | 0.19       | 116                                        | 132                                             | 134                                               | 0.33                      | 0.1                       | 7.14         | 67.2  | 8.21         | 251.3          | 9.4                | 0            | 7.9  | 4.47          | 0.145      | 3.24 | 200                                  | 10                        | 910                  |                    |
| 10/26/1999                   | 2:23 PM  | 0.17       | 114                                        | 115                                             | 129                                               | 0.48                      | 0.2                       | 6.87         | 62.4  | 7.69         | 254            | 5                  | 0.28         | 8.1  | 4.23          | 0.135      | 3.19 | 270                                  | 0                         | 2000                 |                    |
| Mean                         |          | 0.2        | 107                                        | 111                                             | 136                                               | 0.65                      | 0.3                       | 15.09        | 84.2  | 8.51         | 274.6          | 10                 | 0.09         | 8.2  | 4.22          | 0.131      | 3.16 | 317                                  | 74                        | 1471                 |                    |
| StDev                        |          | 0.08       | 31.68                                      | 25.44                                           | 41.02                                             | 0.52                      | 0.08                      | 4.68         | 13.62 | 0.91         | 30.79          | 20.57              | 0.11         | 0.15 | 1.93          | 0.06       | 0.45 | 194.28                               | 107.12                    | 1869.69              |                    |
| 1/4/2000                     | 2:36 PM  | 1.23       | 48                                         | 50                                              | 60                                                | 2.37                      | 0.5                       | 0.6          | 60.4  | 8.81         | 110.1          | 27.1               | 0.17         | 7.95 | 7.99          | 0.283      | 3.54 | 60                                   | 10                        | 397                  |                    |
| 2/29/2000                    | 2:02 PM  | 0.74       |                                            |                                                 |                                                   |                           |                           | 0.72         | 29.7  | 4.32         | 128.5          | 45.6               | 0.01         | 7.27 | 5.47          | 0.19       | 3.47 | 1986                                 | 51                        |                      |                    |
| 3/21/2000                    | 2:20 PM  | 0.28       | 98                                         | 89                                              | 102                                               | 0.56                      | 0.5                       | 6.68         | 18    | 2.24         | 195.1          | 0                  | 0            | 6.57 | 3.32          |            |      |                                      | 75                        |                      |                    |
| 4/5/2000                     | 2:16 PM  | 0.05       | 66                                         | 62                                              | 68                                                | 0.69                      | 0.2                       | 2.64         | 89.5  | 12.06        | 135.6          | 2.2                | 1.37         | 6.98 | 6.54          | 0.23       | 3.52 | 727                                  | 15                        | 2000                 |                    |
| 4/13/2000                    | 11:36 AM | 0.07       | 82                                         | 83                                              | 91                                                | 0.22                      | 0.2                       | 3.37         | 88.8  | 11.73        | 180.7          | 0                  | 0.6          | 7.37 | 4.35          | 0.14       | 3.22 | 115                                  | 2                         | 493                  |                    |
| 4/18/2000                    | 2:15 PM  | 0.06       | 84                                         | 87                                              | 102                                               | 1.12                      | 0.1                       | 7.87         | 91.8  | 10.76        | 196.2          | 8.1                | 0.61         | 7.33 | 4.49          | 0.159      | 3.54 | 219                                  | 1                         |                      |                    |
| 4/25/2000                    | 2:10 PM  | 0          | 87                                         | 84                                              | 94                                                | 0.88                      | 0.1                       | 12.28        | 84    | 8.92         | 187.9          | 1.9                | 0.72         | 7.63 | 5.08          | 0.178      | 3.5  | 387                                  | 4                         | 774                  |                    |
| 5/4/2000                     | 1:09 PM  | 0.34       | 104                                        | 102                                             | 122                                               | 0.51                      | 0.1                       | 14.41        | 93.9  | 9.51         | 208.1          | 1.2                | 0            | 7.73 | 4.63          | 0.147      | 3.17 | 866                                  | 2                         | 898                  |                    |
| 5/9/2000                     | 2:28 PM  | 0.16       | 100                                        | 100                                             | 114                                               | 1.03                      | 0.1                       | 19.97        | 88.3  | 7.96         | 214.6          | 1.7                | 0.13         | 7.87 | 5.92          | 0.22       | 3.72 | 2420                                 | 19                        | 874                  |                    |
| 5/16/2000                    | 2:33 PM  | 0          | 94                                         | 90                                              | 99                                                | 1.05                      | 0.3                       | 14.89        | 97.4  | 9.76         | 194.6          | 1.3                | 1.06         | 7.56 | 6.55          | 0.252      | 3.85 | 1553                                 | 13                        | 2470                 | 0/0                |
| 5/30/2000                    | 2:09 PM  | 0.15       | 102                                        | 106                                             | 121                                               | 0.62                      | 0.2                       | 16.67        | 85.7  | 8.22         | 229.5          | 1.6                | 0.33         | 7.89 | 5.1           | 0.178      | 3.49 | 1300                                 | 5                         | 2070                 |                    |
| 6/6/2000                     | 2:14 PM  | 0.64       | 91                                         | 92                                              | 101                                               | 1.18                      | 0.2                       | 11.68        | 85.8  | 9.24         | 193.7          | 2.6                | 0.03         | 7.64 | 7.88          | 0.283      | 3.59 | 2419                                 | 816                       | 4970                 |                    |
| 6/15/2000                    |          | 0:00       | 110                                        | 103                                             | 113                                               | 1.1                       | 0.2                       |              | 82.3  | 7.5          |                |                    |              | 7.68 | 6.97          | 0.285      | 4.09 | 1119                                 | 30                        | 1970                 |                    |
| 6/20/2000                    | 2:10 PM  | 0.21       | 119                                        | 114                                             | 130                                               | 0.55                      | 0.1                       | 19.42        | 81.2  | 7.41         | 234.7          | 1.2                | 0            | 8.01 | 4.75          | 0.164      | 3.45 | 1986                                 | 133                       | 1590                 | 0/0                |
| 6/27/2000                    | 12:03 PM | 0.3        | 123                                        | 115                                             | 126                                               | 0.74                      | 0.3                       | 18.59        | 81.8  | 7.58         | 244.5          | 1.8                | 0            | 8    | 5.07          | 0.193      | 3.81 | 2419                                 | 61                        | 1910                 |                    |
| 7/11/2000                    | 12:47 PM | 0.26       | 119                                        | 114                                             | 123                                               | 1.06                      | 0.2                       | 17.86        | 75.4  | 7.11         | 227.1          | 3                  | 0            | 8.07 | 6.69          | 0.235      | 3.51 | 1987                                 | 38                        | 3140                 |                    |
| 7/18/2000                    | 1:45 PM  | 0.07       | 114                                        | 112                                             | 122                                               | 0.69                      | 0.4                       | 18           | 74.5  | 6.99         | 228.7          | 1                  | 0.41         | 8.06 | 7             | 0.245      | 3.5  | 2419                                 | 40                        | 2100                 |                    |
| 7/25/2000                    | 12:20 PM | 0.17       | 130                                        | 136                                             | 149                                               | 0.15                      | 0.1                       | 15.49        | 74.2  | 7.34         | 257            | 1.4                | 0.08         | 8.04 | 2.92          | 0.104      | 3.56 | 1203                                 | 25                        | 2790                 | 0/0                |
| 8/1/2000                     | 12:55 PM | 0.42       | 110                                        | 108                                             | 114                                               | 1.2                       | 0.3                       |              |       |              | 1231           | 1.4                |              | 7.46 | 8.51          | 0.293      | 3.44 | 2419                                 | 96                        | 4640                 |                    |
| 8/8/2000                     | 1:00 PM  | 0.11       | 108                                        | 104                                             | 114                                               | 1.29                      | 0.3                       | 19.29        | 84.2  | 7.76         | 193.4          | 1.4                | 0.29         | 7.75 | 9.4           | 0.346      | 3.68 | 2419                                 | 548                       | 1280                 |                    |
| 8/22/2000                    | 11:58 AM | 0.18       | 118                                        | 114                                             | 150                                               | 0.71                      | 0.2                       | 16.91        | 76.6  | 7.41         | 196.8          | 1                  | 0.01         | 7.95 | 5.74          | 0.2        | 3.48 | 1120                                 | 16                        | 1250                 |                    |

| Date                         | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 8/29/2000                    | 1:43 PM    | 0.25       | 116                                        | 112                                             | 126                                               | 0.69                      | 0.2                       | 22.1         | 100.9 | 8.8          | 130.1          | 1                  | 0            | 8.17 | 6.35          | 0.201      | 3.17 | 1300                                 | 9                         |                      | 0/0                |
| 9/19/2000                    | 10:36 AM   | 0.16       | 118                                        | 111                                             | 124                                               | 0.14                      | 0.3                       | 16.15        | 107.1 | 10.53        | 218.7          | 0.7                | 0            | 8.07 | 5.54          | 0.188      | 3.39 | 866                                  | 11                        | 1200                 |                    |
| 10/24/2000                   | 11:23 AM   |            | 114                                        | 116                                             | 124                                               | 0.09                      | 0.2                       | 7.45         |       |              | 197.7          | 0.6                | 0.1          | 7.94 | 5.66          | 0.179      | 3.16 | 1553                                 | 6                         | 1260                 |                    |
| Mean                         |            | 0.25       | 102                                        | 100                                             | 113                                               | 0.81                      | 0.2                       | 12.87        | 79.6  | 8.27         | 240.6          | 4.7                | 0.27         | 7.71 | 5.91          | 0.213      | 3.52 | 1372                                 | 85                        | 1904                 |                    |
| StDev                        |            | 0.28       | 19.46                                      | 18.88                                           | 21.45                                             | 0.49                      | 0.12                      | 6.71         | 20.71 | 2.2          | 219.24         | 10.49              | 0.38         | 0.39 | 1.57          | 0.06       | 0.22 | 838.08                               | 195.39                    | 1236.22              |                    |
| 2001                         | 4/26/2001  |            | 64                                         | 68                                              | 74                                                | 0.140                     | 0.30                      |              |       |              |                | 0.83               |              |      | 6.04          | 0.21       | 3.53 |                                      |                           |                      |                    |
|                              | 5/31/2001  |            | 104                                        | 108                                             | 124                                               | 0.060                     | 0.20                      | 9.62         | 74.4  | 8.56         | 200.00         | 1.10               |              | 8.14 | 5.55          | 0.18       | 3.26 | 1120.0                               | 41                        |                      |                    |
|                              | 6/27/2001  | 12:29 PM   | 82                                         | 84                                              | 90                                                | 0.080                     | 0.40                      | 18.58        | 73.8  | 6.98         | 241.40         | 1.18               |              | 7.94 | 9.84          | 0.36       | 3.65 | 2419.0                               | 59                        |                      |                    |
|                              | 7/31/2001  | 11:10 AM   | 128                                        | 134                                             | 138                                               | 0.150                     | 0.20                      | 15.27        | 89.7  | 9.18         | 235.20         |                    | 0.13         | 8.13 | 3.16          | 0.10       | 3.20 | 1986.0                               | 34                        |                      |                    |
|                              | 8/22/2001  | 12:00 PM   | 132                                        | 128                                             | 140                                               | 0.830                     | 0.20                      | 16.16        | 23.9  | 2.40         | 230.50         | 1.50               |              | 8.11 | 3.77          | 0.15       | 3.90 | 1553.0                               | 29                        |                      |                    |
|                              | 9/20/2001  |            | 76                                         | 82                                              | 88                                                | 0.010                     | 0.50                      | 12.82        | 119.0 | 12.54        | 161.30         |                    |              | 7.93 | 15.10         | 0.55       | 3.62 | 2419.0                               | 96                        |                      |                    |
|                              | 10/29/2001 | 2:08 PM    | 117                                        | 113                                             | 125                                               | 0.490                     | 0.20                      | 7.95         | 97.3  | 11.73        | 227.90         | 1.49               | 0.00         | 8.22 | 4.62          | 0.16       | 3.40 | 688.0                                | 6                         |                      |                    |
|                              | Mean       |            | 100                                        | 102                                             | 111                                               | 0.251                     | 0.29                      | 13.40        | 79.7  | 8.57         | 216.05         | 1.22               | 0.07         | 8.08 | 6.87          | 0.24       | 3.51 | 1697.5                               | 44                        |                      |                    |
|                              | StDev      |            | 27                                         | 25                                              | 27                                                | 0.300                     | 0.12                      | 4.06         | 32.0  | 3.65         | 30.38          | 0.28               | 0.09         | 0.12 | 4.23          | 0.16       | 0.24 | 706.8                                | 31                        |                      |                    |
| 2002                         | 4/30/2002  | 12:38 PM   | 89                                         | 86                                              | 97                                                | 0.260                     | 0.20                      | 6.54         | 112.1 | 13.91        | 182.20         | 0.82               | 0.30         | 7.59 | 5.21          | 0.18       | 3.40 | 770.0                                | 9                         |                      |                    |
|                              | 5/29/2002  | 1:51 PM    | 121                                        | 112                                             | 126                                               | 0.330                     | 0.20                      | 17.01        | 110.0 | 10.69        | 275.70         | 1.87               | 0.00         | 8.40 | 3.39          | 0.11       | 3.22 | 1300.0                               | 81                        |                      |                    |
|                              | 7/2/2002   | 10:59 AM   | 39                                         | 36                                              | 43                                                | 0.220                     | 0.20                      | 17.64        | 89.9  | 8.67         | 304.40         | 0.92               | 0.45         | 8.07 | 6.01          | 0.18       | 2.91 | 2419.0                               | 29                        |                      |                    |
|                              | 8/1/2002   |            | 144                                        | 138                                             | 150                                               | 0.260                     | 0.30                      | 17.12        | 113.9 | 11.00        | 262.00         | 1.89               | 0.00         | 8.01 | 3.65          | 0.12       | 3.21 | 1986.0                               | 26                        |                      |                    |
|                              | 8/29/2002  |            | 140                                        | 136                                             | 146                                               | 0.190                     | 0.30                      | 12.50        |       | 8.00         | 310.00         | 2.20               |              | 8.13 | 3.14          | 0.08       | 2.48 | 2419.0                               | 30                        |                      |                    |
|                              | 9/25/2002  | 12:00 AM   | 136                                        | 128                                             | 136                                               | 0.350                     | 0.30                      | 11.92        | 96.8  | 10.45        | 216.00         | 0.99               | 0.00         | 8.01 | 4.53          | 0.16       | 3.44 | 2419.0                               | 150                       |                      |                    |
|                              | 10/24/2002 | 12:10 PM   | 100                                        | 104                                             | 118                                               | 0.770                     | 0.30                      | 3.77         | 99.2  | 13.07        | 196.00         | 0.96               | 0.96         | 7.78 | 6.38          | 0.21       | 3.29 | 1733.0                               | 7                         |                      |                    |
|                              | Mean       |            | 110                                        | 106                                             | 117                                               | 0.340                     | 0.26                      | 12.36        | 103.7 | 10.83        | 249.47         | 1.38               | 0.28         | 8.00 | 4.62          | 0.15       | 3.14 | 1863.7                               | 47                        |                      |                    |
|                              | StDev      |            | 37                                         | 36                                              | 37                                                | 0.198                     | 0.05                      | 5.48         | 9.7   | 2.14         | 51.69          | 0.58               | 0.38         | 0.26 | 1.29          | 0.05       | 0.34 | 641.7                                | 51                        |                      |                    |
| 4/28/2003                    | 1:43 PM    |            | 90                                         | 94                                              | 98                                                | 0.041                     | 0.30                      | 14.54        | 108.7 | 11.06        | 186.00         | 1.80               | 1.20         | 7.90 | 5.03          | 0.17       | 3.32 | 648.8                                | 4                         |                      |                    |
| 5/27/2003                    | 1:17 PM    |            | 94                                         | 99                                              | 106                                               | 0.056                     | 0.30                      | 14.93        | 100.8 | 10.17        | 196.00         | 2.14               | 0.83         | 9.03 | 6.18          | 0.22       | 3.56 | 2419.2                               | 47                        |                      |                    |

| Date                         | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2003                         | 6/23/2003  | 1:25 AM    | 108                                        | 102                                             | 160                                               | 0.039                     | 0.30                      | 20.44        | 89.7  | 8.08         | 170.00         | 1.23               | 0.70         | 8.30 | 7.06          | 0.26       | 3.68 | 1733.0                               | 58                        |                      |                    |
|                              | 7/17/2003  | 12:43 PM   | 118                                        | 118                                             | 132                                               | 0.038                     | 0.20                      | 18.70        | 100.1 | 9.33         | 233.00         | 0.96               | 0.67         | 8.21 | 4.67          | 0.20       | 4.28 | >2419                                | 248                       |                      |                    |
|                              | 8/18/2003  | 1:07 PM    | 124                                        | 120                                             | 136                                               | 0.054                     | 0.30                      | 19.59        | 108.2 | 9.92         | 201.00         | 1.00               | 0.63         | 8.10 | 6.85          | 0.26       | 3.78 | >2419                                | 88                        |                      |                    |
|                              | 9/24/2003  | 12:42 PM   | 98                                         | 92                                              | 102                                               | 0.004                     | 0.40                      | 15.16        | 97.3  | 9.77         | 155.00         | 1.35               | 0.63         | 7.88 | 9.98          | 0.38       | 3.81 | >2419.2                              | 119                       |                      |                    |
|                              | 10/15/2003 | 12:14 PM   | 122                                        | 118                                             | 134                                               |                           |                           | 8.96         | 95.7  | 11.07        | 256.00         | 0.92               | 0.40         | 8.00 | 3.87          | 0.13       | 3.41 | 687.0                                | 12                        |                      |                    |
|                              | Mean       |            | 108                                        | 106                                             | 124                                               | 0.039                     | 0.30                      | 16.05        | 100.1 | 9.91         | 199.57         | 1.34               | 0.72         | 8.20 | 6.23          | 0.23       | 3.69 | 1372.0                               | 82                        |                      |                    |
|                              | StDev      |            | 14                                         | 12                                              | 23                                                | 0.019                     | 0.06                      | 3.95         | 6.8   | 1.04         | 35.03          | 0.47               | 0.25         | 0.40 | 2.02          | 0.08       | 0.32 | 860.1                                | 83                        |                      |                    |
| 2004                         | 4/19/2004  | 11:55 AM   | 84                                         | 82                                              | 88                                                |                           |                           | 11.04        | 97.8  | 10.77        | 161.00         | 1.21               | 0.34         | 7.85 | 4.75          | 0.17       | 3.64 | 365.0                                | 12                        |                      |                    |
|                              | 5/25/2004  | 2:05 PM    | 52                                         | 50                                              | 56                                                | 0.016                     | 0.03                      | 19.45        | 80.4  | 7.39         | 85.00          | 5.96               | 0.17         | 7.13 | 11.90         | 0.47       | 3.98 | >2419.2                              | 479                       |                      |                    |
|                              | 6/14/2004  | 11:26 AM   | 114                                        | 136                                             | 138                                               | 0.013                     | 0.08                      | 19.13        | 94.4  | 9.70         | 237.00         | 1.08               | 0.14         | 7.85 | 3.44          | 0.11       | 3.17 | 755.5                                | 31                        |                      |                    |
|                              | 7/19/2004  | 10:12 AM   | 117                                        | 124                                             | 130                                               | 0.009                     | 0.13                      | 15.96        | 113.8 | 11.23        | 230.00         | 1.73               | 0.10         | 8.26 | 6.13          | 0.21       | 3.49 | >2419                                | 57                        |                      |                    |
|                              | 8/30/2004  | 12:31 PM   | 120                                        | 116                                             | 134                                               | 0.007                     | 0.18                      | 14.59        | 105.4 | 10.72        | 211.00         | 1.57               | 0.69         | 8.10 | 5.08          | 0.17       | 3.43 | >2419.2                              | 38                        |                      |                    |
|                              | 9/14/2004  | 1:03 PM    | 126                                        | 124                                             | 134                                               | -0.003                    | 0.11                      | 15.88        | 97.8  | 9.67         | 232.00         | 1.06               | 0.45         | 7.98 | 5.44          | 0.18       | 3.22 | 1732.0                               | 11                        |                      |                    |
|                              | 10/4/2004  | 2:52 PM    | 128                                        | 122                                             | 136                                               | 0.000                     | 0.07                      | 12.10        | 99.4  | 10.96        | 216.00         | 1.45               | 0.05         | 8.27 | 4.18          | 0.13       | 3.04 | 1553.1                               | 35                        |                      |                    |
|                              | Mean       |            | 106                                        | 108                                             | 117                                               | 0.007                     | 0.10                      | 15.45        | 98.4  | 10.06        | 196.00         | 2.01               | 0.27         | 7.92 | 5.85          | 0.21       | 3.42 | 1101.4                               | 95                        |                      |                    |
|                              | StDev      |            | 28                                         | 31                                              | 32                                                | 0.007                     | 0.05                      | 3.20         | 10.2  | 1.32         | 55.23          | 1.76               | 0.23         | 0.39 | 2.81          | 0.12       | 0.32 | 649.0                                | 170                       |                      |                    |
| 2006                         | 4/24/2006  |            | 84                                         | 76                                              | 84                                                | <0.025                    | <0.25                     | 7.37         | 93.6  | 11.25        | 165.00         | 0.74               |              | 7.21 | 5.35          | 0.26       | 4.88 | >2419.2                              | 34                        |                      |                    |
|                              | 5/15/2006  |            | 20                                         | 120                                             | 126                                               | <0.025                    | <0.25                     | 16.46        | 95.1  | 9.48         | 217.00         | 1.77               |              | 8.21 | 1.38          | 0.13       | 9.57 | 920.8                                | 19                        |                      |                    |
|                              | 6/8/2006   |            | 126                                        | 116                                             | 122                                               | <0.025                    | <0.25                     | 15.87        | 93.4  | 9.24         | 236.00         | 1.45               |              | 7.93 |               |            |      | 1732.8                               | 10                        |                      |                    |
|                              | 7/17/2006  |            | 130                                        | 140                                             | 142                                               | <0.025                    | <0.25                     | 18.75        | 94.2  | 8.78         | 240.00         | 0.92               |              | 7.86 |               |            |      | 1732.0                               | 74                        |                      |                    |
|                              | 8/14/2006  |            | 120                                        | 142                                             | 162                                               | <0.025                    | <0.25                     | 14.09        | 91.9  | 9.45         | 246.00         | 2.29               |              | 7.93 |               |            |      | 1732.0                               | 20                        |                      |                    |
|                              | 9/5/2006   |            | 124                                        | 130                                             | 134                                               | <0.025                    | <0.25                     | 14.06        | 100.1 | 10.30        | 226.00         | 0.74               |              | 7.96 |               |            |      | 866.0                                | 14                        |                      |                    |
|                              | 10/16/2006 |            | 122                                        | 126                                             | 130                                               | <0.025                    | <0.25                     | 7.26         | 94.6  | 11.40        | 225.00         | 1.29               |              | 7.66 |               |            |      | 461.0                                | 10                        |                      |                    |
|                              | Mean       |            | 104                                        | 121                                             | 129                                               |                           |                           | 13.41        | 94.7  | 9.99         | 222.14         | 1.31               |              | 7.82 | 3.37          | 0.20       | 7.22 | 1240.8                               | 26                        |                      |                    |
|                              | StDev      |            | 40                                         | 22                                              | 24                                                |                           |                           | 4.45         | 2.6   | 1.02         | 27.06          | 0.58               |              | 0.31 | 2.81          | 0.09       | 3.31 | 561.4                                | 23                        |                      |                    |

|      | Date                         | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------|------------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
|      | SITE 4 – BEAVER MEADOW CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2007 | 4/23/2007                    |      |            | 40                                         | 80                                              | 82                                                | <0.025                    | <0.25                     | 10.29        | 97.7  | 10.95        | 153.00         | 0.96               |              | 7.06 | 4.24          | 0.15       |      | 238.2                                | 10                        |                      |                    |
|      | 5/4/2007                     |      |            | 112                                        | 120                                             | 132                                               | <0.025                    | <0.25                     | 13.95        | 105.8 | 10.91        | 216.00         | 1.11               |              | 7.56 | 2.98          | 0.11       |      | 2419.0                               | 31                        |                      |                    |
|      | 6/5/2007                     |      |            | 122                                        | 130                                             | 140                                               | <0.025                    | <0.25                     | 17.13        | 106.1 | 10.22        | 247.00         | 1.54               |              | 7.75 | 2.28          | 0.12       |      | 1299.7                               | 51                        |                      |                    |
|      | 7/2/2007                     |      |            | 146                                        | 124                                             | 146                                               | <0.025                    | <0.25                     | 15.63        | 108.6 | 10.80        | 214.00         | 2.08               |              | 7.80 | 3.75          | 0.09       |      | 1733.0                               | 119                       |                      |                    |
|      | 8/20/2007                    |      |            | 124                                        | 94                                              | 156                                               | <0.025                    | <0.25                     |              | 100.1 | 10.45        | 0.27           | 0.63               |              | 7.88 | 4.81          | 0.09       |      | 1203.3                               | 22                        |                      |                    |
|      | 9/17/2007                    |      |            | 52                                         | 59                                              | 82                                                | <0.025                    | <0.25                     | 12.16        | 101.2 | 10.86        | 0.22           | 0.84               |              | 7.91 | 6.98          | 0.14       |      | 1553.0                               | 16                        |                      |                    |
|      | 10/9/2007                    |      |            | 118                                        | 70                                              | 75                                                | <0.025                    | <0.25                     | 15.93        | 115.9 | 11.45        | 0.22           | 1.20               |              | 7.99 | 7.83          | 0.19       |      | 2419.2                               | 548                       |                      |                    |
|      | Mean                         |      |            | 102                                        | 97                                              | 116                                               |                           |                           | 14.18        | 105.1 | 10.81        | 118.67         | 1.19               |              | 7.71 | 4.70          | 0.13       |      | 1552.2                               | 114                       |                      |                    |
|      | StDev                        |      |            | 40                                         | 28                                              | 35                                                |                           |                           | 2.57         | 6.1   | 0.39         | 114.23         | 0.48               |              | 0.32 | 2.04          | 0.04       |      | 758.0                                | 195                       |                      |                    |
| 2008 | 4/21/2008                    |      |            | 96                                         | 94                                              | 97                                                | <0.025                    | <0.25                     | 13.61        | 89.3  | 9.28         | 0.19           | 0.55               |              | 7.16 | 5.92          | 0.14       |      | 1732.9                               | 4                         |                      |                    |
|      | 5/19/2008                    |      |            | 119                                        | 113                                             | 127                                               | <0.025                    | <0.25                     | 8.85         | 98.2  | 11.39        | 0.20           | 0.82               |              | 8.12 | 5.30          | 0.11       |      | 2419.2                               | 23                        |                      |                    |
|      | 6/16/2008                    |      |            | 122                                        | 140                                             | 144                                               | <0.025                    | <0.25                     | 17.70        | 94.8  | 9.03         | 0.26           | 0.72               |              | 8.24 | 5.84          | 0.10       |      | >2419.2                              | 24                        |                      |                    |
|      | 7/14/2008                    |      |            | 73                                         | 75                                              | 160                                               | <0.025                    | <0.25                     | 19.69        | 96.7  | 8.85         | 0.14           | 0.86               |              | 7.47 | 14.60         | 0.50       |      | >2419.2                              | 866                       |                      |                    |
|      | 8/4/2008                     |      |            | 113                                        | 124                                             | 133                                               | <0.025                    | <0.25                     | 16.18        | 108.3 | 10.64        | 0.25           | 0.80               |              | 8.03 | 8.18          | 0.18       |      | >2419.2                              | 86                        |                      |                    |
|      | 8/26/2008                    |      |            | 134                                        | 115                                             | 134                                               | <0.025                    | <0.25                     | 16.72        | 105.5 | 10.25        | 0.25           | 0.93               |              | 8.14 | 6.10          | 0.14       |      | 1553.1                               | 35                        |                      |                    |
|      | 9/23/2008                    |      |            | 64                                         | 96                                              | 110                                               | <0.025                    | <0.25                     | 10.84        | 109.6 | 12.13        | 0.27           | 0.55               |              | 8.18 | 4.84          | 0.09       |      | 727.0                                | 14                        |                      |                    |
|      | 10/14/2008                   |      |            | 135                                        | 186                                             | 200                                               | <0.025                    | <0.25                     | 10.06        | 102.4 | 11.53        | 0.27           | 0.97               |              | 8.14 | 5.45          | 0.08       |      | 365.4                                | 7                         |                      |                    |
|      | Mean                         |      |            | 107                                        | 118                                             | 138                                               |                           |                           | 14.21        | 100.6 | 10.39        | 0.23           | 0.78               |              | 7.94 | 7.03          | 0.17       |      | 1359.5                               | 133                       |                      |                    |
|      | StDev                        |      |            | 27                                         | 34                                              | 32                                                |                           |                           | 3.97         | 7.1   | 1.25         | 0.05           | 0.16               |              | 0.40 | 3.22          | 0.14       |      | 819.8                                | 298                       |                      |                    |
| 2009 | 4/13/2009                    |      |            | 106                                        | 82                                              | 93                                                | <0.025                    | <0.25                     | 8.54         | 97.0  | 11.34        | 0.21           | 0.60               |              | 7.87 |               |            |      | 224.7                                | 0                         |                      |                    |
|      | 5/11/2009                    |      |            | 121                                        | 112                                             | 127                                               | <0.025                    | <0.25                     | 14.79        | 93.0  | 9.42         | 0.21           | 0.74               |              | 8.09 |               |            |      | 1299.7                               | 4                         |                      |                    |
|      | 5/27/2009                    |      |            | 127                                        | 115                                             | 142                                               | <0.025                    | <0.25                     | 14.09        | 96.3  | 9.90         | 0.26           | 0.90               |              | 8.18 |               |            |      | 1986.0                               | 48                        |                      |                    |
|      | 6/8/2009                     |      |            | 122                                        | 129                                             | 135                                               | <0.025                    | <0.25                     | 15.69        | 105.8 | 10.51        | 0.25           | 0.41               |              | 8.15 |               |            |      | 727.0                                | 15                        |                      |                    |
|      | 6/22/2009                    |      |            | 122                                        | 15                                              | 17                                                | <0.025                    | <0.25                     | 20.18        | 96.2  | 8.71         | 0.20           | 0.54               |              | 8.02 |               |            |      | 1986.0                               | 16                        |                      |                    |
|      | 7/6/2009                     |      |            | 119                                        | 132                                             | 152                                               | <0.025                    | <0.25                     | 14.78        | 99.2  | 10.05        | 0.26           | 1.02               |              | 8.32 |               |            |      | 1553.1                               | 19                        |                      |                    |



| Date                         | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 7/20/2009                    |           |            | 139                                        | 140                                             | 149                                               | <0.025                    | <0.25                     | 17.28        | 120.3 | 11.55        | 0.23           | 0.74               |              | 8.28 |               |            |      | >2419                                | 36                        |                      |                    |
| 8/4/2009                     |           |            | 127                                        | 114                                             | 146                                               | <0.025                    | <0.25                     | 18.48        | 92.9  | 8.70         | 0.25           | 0.74               |              | 8.11 |               |            |      | 1986.3                               | 46                        |                      |                    |
| 8/18/2009                    |           |            | 138                                        | 122                                             | 163                                               | <0.025                    | <0.25                     | 18.57        | 96.7  | 9.04         | 0.23           | 0.46               |              | 8.15 |               |            |      | 2419.2                               | 19                        |                      |                    |
| 8/31/2009                    |           |            | 121                                        | 116                                             | 137                                               | <0.025                    | <0.25                     | 14.47        | 81.8  | 8.34         | 0.23           | 0.63               |              | 8.16 |               |            |      | 1732.0                               | 28                        |                      |                    |
| 9/14/2009                    |           |            | 132                                        | 119                                             | 146                                               | <0.025                    | <0.25                     | 14.70        | 99.8  | 10.12        | 0.27           | 0.47               |              | 8.14 |               |            |      | 1299.7                               | 31                        |                      |                    |
| 9/28/2009                    |           |            | 106                                        | 92                                              | 110                                               | <0.025                    | <0.25                     | 13.16        | 93.4  | 9.80         | 0.18           | 1.15               |              | 7.69 |               |            |      | >2419.2                              | 261                       |                      |                    |
| 10/14/2009                   |           |            | 121                                        | 114                                             | 130                                               | <0.025                    | <0.25                     | 6.71         | 101.3 | 12.37        | 0.21           | 2.41               |              | 7.83 |               |            |      | 1046.2                               | 10                        |                      |                    |
| Mean                         |           |            | 123                                        | 108                                             | 127                                               |                           |                           | 14.73        | 98.0  | 9.99         | 0.23           | 0.83               |              | 8.08 |               |            |      | 1478.2                               | 41                        |                      |                    |
| StDev                        |           |            | 10                                         | 32                                              | 38                                                |                           |                           | 3.78         | 8.7   | 1.21         | 0.03           | 0.52               |              | 0.18 |               |            |      | 641.5                                | 68                        |                      |                    |
| 2010                         | 5/3/2010  |            | 128                                        | 14                                              | 22                                                | <0.025                    | <0.25                     | 16.49        | 97.7  | 9.54         | 0.23           |                    |              | 7.83 |               |            |      | 241.9                                | 517                       |                      |                    |
|                              | 5/17/2010 |            | 124                                        | 125                                             | 133                                               | <0.025                    | <0.25                     | 13.15        | 99.4  | 10.44        | 0.24           | 0.53               |              | 7.66 |               |            |      | 686.7                                | 4                         |                      |                    |
|                              | 6/1/2010  |            | 130                                        | 138                                             | 146                                               | <0.025                    | <0.25                     | 15.96        | 96.2  | 9.20         | 0.25           | 4.89               |              | 7.78 |               |            |      | >2419                                | 111                       |                      |                    |
|                              | 6/14/2010 |            | 106                                        | 95                                              | 122                                               | <0.025                    | <0.25                     | 15.18        | 95.3  | 9.59         | 0.21           | 1.08               |              | 7.79 |               |            |      | >2419.2                              | 42                        |                      |                    |
|                              | 6/29/2010 |            | 75                                         | 78                                              | 88                                                | <0.025                    | <0.25                     | 19.12        | 89.9  | 8.32         | 0.13           | 0.44               |              | 7.26 |               |            |      | >2419                                | 816                       |                      |                    |
|                              | 7/12/2010 |            | 138                                        | 122                                             | 150                                               | <0.025                    | <0.25                     | 19.72        | 104.9 | 9.59         | 0.24           | 0.63               |              | 8.14 |               |            |      | 2419.2                               | 38                        |                      |                    |
|                              | 8/9/2010  |            | 130                                        | 120                                             | 155                                               | <0.025                    | <0.25                     | 18.61        | 112.2 | 10.48        | 0.22           | 0.62               |              | 8.12 |               |            |      | 2419.2                               | 24                        |                      |                    |
|                              | 8/23/2010 |            | 72                                         | 68                                              | 78                                                | <0.025                    | <0.25                     | 16.97        |       |              | 0.13           | 1.24               |              | 7.40 |               |            |      | >2419.2                              | 411                       |                      |                    |
|                              | 9/7/2010  |            | 138                                        | 135                                             | 170                                               | <0.025                    | <0.25                     | 15.34        | 101.8 | 10.18        | 0.23           | 0.47               |              | 7.99 |               |            |      | 980.0                                | 11                        |                      |                    |
|                              | 9/20/2010 |            | 96                                         | 119                                             | 130                                               | <0.025                    | <0.25                     | 12.26        | 106.0 | 11.35        | 0.22           | 0.49               |              | 8.02 |               |            |      | 1299.7                               | 7                         |                      |                    |
|                              | 10/4/2010 |            | 104                                        | 105                                             | 120                                               | <0.025                    | <0.25                     | 10.18        | 96.0  | 10.79        | 0.18           | 0.69               |              | 7.69 |               |            |      | >2419                                | 13                        |                      |                    |
|                              | Mean      |            | 113                                        | 102                                             | 119                                               |                           |                           | 15.73        | 99.9  | 9.95         | 0.21           | 1.11               |              | 7.79 |               |            |      | 1341.1                               | 181                       |                      |                    |
|                              | StDev     |            | 24                                         | 37                                              | 42                                                |                           |                           | 2.96         | 6.4   | 0.87         | 0.04           | 1.36               |              | 0.28 |               |            |      | 904.8                                | 275                       |                      |                    |
| 2011                         | 5/9/2011  |            | 107                                        | 105                                             | 119                                               | <0.025                    | <0.25                     | 14.04        | 102.2 | 10.52        | 0.20           | 1.30               |              | 7.90 |               |            |      | 291.0                                | <1                        |                      |                    |
|                              | 5/23/2011 |            | 100                                        | 86                                              | 107                                               | <0.025                    | <0.05                     | 14.13        | 95.3  | 9.79         | 0.18           | 0.90               |              | 7.79 |               |            |      | >2419                                | 99                        |                      |                    |
|                              | 6/6/2011  |            | 132                                        | 90                                              | 98                                                | <0.025                    | 0.15                      | 13.99        | 100.4 | 10.35        | 0.23           | 0.44               |              | 7.96 |               |            |      | 1299.0                               | 39                        |                      |                    |

| Date                         | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2011                         | 6/19/2011  |            | 135                                        | 138                                             | 146                                               | <0.025                    | 0.12                      | 16.77        | 82.5  | 8.01         | 0.24           | 1.01               |              | 8.11 |               |            |      | 980.0                                | 7                         |                      |                    |
|                              | 7/11/2011  |            | 144                                        | 130                                             | 148                                               | <0.025                    | 0.13                      | 16.74        | 77.8  | 7.56         | 0.25           | 1.09               |              | 8.09 |               |            |      | 1203.0                               | 23                        |                      |                    |
|                              | 7/25/2011  |            | 130                                        | 126                                             | 133                                               | <0.025                    | 0.14                      | 14.74        | 92.2  | 9.34         | 0.20           | 2.24               |              | 7.73 |               |            |      | >2419                                | >2419                     |                      |                    |
|                              | 8/8/2011   |            | 112                                        | 113                                             | 131                                               | <0.025                    | 0.06                      | 18.64        |       |              | 0.19           | 0.92               |              | 8.16 |               |            |      | >2419                                | 79                        |                      |                    |
|                              | 9/12/2011  |            | 75                                         | 72                                              | 77                                                | <0.025                    | <0.05                     | 13.89        |       |              | 0.22           | 0.93               |              | 7.56 |               |            |      | >2419                                | 32                        |                      |                    |
|                              | 9/27/2011  |            | 103                                        | 106                                             | 139                                               | <0.025                    | 0.13                      | 14.86        |       |              | 0.22           | 1.78               |              | 8.08 |               |            |      | 1299.0                               | 10                        |                      |                    |
|                              | 10/11/2011 |            | 130                                        | 109                                             | 127                                               | <0.025                    | 0.15                      | 11.48        | 107.0 | 11.66        | 0.23           | 0.65               |              | 7.89 |               |            |      | 1732.9                               | 38                        |                      |                    |
|                              | 10/24/2011 |            | 126                                        | 119                                             | 165                                               | 0.039                     | 0.13                      | 7.36         |       |              | 0.21           | 0.76               |              | 7.93 |               |            |      | 1299.0                               | 11                        |                      |                    |
|                              | Mean       |            | 118                                        | 109                                             | 126                                               |                           |                           | 14.24        | 93.9  | 9.60         | 0.22           | 1.09               |              | 7.93 |               |            |      | 1157.7                               | 38                        |                      |                    |
|                              | StDev      |            | 20                                         | 20                                              | 25                                                |                           |                           | 2.96         | 10.6  | 1.44         | 0.02           | 0.52               |              | 0.18 |               |            |      | 442.6                                | 32                        |                      |                    |
| 2012                         | 4/23/2012  |            | 76                                         | 72                                              | 78                                                | <0.025                    | 0.05                      | 7.40         |       |              | 124.30         | 8.96               |              | 7.79 |               |            |      | >2419                                | 101                       |                      |                    |
|                              | 5/7/2012   |            | 114                                        | 109                                             | 122                                               | <0.025                    | 0.13                      | 17.00        |       |              |                | 1.20               |              | 8.40 |               |            |      | 866.4                                | 13                        |                      |                    |
|                              | 7/10/2012  |            | 144                                        | 142                                             | 150                                               | <0.025                    | 0.22                      | 17.00        |       |              | 270.00         | 2.27               |              | 8.32 |               |            |      |                                      |                           |                      |                    |
|                              | 8/1/2012   |            | 108                                        | 104                                             | 108                                               | <0.025                    | <0.05                     | 20.10        |       |              | 212.70         | 3.93               |              | 8.07 |               |            |      |                                      |                           |                      |                    |
|                              | 8/13/2012  |            | 130                                        | 128                                             | 132                                               | <0.025                    | 0.14                      | 17.60        |       |              | 267.00         | 1.52               |              | 8.24 |               |            |      |                                      |                           |                      |                    |
|                              | 9/17/2012  |            | 134                                        | 134                                             | 146                                               | <0.025                    | 0.18                      | 13.00        |       |              | 273.00         | 1.16               |              | 7.84 |               |            |      |                                      |                           |                      |                    |
|                              | 10/1/2012  |            | 114                                        | 112                                             | 114                                               | <0.025                    | 0.11                      | 12.80        |       |              | 224.00         | 2.04               |              | 8.12 |               |            |      | >2419                                | 53                        |                      |                    |
|                              | Mean       |            | 117                                        | 114                                             | 121                                               |                           |                           | 14.99        |       |              | 228.50         | 3.01               |              | 8.11 |               |            |      | 866.4                                | 56                        |                      |                    |
|                              | StDev      |            | 22                                         | 23                                              | 25                                                |                           |                           | 4.23         |       |              | 57.12          | 2.79               |              | 0.23 |               |            |      |                                      | 44                        |                      |                    |
| 2013                         | 5/20/2013  |            | 134                                        | 138                                             | 140                                               |                           | 0.14                      | 15.20        |       | 9.60         | 250.00         | 0.93               |              | 8.11 |               |            |      | 1986.0                               | 6                         |                      |                    |
|                              | 6/3/2013   |            | 132                                        | 120                                             | 144                                               | <0.025                    | 0.14                      | 14.70        |       | 9.60         | 238.00         | 1.28               |              | 8.25 |               |            |      | 1732.9                               | 15                        |                      |                    |
|                              | 6/25/2013  |            | 120                                        | 116                                             | 128                                               | <0.025                    | 0.09                      | 19.30        |       |              | 229.00         | 2.27               |              | 8.24 |               |            |      | 2419.0                               | 123                       |                      |                    |
|                              | 7/15/2013  |            | 128                                        | 118                                             | 130                                               | <0.025                    | 0.10                      | 23.20        |       | 8.70         | 236.00         | 1.99               |              | 8.19 |               |            |      | >2419                                | 37                        |                      |                    |
|                              | 7/29/2013  |            | 128                                        | 122                                             | 130                                               | <0.025                    | 0.08                      | 17.10        |       | 9.60         | 235.00         | 1.41               |              | 8.15 |               |            |      | 1986.0                               | 110                       |                      |                    |
|                              | 8/12/2013  |            | 136                                        | 130                                             | 144                                               | <0.025                    | 0.15                      | 16.50        |       | 10.10        | 255.00         | 0.71               |              | 8.18 |               |            |      | 1299.7                               | 38                        |                      |                    |

| Date                         | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 4 – BEAVER MEADOW CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 9/9/2013                     |           |            | 138                                        | 134                                             | 140                                               | <0.025                    | 0.16                      | 10.90        |     | 6.00         | 253.00         | 1.22               |              | 8.22 |               |            |      | 517.2                                | 13                        |                      |                    |
| 9/24/2013                    |           |            | 128                                        | 120                                             | 134                                               | <0.025                    | 0.14                      | 9.70         |     | 9.50         | 237.00         | 1.18               |              | 8.14 |               |            |      | 1299.7                               | 18                        |                      |                    |
| Mean                         |           |            | 131                                        | 125                                             | 136                                               |                           |                           | 15.83        |     | 9.01         | 241.63         | 1.37               |              | 8.19 |               |            |      | 1605.8                               | 45                        |                      |                    |
| StDev                        |           |            | 6                                          | 8                                               | 7                                                 |                           |                           | 4.34         |     | 1.39         | 9.62           | 0.52               |              | 0.05 |               |            |      | 624.4                                | 46                        |                      |                    |
| 2014                         | 5/20/2014 |            | 106                                        | 106                                             | 114                                               | <0.025                    | <0.05                     | 16.40        |     |              | 192.80         | 0.63               |              | 8.13 |               |            |      | 1413.6                               | 17                        |                      |                    |
|                              | 6/17/2014 |            | 116                                        | 114                                             | 118                                               | <0.025                    | 0.12                      | 19.80        |     |              | 204.90         | 0.80               |              | 8.04 |               |            |      | >2419                                | 22                        |                      |                    |
|                              | 7/17/2014 |            | 88                                         | 122                                             | 160                                               | <0.025                    | 0.06                      | 16.80        |     |              | 228.00         | 1.15               |              | 8.29 |               |            |      | 920.8                                | 46                        |                      |                    |
|                              | 8/19/2014 |            | 130                                        | 130                                             | 138                                               | <0.025                    | 0.11                      | 15.30        |     |              | 233.00         | 1.01               |              | 8.26 |               |            |      | 770.1                                | 13                        |                      |                    |
|                              | 9/23/2014 |            | 124                                        | 120                                             | 128                                               | <0.025                    | 0.13                      | 11.30        |     |              | 248.00         | 0.99               |              | 8.15 |               |            |      | 980.0                                | 10                        |                      |                    |
|                              | Mean      |            | 113                                        | 118                                             | 132                                               |                           |                           | 15.92        |     |              | 221.34         | 0.92               |              | 8.17 |               |            |      | 1021.1                               | 22                        |                      |                    |
|                              | StDev     |            | 17                                         | 9                                               | 18                                                |                           |                           | 3.07         |     |              | 22.23          | 0.20               |              | 0.10 |               |            |      | 276.2                                | 15                        |                      |                    |
| 2015                         | 4/26/2015 |            | 104                                        | 96                                              | 106                                               | <0.025                    | 0.14                      | 8.40         |     |              | 202.90         | 1.48               |              | 8.05 |               |            |      | 345.0                                | 1                         |                      |                    |
|                              | 5/21/2015 |            | 126                                        | 120                                             | 128                                               | <0.025                    | 0.12                      | 13.70        |     |              | 244.00         | 1.00               |              | 8.32 |               |            |      | 1732.9                               | 5                         |                      |                    |
|                              | 7/28/2015 |            | 131                                        | 128                                             | 140                                               | <0.025                    | 0.08                      | 19.40        |     |              | 263.00         | 0.82               |              | 8.19 |               |            |      | 1120.0                               | 15                        |                      |                    |
|                              | 8/31/2015 |            | 136                                        | 132                                             | 140                                               | <0.025                    | 0.10                      | 16.90        |     |              | 269.00         | 0.70               |              | 8.24 |               |            |      | 727.0                                | 13                        |                      |                    |
|                              | 9/21/2015 |            | 128                                        | 126                                             | 138                                               | <0.025                    | <0.05                     | 12.30        |     |              | 264.00         | 10.40              |              | 8.16 |               |            |      | 727.0                                | 23                        |                      |                    |
|                              | Mean      |            | 125                                        | 120                                             | 130                                               |                           |                           | 14.14        |     |              | 248.58         | 2.88               |              | 8.19 |               |            |      | 930.4                                | 11                        |                      |                    |
|                              | StDev     |            | 12                                         | 14                                              | 15                                                |                           |                           | 4.24         |     |              | 27.25          | 4.21               |              | 0.10 |               |            |      | 525.7                                | 9                         |                      |                    |
| 2016                         | 5/10/2016 |            | 120                                        | 118                                             | 122                                               | <0.025                    | 0.11                      | 11.70        |     |              | 234.00         | 2.19               |              | 8.23 |               |            |      | 461.0                                | 14                        |                      |                    |
|                              | 6/13/2016 |            | 121                                        | 140                                             | 142                                               | <0.025                    | 0.10                      | 11.10        |     |              | 210.40         | 1.11               |              | 8.15 |               |            |      | 461.1                                | 16                        |                      |                    |
|                              | 7/6/2016  |            | 134                                        | 132                                             | 146                                               | <0.025                    | 0.10                      | 18.00        |     |              | 241.00         | 0.85               |              | 8.21 |               |            |      | 1299.6                               | 37                        |                      |                    |
|                              | 8/13/2016 |            | 118                                        | 110                                             | 126                                               | <0.025                    | <0.05                     |              |     |              | 202.50         | 1.30               |              | 7.51 |               |            |      | 2419.2                               | 34                        |                      |                    |
|                              | 9/13/2016 |            | 138                                        | 132                                             | 146                                               | <0.025                    | <0.05                     | 15.30        |     |              | 249.00         | 1.08               |              | 8.16 |               |            |      | 920.0                                | 16                        |                      |                    |
|                              | Mean      |            | 126                                        | 126                                             | 136                                               |                           |                           | 14.03        |     |              | 227.38         | 1.31               |              | 8.05 |               |            |      | 1112.2                               | 23                        |                      |                    |
|                              | StDev     |            | 9                                          | 12                                              | 12                                                |                           |                           | 3.23         |     |              | 20.03          | 0.52               |              | 0.30 |               |            |      | 810.6                                | 11                        |                      |                    |

[EPA, 2001; MVWA, 2016](#)

Table C-8: Tributary Sampling Results – Buttermilk Brook, Site 5

| Date                      | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|------------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 4/28/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 0                                    | 295                       |                      |                    |
| 5/5/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 280                                  | 270                       | 653                  |                    |
| 5/13/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 0                                    | 0                         | 2000                 |                    |
| 5/19/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 560                                  | 120                       | 4550                 |                    |
| 5/26/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 120                                  | 0                         | 710                  |                    |
| 6/1/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 160                                  | 160                       | 295                  |                    |
| 6/9/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 70                                   | 0                         | 400                  |                    |
| 6/16/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 10                                   | 0                         | 412                  |                    |
| 6/22/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1350                                 | 100                       | 496                  |                    |
| 6/29/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 150                                  | 0                         | 390                  |                    |
| 7/7/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 200                                  | 0                         | 225                  |                    |
| 7/13/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 860                                  | 180                       | 150                  |                    |
| 7/28/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1100                                 | 300                       | 89                   |                    |
| 8/4/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 260                                  | 40                        | 148                  |                    |
| 8/11/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 860                                  | 380                       | 120                  |                    |
| 8/18/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1400                                 | 1400                      | 305                  |                    |
| 8/25/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1150                                 | 150                       | 265                  |                    |
| 9/2/1998                  |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 140                                  | 0                         | 215                  |                    |
| 9/22/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 160                                  | 20                        | 105                  |                    |
| 9/29/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 640                                  | 180                       | 315                  |                    |
| 10/6/1998                 |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 20                                   | 20                        | 1089                 |                    |
| 10/13/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 90                                   | 0                         | 1573                 |                    |
| 10/20/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 60                                   | 20                        | 200                  |                    |
| 10/27/1998                |      |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 10                                   | 0                         | 726                  |                    |

| Date                      | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |      |
|---------------------------|------------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|------|
| SITE 5 – BUTTERMILK BROOK |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |      |                                      |                           |                      |                    |      |
| 12/15/1998                |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |      | 180                                  | 0                         | 2000                 |                    |      |
| Mean                      |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |      | 395                                  | 134                       | 709                  |                    |      |
| StDev                     |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |      | 455                                  | 286                       | 971                  |                    |      |
| 1999                      | 4/27/1999  | 2:45       | PM                            |                                    |                                      |               |               | 10.21        | 102.1 | 11.1             | 179.6          | 2.4                | -0.09        | 8.27 | 2.39          | 0.045      | 1.88 | 10                                   | 0                         | 530                  |                    |      |
|                           | 5/6/1999   | 2:36       | PM                            |                                    |                                      |               |               | 14.61        | 104.8 | 10.32            | 191.8          | 0                  | 0.1          | 8.24 | 2.59          | 0.082      | 3.17 | 100                                  | 0                         | 50                   |                    |      |
|                           | 5/11/1999  | 2:38       | PM                            |                                    |                                      |               |               | 13.6         | 105.8 | 10.63            | 193.8          | 0.2                | 0.1          | 8.27 | 2.82          | 0.096      | 3.4  | 80                                   | 0                         | 306                  |                    |      |
|                           | 5/18/1999  | 2:41       | PM                            |                                    |                                      |               |               | 15.67        | 104.9 | 10.57            | 204            | 1.6                | 0.13         | 8.31 | 2.32          | 0.079      | 3.41 | 160                                  | 60                        | 320                  |                    |      |
|                           | 6/2/1999   | 2:38       | PM                            |                                    |                                      |               |               | 14.63        | 111.8 | 11.52            | 203.8          | 3.8                | 0            | 8.3  | 3.13          | 0.105      | 3.35 | 120                                  | 0                         | 6050                 |                    |      |
|                           | 6/8/1999   | 2:30       | PM                            |                                    |                                      |               |               | 16.36        | 104.7 | 10.4             | 207.1          | 1.9                | 0.11         | 8.37 | 2.76          | 0.092      | 3.33 | 190                                  | 10                        | 2400                 |                    |      |
|                           | 6/15/1999  | 2:40       | PM                            |                                    |                                      |               |               | 13.92        | 11.9  | 10.67            | 232.8          | 0                  | 0.17         | 8.38 | 2.34          | 0.114      | 4.87 | 290                                  | 20                        | 630                  |                    |      |
|                           | 6/21/1999  | 2:46       | PM                            | 0.15                               |                                      |               |               | 12.74        | 103.2 | 11.09            | 222.8          | 0.1                | 0.1          | 8.42 | 2.25          | 0.051      | 2.27 | 140                                  | 65                        | 920                  |                    |      |
|                           | 6/29/1999  | 2:30       | PM                            | 0.13                               | 99                                   | 92            |               | 14.36        | 100.8 | 10.45            | 211            | 1.8                | 0.14         | 8.35 | 2.3           | 0.089      | 3.87 | 160                                  | 2                         | 180                  |                    |      |
|                           | 7/13/1999  | 2:20       | PM                            |                                    | 94                                   | 64            | 80            | 0.218        | 0.2   | 15.04            | 100.2          | 10.24              | 206.9        | 2.7  | 0.34          | 8.45       | 2.55 | 0.089                                | 3.49                      | 940                  | 60                 | 2000 |
|                           | 7/20/1999  | 2:45       | PM                            | 0.08                               | 98                                   | 90            | 108           | 0.026        | 0.1   | 16.24            | 96.1           | 9.57               | 213.7        | 3    | 0.48          | 8.4        | 3.32 | 0.074                                | 2.23                      | 760                  | 190                | 738  |
|                           | 7/27/1999  | 2:45       | PM                            | 0.1                                | 96                                   | 90            | 110           | 0.09         | 0.1   | 16.33            | 94.8           | 9.42               | 209.5        | 2.4  | 0.47          | 8.56       | 2.19 | 0.075                                | 3.42                      | 480                  | 140                | 1048 |
|                           | 8/3/1999   | 2:18       | PM                            |                                    | 37                                   | 28            | 54            | 0.18         | 0.2   | 14.15            | 92.9           | 9.67               | 206.9        | 2.6  | 0.31          | 8.65       | 1.8  | 0.064                                | 3.56                      | 400                  | 30                 | 1560 |
|                           | 8/17/1999  | 2:37       | PM                            |                                    | 104                                  | 88            | 108           | 0.41         | 0.2   | 14.95            | 85             | 8.71               | 201.2        | 0.7  | 0.35          | 8.65       | 1.86 | 0.062                                | 3.33                      | 120                  | 90                 | 496  |
|                           | 8/24/1999  | 2:27       | PM                            | 0.08                               | 102                                  | 86            | 108           | 0.72         |       | 14.27            | 82.8           | 8.6                | 196.9        | 0    | 0.34          | 8.66       | 1.44 | 0.053                                | 3.68                      | 270                  | 0                  | 2000 |
|                           | 8/31/1999  | 2:22       | PM                            |                                    | 98                                   | 90            | 118           | 0.26         |       | 13.31            | 80.6           | 8.53               | 200.3        | 0.2  | 0.35          | 8.6        | 1.32 | 0.048                                | 3.64                      | 220                  | 10                 | 319  |
|                           | 9/8/1999   | 2:30       | PM                            |                                    | 36                                   | 60            | 82            | 0.35         | 0.1   | 15.84            | 76.6           | 7.69               | 197.1        | 8.2  | 0.37          | 8.58       | 2.79 | 0.095                                | 3.41                      | 360                  | 10                 | 411  |
|                           | 9/15/1999  | 2:30       | PM                            | 0.11                               | 90                                   | 45            | 100           | 1.03         | 0.2   | 13.95            | 75.2           | 7.87               | 190.7        | 0    | 0.34          | 8.37       | 4.28 | 0.163                                | 3.81                      | 410                  | 360                | 519  |
|                           | 9/21/1999  | 2:45       | PM                            | 0.15                               | 74                                   | 74            | 122           | 0.92         | 0.1   | 11.58            | 75.7           | 8.35               | 176.7        | 1.2  | 0.37          | 8.19       | 6.56 | 0.22                                 | 3.35                      | 370                  | 50                 | 411  |
|                           | 9/28/1999  | 2:25       | PM                            | 0.08                               | 90                                   | 82            | 158           | 0.34         | 0.1   | 13.13            | 76.1           | 8.11               | 189.1        | 0    | 0.37          | 8.44       | 2.87 | 0.106                                | 3.69                      | 110                  | 20                 | 340  |
|                           | 10/5/1999  | 2:32       | PM                            | 0.16                               | 72                                   | 70            | 81            | 0.7          | 0.3   | 9.63             | 74.4           | 8.59               | 170.9        | 0    | 0.41          | 8.25       | 5.68 | 0.206                                | 3.63                      | 100                  | 30                 | 446  |
|                           | 10/19/1999 | 2:29       | PM                            | 0.08                               | 84                                   | 76            | 94            | 0.29         | 0     | 7.79             | 66.4           | 8.01               | 185          | 0    | 0.04          | 7.04       | 3.15 | 0.109                                | 3.46                      | 60                   | 10                 | 747  |



| Date                      | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |      |     |
|---------------------------|-----------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|------|-----|
| SITE 5 – BUTTERMILK BROOK |           |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       |                                      |                           |                      |                    |      |     |
| 10/26/1999                | 2:35      | PM         | 0.08                          | 82                                 | 75                                   | 90            | 0.31          | 0.1          | 7.88  | 63.6             | 7.66           | 183.8              | 1.2          | 0.35 | 8.23          | 3.05       | 0.106 | 3.48                                 | 170                       | 0                    | 50                 |      |     |
| 10/26/1999                | 2:23      | PM         | 0.17                          | 114                                | 115                                  | 129           | 0.48          | 0.2          | 6.87  | 62.4             | 7.69           | 254                | 5            | 0.28 | 8.1           | 4.23       | 0.135 | 3.19                                 | 270                       | 0                    | 2000               |      |     |
| Mean                      |           |            | 0.11                          | 86                                 | 77                                   | 103           | 0.42          | 0.1          | 13.21 | 85.5             | 9.39           | 201.2              | 1.6          | 0.25 | 8.34          | 2.92       | 0.098 | 3.37                                 | 262                       | 48                   | 1020               |      |     |
| StDev                     |           |            | 0.04                          | 22.02                              | 20.57                                | 24.68         | 0.3           | 0.08         | 2.79  | 21.7             | 1.27           | 18.27              | 1.99         | 0.16 | 0.32          | 1.22       | 0.05  | 0.59                                 | 220.95                    | 81.97                | 1269.59            |      |     |
| 2000                      | 1/4/2000  | 2:46       | PM                            | 0.26                               | 37                                   | 38            | 46            | 1.36         | 0.4   | 1.51             | 68.3           | 9.71               | 88.1         | 7.4  | 0.55          | 7.96       | 9.45  | 0.331                                | 3.5                       | 10                   | 0                  | 530  |     |
|                           | 2/29/2000 | 2:14       | PM                            | 0.17                               |                                      |               |               | 3.19         | 30.9  | 4.19             | 132            | 3.1                | 0.43         | 7.48 |               |            |       |                                      |                           |                      |                    |      |     |
|                           | 3/21/2000 | 2:31       | PM                            | 0.12                               | 72                                   | 62            | 76            | 1.28         | 0.6   | 5.84             | 18.5           | 2.34               | 147          | 11.3 | 0.46          | 5.32       | 3.28  |                                      | 299                       |                      |                    |      |     |
|                           | 4/5/2000  | 2:28       | PM                            | 0.06                               | 67                                   | 52            | 60            | 0.29         | 0.2   | 3.42             | 87.1           | 11.49              | 124.2        | 2.2  | 0.9           | 7.01       | 5.42  | 0.187                                | 3.45                      | 167                  | 2                  | 2000 |     |
|                           | 4/13/2000 | 11:50      | AM                            | 0.07                               | 69                                   | 66            | 79            | 0.44         | 0.2   | 4.97             | 93.7           | 11.87              | 160.1        | 1.4  | 0.35          | 7.47       | 3.17  | 0.1                                  | 3.15                      | 115                  | 2                  | 86   |     |
|                           | 4/18/2000 | 2:30       | PM                            | 0.11                               | 72                                   | 68            | 84            | 0.63         | 0.2   | 7.68             | 84.9           | 10.04              | 166          | 2    | 0.41          | 7.38       | 3.31  | 0.117                                | 3.53                      | 225                  | 1                  |      |     |
|                           | 4/25/2000 | 2:23       | PM                            | 0.14                               | 74                                   | 67            | 82            | 0.63         | 0     | 11.46            | 84.7           | 9.16               | 158.6        | 1.7  | 0.44          | 7.58       | 3.55  | 0.124                                | 3.49                      | 261                  | 1                  | 416  |     |
|                           | 5/4/2000  | 1:20       | PM                            | 0.1                                | 78                                   | 74            | 87            | 0.41         | 0.1   | 13.34            | 86.9           | 9.01               | 168.5        | 1.3  | 0.38          | 7.68       | 3.14  | 0.104                                | 3.31                      | 261                  | 0                  | 688  |     |
|                           | 5/9/2000  | 2:38       | PM                            | 0.14                               | 82                                   | 74            | 88            | 0.96         | 0     | 16.52            | 83.6           | 8.09               | 169.6        | 3.1  | 0.51          | 7.66       | 4.2   | 0.156                                | 3.71                      | 866                  | 13                 | 854  |     |
|                           | 5/16/2000 | 2:54       | PM                            | 0.09                               | 75                                   | 68            | 79            | 0.89         | 0.2   | 12.71            | 84.7           | 8.91               | 155.5        | 1.6  | 0.67          | 7.45       | 4.79  | 0.185                                | 3.86                      | 349                  | 5                  | 3030 |     |
|                           | 5/30/2000 | 2:21       | PM                            | 0.1                                | 85                                   | 75            | 91            | 0.21         | 0.2   | 13.71            | 86.9           | 8.94               | 177.3        | 2    | 0.32          | 7.81       | 3.39  | 0.113                                | 3.33                      | 365                  | 5                  | 3170 | 0/0 |
|                           | 6/6/2000  | 2:27       | PM                            | 0.23                               | 72                                   | 67            | 81            | 0.99         | 0.2   | 10.63            | 82             | 9.04               | 157.4        | 3.1  | 0.61          | 7.54       | 6.46  | 0.24                                 | 3.72                      | 2419                 | 43                 | 3250 |     |
|                           | 6/15/2000 | 0:00       |                               |                                    | 79                                   | 74            | 88            | 0.94         | 0.1   |                  | 94.8           | 8.85               | 174.5        | 3.8  |               | 7.79       | 4.88  | 0.196                                | 4.02                      | 435                  | 14                 | 920  |     |
|                           | 6/20/2000 | 2:18       | PM                            | 0.12                               | 85                                   | 80            | 94            | 0.62         | 0.1   | 15.72            | 80.1           | 7.9                | 179.9        | 0.7  | 0.48          | 7.85       | 4.38  | 0.151                                | 3.45                      | 1553                 | 6                  | 1490 |     |
|                           | 6/27/2000 | 12:27      | PM                            | 0.12                               | 89                                   | 79            | 97            | 0.83         | 0.2   | 14.95            | 80.7           | 8.08               | 179.3        | 3.4  | 0.47          | 7.92       | 4.42  | 0.169                                | 3.82                      | 1986                 | 42                 | 2570 | 0/0 |
|                           | 7/11/2000 | 12:57      | PM                            | 0.17                               | 86                                   | 75            | 92            | 0.85         | 0.2   | 14.99            | 76.7           | 7.68               | 171.6        | 1.5  | 0.45          | 7.65       | 5.01  | 0.176                                | 3.51                      | 1987                 | 41                 | 1740 |     |
|                           | 7/18/2000 | 1:33       | PM                            | 0.08                               | 92                                   | 78            | 91            | 1.04         | 0.3   | 14.03            | 78.3           | 7.97               | 169.1        | 0.9  | 0.4           | 7.93       | 5.18  | 0.189                                | 3.65                      | 1553                 | 88                 | 2100 |     |
|                           | 7/25/2000 | 1:35       | PM                            | 0.11                               | 92                                   | 88            | 100           | 0            | 0.2   | 13.87            | 76.1           | 7.8                | 186.6        | 0.8  | 0.43          | 8.16       | 3.39  | 0.096                                | 2.83                      | 1300                 | 54                 | 4650 |     |
|                           | 8/1/2000  | 1:05       | PM                            | 0.19                               | 76                                   | 71            | 81            | 1.06         | 0.2   |                  |                |                    | 166.3        | 1.2  |               | 7.62       | 8.2   | 0.299                                | 3.65                      | 2419                 | 102                | 3600 | 2/0 |
|                           | 8/8/2000  | 12:51      | PM                            | 0.06                               | 84                                   | 74            | 90            | 0.74         | 0.2   | 15.57            | 83.5           | 8.31               | 144.1        | 1    | 0.44          | 7.37       | 5.77  | 0.211                                | 3.66                      | 1553                 | 31                 | 1090 |     |
|                           | 8/22/2000 | 12:08      | PM                            | 0.11                               | 92                                   | 82            | 100           | 0.43         | 0.2   | 12.61            | 90.1           | 9.57               | 160.1        | 0.7  | 0.39          | 8.09       | 3.2   | 0.116                                | 3.63                      | 2419                 | 248                | 2130 |     |

| Date                      | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 8/29/2000                 | 3:19 PM    | 0.12       | 92                                         | 82                                              | 95                                                | 0.56                      | 0.2                       | 14.53        | 113   | 11.5         | 193.2          | 0.6                | 0.39         | 8.16 | 3.54          | 0.121      | 3.42 | 816                                  | 5                         |                      |                    |
| 9/19/2000                 | 10:49 AM   | 0.1        | 90                                         | 79                                              | 96                                                | 0.29                      | 0.2                       | 11.46        | 115.6 | 12.6         | 193.9          | 0.5                | 0.39         | 8.1  | 3.78          | 0.131      | 3.47 | 1120                                 | 16                        | 1770                 |                    |
| 10/24/2000                | 11:34 AM   |            | 88                                         | 82                                              | 102                                               | 0.2                       | 0.2                       | 7.7          |       |              | 134            | 0.7                | 0.41         | 7.97 | 3.59          | 0.11       | 3.06 | 1733                                 | 3                         | 1200                 |                    |
| Mean                      |            | 0.12       | 79                                         | 72                                              | 86                                                | 0.68                      | 0.2                       | 10.93        | 81    | 8.78         | 160.7          | 2.3                | 0.47         | 7.62 | 4.59          | 0.165      | 3.51 | 1053                                 | 33                        | 1864                 |                    |
| StDev                     |            | 0.06       | 12.31                                      | 10.79                                           | 12.91                                             | 0.36                      | 0.12                      | 4.61         | 21.21 | 2.28         | 23.82          | 2.44               | 0.13         | 0.57 | 1.64          | 0.06       | 0.27 | 834.54                               | 56.01                     | 1212.67              |                    |
| 2001                      | 4/26/2001  |            | 70                                         | 70                                              | 78                                                | 0.240                     | 0.20                      |              |       |              |                | 1.03               |              |      | 4.53          | 0.13       | 2.94 |                                      |                           |                      |                    |
|                           | 5/31/2001  |            | 84                                         | 80                                              | 92                                                | 0.310                     | 0.10                      | 9.43         | 80.3  | 9.39         | 155.20         |                    |              | 8.08 | 3.14          | 0.10       | 3.22 | 980.0                                | 10                        |                      |                    |
|                           | 6/27/2001  | 12:44 PM   | 86                                         | 86                                              | 94                                                | 0.140                     | 0.20                      | 15.18        | 85.5  | 8.69         | 188.40         | 1.38               | 0.09         | 8.02 | 4.35          | 0.15       | 3.52 | 2419.0                               | 37                        |                      |                    |
|                           | 7/31/2001  | 11:26 AM   | 98                                         | 90                                              | 102                                               | 0.140                     | 0.20                      | 13.10        | 85.7  | 9.05         | 176.40         |                    | 0.05         | 7.95 | 2.68          | 0.09       | 3.28 | 1413.0                               | 29                        |                      |                    |
|                           | 8/22/2001  | 12:20 PM   | 94                                         | 88                                              | 106                                               | 0.840                     | 0.20                      | 14.85        | 20.1  | 2.06         | 172.80         | 3.70               |              | 8.15 | 3.37          | 0.13       | 3.80 | 1986.0                               | 31                        |                      |                    |
|                           | 9/20/2001  |            | 78                                         | 76                                              | 86                                                | 0.070                     | 0.20                      | 11.16        | 109.0 | 12.62        | 156.80         |                    |              | 8.00 | 7.97          | 0.29       | 3.64 | 2419.0                               | 52                        |                      |                    |
|                           | 10/29/2001 | 2:19 PM    | 88                                         | 79                                              | 95                                                | 0.290                     | 0.20                      | 5.87         | 107.4 | 13.30        | 184.70         | 1.98               | 0.11         | 8.01 | 3.67          | 0.11       | 3.00 | 613.0                                | 0                         |                      |                    |
|                           | Mean       |            | 85                                         | 81                                              | 93                                                | 0.290                     | 0.19                      | 11.60        | 81.3  | 9.19         | 172.38         | 2.02               | 0.08         | 8.04 | 4.24          | 0.14       | 3.34 | 1638.3                               | 27                        |                      |                    |
|                           | StDev      |            | 9                                          | 7                                               | 9                                                 | 0.258                     | 0.04                      | 3.56         | 32.3  | 4.00         | 13.88          | 1.19               | 0.03         | 0.07 | 1.77          | 0.07       | 0.32 | 758.3                                | 19                        |                      |                    |
| 2002                      | 4/30/2002  | 12:20 PM   | 72                                         | 65                                              | 77                                                | 0.350                     | 0.20                      | 5.76         | 109.5 | 13.79        | 147.60         | 1.74               | 0.35         | 7.20 | 4.22          | 0.14       | 3.20 | 387.0                                | 12                        |                      |                    |
|                           | 5/29/2002  | 2:01 PM    | 98                                         | 86                                              | 96                                                | 0.140                     | 0.10                      | 13.87        | 112.2 | 11.67        | 218.60         | 1.07               | 0.33         | 8.07 | 2.54          | 0.08       | 3.11 | 261.0                                | 6                         |                      |                    |
|                           | 7/2/2002   | 11:12 AM   | 99                                         | 88                                              | 108                                               | 0.270                     | 0.20                      | 14.60        | 104.0 | 10.71        | 226.10         | 0.82               | 0.19         | 8.02 | 3.39          | 0.11       | 3.24 | 2419.0                               | 78                        |                      |                    |
|                           | 8/1/2002   |            | 104                                        | 92                                              | 108                                               | 0.340                     | 0.40                      | 15.02        | 122.6 | 12.37        | 187.00         | 4.75               | 0.38         | 7.91 | 2.56          | 0.07       | 2.73 | 2419.0                               | 95                        |                      |                    |
|                           | 8/29/2002  |            | 100                                        | 88                                              | 104                                               | 0.270                     | 0.20                      | 11.30        |       | 8.40         | 220.00         | 2.64               |              | 8.05 | 2.67          | 0.06       | 2.32 | 1120.0                               | 42                        |                      |                    |
|                           | 9/25/2002  | 1:04 PM    | 92                                         | 86                                              | 100                                               | 0.390                     | 0.20                      | 12.03        | 101.4 | 10.92        | 157.00         | 0.84               | 0.00         | 7.98 | 4.10          | 0.13       | 3.05 | 1733.0                               | 28                        |                      |                    |
|                           | 10/24/2002 | 1:37 PM    | 78                                         | 76                                              | 86                                                | 0.520                     | 0.20                      | 6.12         | 100.5 | 12.47        | 145.00         | 1.09               | 1.13         | 7.92 | 4.37          | 0.15       | 3.43 | 921.0                                | 9                         |                      |                    |
|                           | Mean       |            | 92                                         | 83                                              | 97                                                | 0.326                     | 0.21                      | 11.24        | 108.4 | 11.48        | 185.90         | 1.85               | 0.40         | 7.88 | 3.41          | 0.10       | 3.01 | 1322.9                               | 39                        |                      |                    |
|                           | StDev      |            | 12                                         | 9                                               | 12                                                | 0.118                     | 0.09                      | 3.86         | 8.3   | 1.71         | 36.11          | 1.43               | 0.39         | 0.31 | 0.82          | 0.03       | 0.37 | 892.3                                | 35                        |                      |                    |
| 4/28/2003                 | 1:54 PM    |            | 76                                         | 72                                              | 82                                                | 0.055                     | 0.30                      | 12.56        | 110.6 | 11.77        | 156.00         | 2.13               | 1.06         | 7.97 | 3.23          | 0.11       | 3.41 | 387.3                                | 3                         |                      |                    |
| 5/27/2003                 | 1:28 PM    |            | 76                                         | 73                                              | 97                                                | 0.059                     | 0.30                      | 11.94        | 101.6 | 10.96        | 163.00         | 1.23               | 1.10         | 9.09 | 4.02          | 0.15       | 3.66 | 1046.2                               | 40                        |                      |                    |

| Date                      | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |                  |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2003                      | 6/23/2003  | 1:37 PM    | 86                                         | 70                                              | 84                                                | 0.049                     | 0.30                      | 15.36        | 92.4  | 9.25             | 131.00         | 1.51               | 1.91         | 8.42 | 5.19          | 0.19       | 3.66 | 727.0                                | 30                        |                      |                    |
|                           | 7/17/2003  | 12:55 PM   | 90                                         | 78                                              | 104                                               | 0.040                     | 0.20                      | 15.94        | 99.7  | 9.85             | 177.00         | 0.54               | 1.86         | 8.05 | 4.21          | 0.16       | 3.80 | 1413.6                               | 22                        |                      |                    |
|                           | 8/18/2003  | 1:17 PM    | 98                                         | 84                                              | 101                                               | 0.045                     | 0.30                      | 16.05        | 106.4 | 10.48            | 149.00         | 1.15               | 0.82         | 7.94 | 5.58          | 0.22       | 3.91 | 1986.3                               | 50                        |                      |                    |
|                           | 9/24/2003  | 1:20 PM    | 82                                         | 78                                              | 80                                                | 0.010                     | 0.40                      | 13.50        | 97.6  | 10.17            | 128.00         | 0.99               | 0.93         | 7.82 | 7.08          | 0.28       | 3.97 | 1986.0                               | 48                        |                      |                    |
|                           | 10/15/2003 | 1:12 PM    | 88                                         | 84                                              | 92                                                |                           |                           | 10.39        | 97.9  | 10.94            | 189.00         | 1.32               | 1.26         | 8.02 | 3.55          | 0.12       | 3.46 | 1046.0                               | 47                        |                      |                    |
|                           | Mean       |            | 85                                         | 77                                              | 91                                                | 0.043                     | 0.30                      | 13.68        | 100.9 | 10.49            | 156.14         | 1.27               | 1.28         | 8.19 | 4.69          | 0.18       | 3.69 | 1227.5                               | 34                        |                      |                    |
|                           | StDev      |            | 8                                          | 6                                               | 10                                                | 0.018                     | 0.06                      | 2.19         | 6.0   | 0.83             | 22.50          | 0.49               | 0.44         | 0.44 | 1.35          | 0.06       | 0.21 | 606.6                                | 17                        |                      |                    |
| 2004                      | 4/19/2004  | 12:39 PM   | 68                                         | 66                                              | 72                                                |                           |                           | 10.29        | 96.4  | 10.81            | 126.00         | 2.15               | 0.37         | 7.78 | 3.91          | 0.15       | 3.81 | 291.0                                | 4                         |                      |                    |
|                           | 5/25/2004  | 2:18 PM    | 41                                         | 40                                              | 46                                                | 0.092                     | 0.07                      | 16.57        | 75.4  | 7.36             | 70.00          | 3.26               | 0.13         | 7.25 | 11.80         | 0.49       | 4.14 | >2419.2                              | 238                       |                      |                    |
|                           | 6/14/2004  | 12:15 PM   | 96                                         | 103                                             | 107                                               | 0.008                     | 0.12                      | 11.97        | 95.1  | 10.25            | 187.00         | 1.88               | 0.23         | 8.06 | 2.85          | 0.09       | 3.05 | 328.2                                | 10                        |                      |                    |
|                           | 7/19/2004  | 10:24 AM   | 94                                         | 94                                              | 107                                               | 0.008                     | 0.16                      | 13.38        | 107.5 | 11.22            | 189.00         | 1.82               | 0.33         | 8.17 | 3.98          | 0.15       | 3.72 | 1096.2                               | 61                        |                      |                    |
|                           | 8/30/2004  | 12:20 PM   | 102                                        | 84                                              | 104                                               | 0.032                     | 0.16                      | 13.63        | 108.0 | 11.22            | 164.00         | 1.06               | 0.83         | 8.01 | 4.18          | 0.14       | 3.42 | 1046.2                               | 23                        |                      |                    |
|                           | 9/14/2004  | 2:37 PM    | 82                                         | 94                                              | 108                                               | 0.000                     | 0.20                      | 14.75        | 100.3 | 10.17            | 181.00         | 1.04               | 0.46         | 8.04 | 4.39          | 0.14       | 3.26 | 1986.0                               | 18                        |                      |                    |
|                           | 10/4/2004  | 1:29 PM    | 100                                        | 86                                              | 102                                               | 0.004                     | 0.09                      | 10.84        | 99.8  | 11.04            | 168.00         | 0.81               | 0.46         | 8.03 | 3.04          | 0.09       | 2.96 | 980.4                                | 4                         |                      |                    |
|                           | Mean       |            | 83                                         | 81                                              | 92                                                | 0.024                     | 0.13                      | 13.06        | 97.5  | 10.30            | 155.00         | 1.72               | 0.40         | 7.91 | 4.88          | 0.18       | 3.48 | 954.7                                | 51                        |                      |                    |
|                           | StDev      |            | 22                                         | 21                                              | 24                                                | 0.035                     | 0.05                      | 2.21         | 10.9  | 1.36             | 43.15          | 0.85               | 0.22         | 0.31 | 3.11          | 0.14       | 0.43 | 620.6                                | 85                        |                      |                    |
| 2006                      | 4/24/2006  |            | 72                                         | 72                                              | 74                                                | <0.025                    | <0.25                     | 7.36         | 149.0 | 11.66            | 149.00         | 1.59               |              | 7.31 | 2.96          | 0.16       | 5.44 | 1119.9                               | 6                         |                      |                    |
|                           | 5/15/2006  |            | 88                                         | 72                                              | 98                                                | <0.025                    | <0.25                     | 12.79        | 97.0  | 10.27            | 169.00         | 1.10               |              | 8.03 | 0.64          |            |      | 435.2                                | 4                         |                      |                    |
|                           | 6/8/2006   |            | 90                                         | 86                                              | 94                                                | <0.025                    | <0.25                     | 14.15        | 96.0  | 9.86             | 180.00         | 1.86               |              | 8.11 |               |            |      | 727.0                                | 15                        |                      |                    |
|                           | 7/17/2006  |            | 104                                        | 98                                              | 110                                               | <0.025                    | <0.25                     | 17.21        | 101.9 | 9.81             | 186.00         | 1.07               |              | 7.99 |               |            |      | >2419.2                              | 48                        |                      |                    |
|                           | 8/14/2006  |            | 100                                        | 82                                              | 110                                               | <0.025                    | <0.25                     | 12.94        | 103.4 | 10.90            | 184.00         | 0.94               |              | 8.08 |               |            |      | 1046.0                               | 11                        |                      |                    |
|                           | 9/5/2006   |            | 98                                         | 100                                             | 104                                               | <0.025                    | <0.25                     | 12.39        | 106.4 | 11.35            | 173.00         | 0.90               |              | 7.85 |               |            |      | 980.4                                | 14                        |                      |                    |
|                           | 10/16/2006 |            | 84                                         | 86                                              | 100                                               | <0.025                    | <0.25                     | 8.21         | 96.2  | 11.33            | 166.00         | 1.63               |              | 7.63 |               |            |      | 686.0                                | 3                         |                      |                    |
|                           | Mean       |            | 91                                         | 85                                              | 99                                                |                           |                           | 12.15        | 107.1 | 10.74            | 172.43         | 1.30               |              | 7.86 | 1.80          |            |      | 832.4                                | 14                        |                      |                    |
|                           | StDev      |            | 11                                         | 11                                              | 12                                                |                           |                           | 3.40         | 18.9  | 0.76             | 12.77          | 0.38               |              | 0.29 | 1.64          |            |      | 260.9                                | 16                        |                      |                    |

| Date                      | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |                  |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2007                      | 4/23/2007  |            | 62                                         | 72                                              | 78                                                | <0.025                    | <0.25                     | 9.19         | 101.3 | 11.66            | 123.00         | 1.77               |              | 7.34 | 2.90          | 0.13       |      | 344.8                                | 4                         |                      |                    |
|                           | 5/4/2007   |            | 84                                         | 84                                              | 100                                               | 0.152                     | <0.25                     | 12.43        | 105.7 | 11.28            | 163.00         | 2.46               |              | 7.76 | 1.41          | 0.07       |      | 547.0                                | 2                         |                      |                    |
|                           | 6/4/2007   |            | 90                                         | 100                                             | 120                                               | <0.025                    | <0.25                     | 13.19        | 107.5 | 11.28            | 191.00         | 1.83               |              | 7.72 | 1.07          | 0.07       |      | 2419.2                               | 17                        |                      |                    |
|                           | 7/2/2007   |            | 106                                        | 102                                             | 110                                               | <0.025                    | 0.96                      | 12.59        | 113.2 | 12.56            | 0.17           | 1.35               |              | 7.83 | 2.10          | 0.06       |      | 1986.0                               | 6                         |                      |                    |
|                           | 8/20/2007  |            | 103                                        | 73                                              | 116                                               | <0.025                    | <0.25                     |              | 103.0 | 11.13            | 0.20           | 0.40               |              | 7.94 | 3.83          | 0.08       |      | 980.4                                | 7                         |                      |                    |
|                           | 9/17/2007  |            | 38                                         | 51                                              | 56                                                | <0.025                    | <0.25                     | 11.60        | 102.1 | 11.10            | 0.17           | 0.38               |              | 7.94 | 5.10          | 0.11       |      | 920.0                                | 15                        |                      |                    |
|                           | 10/9/2007  |            | 107                                        | 44                                              | 64                                                | <0.025                    | <0.25                     | 13.43        | 118.1 | 12.32            | 0.19           | 0.72               |              | 8.07 | 5.19          | 0.13       |      | 1299.7                               | 11                        |                      |                    |
|                           | Mean       |            | 84                                         | 75                                              | 92                                                |                           |                           | 12.07        | 107.3 | 11.62            | 68.25          | 1.27               |              | 7.80 | 3.09          | 0.09       |      | 1213.9                               | 9                         |                      |                    |
|                           | StDev      |            | 26                                         | 22                                              | 26                                                |                           |                           | 1.55         | 6.3   | 0.59             | 87.15          | 0.80               |              | 0.24 | 1.68          | 0.03       |      | 752.5                                | 6                         |                      |                    |
| 2008                      | 4/21/2008  |            | 77                                         | 77                                              | 91                                                | <0.025                    | <0.25                     | 13.50        | 89.9  | 9.36             | 0.16           | 0.75               |              | 7.43 | 4.23          | 0.10       |      | 866.4                                | 4                         |                      |                    |
|                           | 5/19/2008  |            | 95                                         | 91                                              | 93                                                | <0.025                    | <0.25                     | 8.74         | 97.3  | 11.32            | 0.15           | 0.54               |              | 8.05 | 3.64          | 0.09       |      | 488.4                                | 10                        |                      |                    |
|                           | 6/16/2008  |            | 87                                         | 92                                              | 95                                                | <0.025                    | <0.25                     | 15.52        | 96.2  | 9.59             | 0.20           | 0.92               |              | 8.21 | 4.23          | 0.10       |      | 2419.2                               | 28                        |                      |                    |
|                           | 7/14/2008  |            | 81                                         | 74                                              | 120                                               | <0.025                    | <0.25                     | 16.53        | 98.7  | 9.63             | 0.16           | 1.34               |              | 7.84 | 8.23          | 0.23       |      | >2419.2                              | 118                       |                      |                    |
|                           | 8/4/2008   |            | 94                                         | 87                                              | 93                                                | <0.025                    | <0.25                     | 15.05        | 104.6 | 10.53            | 0.19           | 0.52               |              | 7.94 | 6.47          | 0.15       |      | 1986.0                               | 27                        |                      |                    |
|                           | 8/26/2008  |            | 60                                         | 59                                              | 64                                                | <0.025                    | <0.25                     | 15.20        | 112.3 | 10.91            | 0.19           | 0.67               |              | 8.16 | 5.48          | 0.12       |      | 1413.6                               | 35                        |                      |                    |
|                           | 9/23/2008  |            | 43                                         | 77                                              | 100                                               | <0.025                    | <0.25                     | 11.58        | 112.7 | 12.26            | 0.20           | 1.06               |              | 8.12 | 3.71          | 0.09       |      | 1119.0                               | 10                        |                      |                    |
|                           | 10/14/2008 |            | 94                                         | 138                                             | 156                                               | <0.025                    | <0.25                     | 10.78        | 102.9 | 11.40            | 0.19           | 0.58               |              | 8.03 | 4.19          | 0.08       |      | 816.4                                | 6                         |                      |                    |
|                           | Mean       |            | 79                                         | 87                                              | 102                                               |                           |                           | 13.36        | 101.8 | 10.63            | 0.18           | 0.80               |              | 7.97 | 5.02          | 0.12       |      | 1301.3                               | 30                        |                      |                    |
|                           | StDev      |            | 19                                         | 23                                              | 27                                                |                           |                           | 2.73         | 7.9   | 1.04             | 0.02           | 0.29               |              | 0.25 | 1.61          | 0.05       |      | 689.1                                | 37                        |                      |                    |
| 2009                      | 4/13/2009  |            | 79                                         | 33                                              | 69                                                | <0.025                    | <0.25                     | 7.45         | 96.7  | 11.60            | 0.16           | 0.92               |              | 7.93 |               |            |      | 261.3                                | 0                         |                      |                    |
|                           | 5/11/2009  |            | 86                                         | 74                                              | 88                                                | <0.025                    | <0.25                     | 12.51        | 100.7 | 10.72            | 0.16           | 0.46               |              | 7.98 |               |            |      | 1119.9                               | 7                         |                      |                    |
|                           | 5/27/2009  |            | 94                                         | 83                                              | 96                                                | <0.025                    | <0.25                     | 11.52        | 101.6 | 11.06            | 0.19           | 0.32               |              | 8.12 |               |            |      | 980.0                                | 6                         |                      |                    |
|                           | 6/8/2009   |            | 98                                         | 88                                              | 103                                               | <0.025                    | <0.25                     | 13.56        | 108.6 | 11.30            | 0.19           | 0.81               |              | 8.19 |               |            |      | 613.1                                | 63                        |                      |                    |
|                           | 6/22/2009  |            | 91                                         | 81                                              | 92                                                | <0.025                    | <0.25                     | 16.46        | 100.8 | 9.85             | 0.15           | 0.40               |              | 8.03 |               |            |      | 1553.0                               | 38                        |                      |                    |
|                           | 7/6/2009   |            | 89                                         | 77                                              | 97                                                | <0.025                    | <0.25                     | 14.04        | 101.4 | 10.44            | 0.20           | 0.42               |              | 8.13 |               |            |      | 1299.7                               | 13                        |                      |                    |

| Date                      | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 7/20/2009                 |           |            | 98                                         | 98                                              | 110                                               | <0.025                    | <0.25                     | 14.04        | 119.9 | 12.34        | 0.17           | 0.49               |              | 8.14 |               |            |      | 980.0                                | 25                        |                      |                    |
| 8/4/2009                  |           |            | 101                                        | 86                                              | 103                                               | <0.025                    | <0.25                     | 16.06        | 95.2  | 9.38         | 0.19           | 0.54               |              | 8.02 |               |            |      | >2419.2                              | 37                        |                      |                    |
| 8/18/2009                 |           |            | 110                                        | 92                                              | 123                                               | <0.025                    | <0.25                     | 16.61        | 103.2 | 10.05        | 0.17           | 0.66               |              | 8.15 |               |            |      | 1413.6                               | 21                        |                      |                    |
| 8/31/2009                 |           |            | 95                                         | 85                                              | 98                                                | <0.025                    | <0.25                     | 13.94        | 82.9  | 8.55         | 0.17           | 0.35               |              | 8.10 |               |            |      | 1413.0                               | 24                        |                      |                    |
| 9/14/2009                 |           |            | 97                                         | 92                                              | 103                                               | <0.025                    | <0.25                     | 13.41        | 96.3  | 10.05        | 0.20           | 0.59               |              | 8.17 |               |            |      | 1203.3                               | 11                        |                      |                    |
| 9/28/2009                 |           |            | 78                                         | 73                                              | 90                                                | <0.025                    | <0.25                     | 12.05        | 96.0  | 10.33        | 0.14           | 0.70               |              | 7.69 |               |            |      | >2419.2                              | 59                        |                      |                    |
| 10/14/2009                |           |            | 89                                         | 83                                              | 101                                               | <0.025                    | <0.25                     | 7.32         | 100.0 | 12.04        | 0.16           | 0.43               |              | 7.81 |               |            |      | 770.1                                | 3                         |                      |                    |
| Mean                      |           |            | 93                                         | 80                                              | 98                                                |                           |                           | 13.00        | 100.3 | 10.59        | 0.17           | 0.55               |              | 8.04 |               |            |      | 1055.2                               | 24                        |                      |                    |
| StDev                     |           |            | 9                                          | 16                                              | 13                                                |                           |                           | 2.95         | 8.4   | 1.07         | 0.02           | 0.18               |              | 0.15 |               |            |      | 388.4                                | 20                        |                      |                    |
| 2010                      | 5/3/2010  |            | 102                                        | 13                                              | 18                                                | <0.025                    | <0.25                     | 14.14        | 98.3  | 10.09        | 0.17           | 0.58               |              | 7.92 |               |            |      | 1203.0                               | 23                        |                      |                    |
|                           | 5/17/2010 |            | 124                                        | 125                                             | 133                                               | <0.025                    | <0.25                     | 13.15        | 99.4  | 10.44        | 0.24           | 0.53               |              | 7.66 |               |            |      | 547.5                                | 1                         |                      |                    |
|                           | 6/1/2010  |            | 92                                         | 86                                              | 100                                               | <0.025                    | <0.25                     | 15.82        | 96.2  | 9.02         | 0.18           | 6.49               |              | 7.70 |               |            |      | >2419                                | 261                       |                      |                    |
|                           | 6/14/2010 |            | 81                                         | 89                                              | 97                                                | <0.025                    | <0.25                     | 13.18        | 96.1  | 10.09        | 0.16           | 0.39               |              | 7.66 |               |            |      | 1732.9                               | 38                        |                      |                    |
|                           | 6/29/2010 |            | 96                                         | 56                                              | 70                                                | <0.025                    | <0.25                     | 18.39        | 89.3  | 8.38         | 0.10           | 0.84               |              | 7.24 |               |            |      | >2419                                | 770                       |                      |                    |
|                           | 7/12/2010 |            | 104                                        | 86                                              | 104                                               | <0.025                    | <0.25                     | 16.04        | 110.4 | 10.88        | 0.17           | 0.38               |              | 0.38 |               |            |      | >2419.2                              | 96                        |                      |                    |
|                           | 8/9/2010  |            | 100                                        | 85                                              | 111                                               | <0.025                    | <0.25                     | 15.75        | 112.8 | 11.19        | 0.17           | 0.48               |              | 8.15 |               |            |      | 1986.9                               | 49                        |                      |                    |
|                           | 8/23/2010 |            | 72                                         | 68                                              | 78                                                | <0.025                    | <0.25                     | 16.97        |       |              | 0.13           | 1.24               |              | 7.40 |               |            |      | >2419.2                              | 411                       |                      |                    |
|                           | 9/7/2010  |            | 105                                        | 100                                             | 120                                               | <0.025                    | <0.25                     | 13.87        | 95.9  | 9.91         | 0.17           | 0.48               |              | 7.95 |               |            |      | 1119.0                               | 33                        |                      |                    |
|                           | 9/20/2010 |            | 110                                        | 117                                             | 125                                               | <0.025                    | <0.25                     | 11.85        | 100.8 | 10.89        | 0.16           | 0.40               |              | 8.07 |               |            |      | 920.8                                | 5                         |                      |                    |
|                           | 10/4/2010 |            | 83                                         | 83                                              | 93                                                | <0.025                    | <0.25                     | 9.98         | 100.5 | 11.34        | 0.16           | 0.51               |              | 7.65 |               |            |      | 1732.0                               | 7                         |                      |                    |
|                           | Mean      |            | 97                                         | 83                                              | 95                                                |                           |                           | 14.47        | 100.0 | 10.22        | 0.16           | 1.12               |              | 7.07 |               |            |      | 1320.3                               | 154                       |                      |                    |
|                           | StDev     |            | 15                                         | 30                                              | 32                                                |                           |                           | 2.42         | 7.0   | 0.95         | 0.03           | 1.80               |              | 2.24 |               |            |      | 515.6                                | 242                       |                      |                    |
| 2011                      | 5/9/2011  |            | 88                                         | 79                                              | 93                                                | <0.025                    | <0.25                     | 12.73        | 104.4 | 11.06        | 0.16           | 0.50               |              | 8.02 |               |            |      | 770.0                                | 2                         |                      |                    |
|                           | 5/23/2011 |            | 79                                         | 70                                              | 87                                                | <0.025                    | 0.06                      | 12.35        | 96.7  | 10.34        | 0.15           | 0.98               |              | 7.79 |               |            |      | 1119.0                               | 11                        |                      |                    |
|                           | 6/6/2011  |            | 97                                         | 72                                              | 83                                                | <0.025                    | 0.15                      | 14.04        | 107.7 | 11.08        | 0.18           | 0.46               |              | 8.10 |               |            |      | 1986.0                               | 20                        |                      |                    |

| Date                      | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2011                      | 6/19/2011  |            | 98                                         | 84                                              | 88                                                | <0.025                    | 0.11                      | 14.15        | 78.9  | 8.10         | 0.18           | 0.49               |              | 8.10 |               |            |      | 1414.0                               | 20                        |                      |                    |
|                           | 7/11/2011  |            | 110                                        | 87                                              | 106                                               | <0.025                    | 0.13                      | 14.45        | 72.6  | 7.41         | 0.19           | 0.46               |              | 8.13 |               |            |      | 2419.0                               | 40                        |                      |                    |
|                           | 7/25/2011  |            | 98                                         | 92                                              | 101                                               | <0.025                    | 0.11                      | 14.37        | 111.2 | 11.36        | 0.14           | 1.41               |              | 7.79 |               |            |      | >2419                                | >2419                     |                      |                    |
|                           | 8/8/2011   |            | 82                                         | 68                                              | 84                                                | <0.025                    | <0.05                     | 17.87        |       |              | 0.14           | 0.55               |              | 7.87 |               |            |      | >2419                                | 70                        |                      |                    |
|                           | 9/12/2011  |            | 98                                         | 86                                              | 99                                                | <0.025                    | 0.07                      | 12.92        |       |              | 0.17           | 0.43               |              | 7.58 |               |            |      | >2419                                | 23                        |                      |                    |
|                           | 9/27/2011  |            | 96                                         | 90                                              | 105                                               | <0.025                    | 0.12                      | 13.91        |       |              | 0.17           | 2.25               |              | 7.76 |               |            |      | 1732.0                               | 11                        |                      |                    |
|                           | 10/11/2011 |            | 90                                         | 82                                              | 96                                                | <0.025                    | 0.12                      | 11.74        | 98.5  | 10.67        | 0.17           | 0.04               |              | 7.92 |               |            |      | 1046.2                               | 4                         |                      |                    |
|                           | 10/24/2011 |            | 89                                         | 82                                              | 97                                                | <0.025                    | 0.08                      | 8.30         |       |              | 0.16           | 0.43               |              | 7.77 |               |            |      | 1299.0                               | 1                         |                      |                    |
|                           | Mean       |            | 93                                         | 81                                              | 94                                                |                           |                           | 13.35        | 95.7  | 10.00        | 0.16           | 0.73               |              | 7.89 |               |            |      | 1473.2                               | 20                        |                      |                    |
|                           | StDev      |            | 9                                          | 8                                               | 8                                                 |                           |                           | 2.32         | 14.6  | 1.58         | 0.02           | 0.61               |              | 0.18 |               |            |      | 542.6                                | 21                        |                      |                    |
| 2012                      | 4/23/2012  |            | 56                                         | 56                                              | 58                                                | <0.025                    | <0.05                     | 7.70         |       |              | 96.60          | 3.98               |              | 7.73 |               |            |      | 1733.0                               | 69                        |                      |                    |
|                           | 5/7/2012   |            | 90                                         | 78                                              | 94                                                | <0.025                    | 0.16                      | 15.00        |       |              |                | 1.12               |              | 8.33 |               |            |      | 1553.1                               | 5                         |                      |                    |
|                           | 7/10/2012  |            | 102                                        | 88                                              | 104                                               | <0.025                    | 0.18                      | 15.50        |       |              | 193.90         | 1.59               |              | 8.30 |               |            |      |                                      |                           |                      |                    |
|                           | 8/1/2012   |            | 84                                         | 80                                              | 86                                                | <0.025                    | <0.05                     | 19.20        |       |              | 172.60         | 3.81               |              | 8.00 |               |            |      |                                      |                           |                      |                    |
|                           | 8/13/2012  |            | 88                                         | 82                                              | 92                                                | <0.025                    | 0.08                      | 17.40        |       |              | 190.20         | 3.12               |              | 8.06 |               |            |      |                                      |                           |                      |                    |
|                           | 9/17/2012  |            | 102                                        | 92                                              | 106                                               | <0.025                    | 0.15                      | 13.30        |       |              | 200.80         | 0.63               |              | 7.79 |               |            |      |                                      |                           |                      |                    |
|                           | 10/1/2012  |            | 88                                         | 76                                              | 86                                                | <0.025                    | 0.06                      | le           |       |              | 172.10         | 1.56               |              | 7.87 |               |            |      | >2419                                | 25                        |                      |                    |
|                           | Mean       |            | 87                                         | 79                                              | 89                                                |                           |                           | 14.68        |       |              | 171.03         | 2.26               |              | 8.01 |               |            |      | 1643.0                               | 33                        |                      |                    |
|                           | StDev      |            | 15                                         | 12                                              | 16                                                |                           |                           | 3.98         |       |              | 38.26          | 1.35               |              | 0.24 |               |            |      | 127.2                                | 33                        |                      |                    |
| 2013                      | 5/20/2013  |            | 100                                        | 88                                              | 102                                               |                           | 0.19                      | 13.30        |       | 11.60        | 190.00         | 2.28               |              | 7.99 |               |            |      | 579.0                                | 15                        |                      |                    |
|                           | 6/3/2013   |            | 98                                         | 86                                              | 96                                                | <0.025                    | 0.14                      | 12.90        |       | 9.00         | 181.70         | 1.19               |              | 8.14 |               |            |      | 1553.1                               | 16                        |                      |                    |
|                           | 6/25/2013  |            | 90                                         | 80                                              | 92                                                | <0.025                    | 0.09                      | 16.70        |       |              | 165.70         | 2.03               |              | 8.08 |               |            |      | 2419.0                               | 285                       |                      |                    |
|                           | 7/15/2013  |            | 96                                         | 86                                              | 102                                               | <0.025                    | 0.16                      | 17.60        |       | 8.60         | 190.70         | 0.65               |              | 8.12 |               |            |      | 1986.0                               | 29                        |                      |                    |
|                           | 7/29/2013  |            | 96                                         | 90                                              | 102                                               | <0.025                    | 0.12                      | 15.70        |       | 8.70         | 181.30         | 0.58               |              | 8.11 |               |            |      | 1986.0                               | 60                        |                      |                    |
|                           | 8/12/2013  |            | 100                                        | 92                                              | 108                                               | <0.025                    | 0.18                      | 15.20        |       | 13.00        | 195.50         | 0.70               |              | 8.09 |               |            |      | 920.8                                | 20                        |                      |                    |



| Date                      | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|---------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 5 – BUTTERMILK BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 9/9/2013                  |           |            | 98                                         | 92                                              | 102                                               | <0.025                    | 0.18                      | 12.50        |     | 7.20         | 191.40         | 0.69               |              | 8.25 |               |            |      | 547.5                                | 6                         |                      |                    |
| 9/24/2013                 |           |            | 96                                         | 92                                              | 96                                                | <0.025                    | 0.17                      | 10.80        |     | 11.30        | 181.70         | 0.71               |              | 8.11 |               |            |      | 579.4                                | 6                         |                      |                    |
| Mean                      |           |            | 97                                         | 88                                              | 100                                               |                           |                           | 14.34        |     | 9.91         | 184.75         | 1.10               |              | 8.11 |               |            |      | 1321.3                               | 55                        |                      |                    |
| StDev                     |           |            | 3                                          | 4                                               | 5                                                 |                           |                           | 2.33         |     | 2.07         | 9.38           | 0.68               |              | 0.07 |               |            |      | 756.2                                | 95                        |                      |                    |
| 2014                      | 5/20/2014 |            | 90                                         | 86                                              | 98                                                | <0.025                    | 0.15                      | 13.70        |     |              | 164.90         | 0.35               |              | 8.18 |               |            |      | 461.1                                | 10                        |                      |                    |
|                           | 6/17/2014 |            | 98                                         | 90                                              | 102                                               | <0.025                    | 0.20                      | 14.60        |     |              | 175.50         | 0.48               |              | 8.05 |               |            |      | 1413.0                               | 12                        |                      |                    |
|                           | 7/17/2014 |            | 100                                        | 96                                              | 98                                                | <0.025                    | 0.17                      | 13.50        |     |              | 182.80         | 0.78               |              | 8.23 |               |            |      | 1299.0                               | 20                        |                      |                    |
|                           | 8/19/2014 |            | 102                                        | 92                                              | 106                                               | <0.025                    | 0.22                      | 13.60        |     |              | 183.20         | 0.57               |              | 8.22 |               |            |      | 980.4                                | 205                       |                      |                    |
|                           | 9/23/2014 |            | 94                                         | 90                                              | 100                                               | <0.025                    | 0.22                      | 10.80        |     |              | 191.40         | 0.69               |              | 8.07 |               |            |      | 1203.0                               | 7                         |                      |                    |
|                           | Mean      |            | 97                                         | 91                                              | 101                                               |                           |                           | 13.24        |     |              | 179.56         | 0.57               |              | 8.15 |               |            |      | 1071.3                               | 51                        |                      |                    |
|                           | StDev     |            | 5                                          | 4                                               | 3                                                 |                           |                           | 1.43         |     |              | 9.94           | 0.17               |              | 0.08 |               |            |      | 376.4                                | 86                        |                      |                    |
| 2015                      | 4/26/2015 |            | 86                                         | 80                                              | 92                                                | <0.025                    | 0.22                      | 8.50         |     |              | 170.80         | 2.23               |              | 8.07 |               |            |      | 222.0                                | <1                        |                      |                    |
|                           | 5/21/2015 |            | 94                                         | 90                                              | 102                                               | <0.025                    | 0.25                      | 12.40        |     |              | 186.20         | 1.19               |              | 8.27 |               |            |      | 1119.9                               | 13                        |                      |                    |
|                           | 7/28/2015 |            | 98                                         | 90                                              | 106                                               | <0.025                    | 0.23                      | 15.80        |     |              | 197.30         | 0.46               |              | 8.19 |               |            |      | 1300.0                               | 13                        |                      |                    |
|                           | 8/31/2015 |            | 100                                        | 94                                              | 112                                               | <0.025                    | 0.22                      | 13.30        |     |              | 204.90         | 1.09               |              | 8.18 |               |            |      | 866.0                                | 19                        |                      |                    |
|                           | 9/21/2015 |            | 100                                        | 92                                              | 94                                                | <0.025                    | 0.09                      | 11.30        |     |              | 201.80         | 8.52               |              | 8.16 |               |            |      | 1203.0                               | 16                        |                      |                    |
|                           | Mean      |            | 96                                         | 89                                              | 101                                               |                           |                           | 12.26        |     |              | 192.20         | 2.70               |              | 8.17 |               |            |      | 942.2                                | 15                        |                      |                    |
|                           | StDev     |            | 6                                          | 5                                               | 8                                                 |                           |                           | 2.68         |     |              | 13.91          | 3.32               |              | 0.07 |               |            |      | 433.6                                | 3                         |                      |                    |
| 2016                      | 5/10/2016 |            | 92                                         | 86                                              | 94                                                | <0.025                    | 0.21                      | 11.20        |     |              | 184.10         | 1.33               |              | 8.22 |               |            |      | 548.0                                | 172                       |                      |                    |
|                           | 6/13/2016 |            | 95                                         | 112                                             | 114                                               | <0.025                    | 0.16                      | 10.00        |     |              | 166.50         | 0.46               |              | 8.14 |               |            |      | 866.4                                | 31                        |                      |                    |
|                           | 7/6/2016  |            | 104                                        | 100                                             | 114                                               | <0.025                    | 0.23                      | 14.10        |     |              | 180.00         | 0.50               |              | 8.18 |               |            |      | 732.9                                | 56                        |                      |                    |
|                           | 8/13/2016 |            | 118                                        | 110                                             | 126                                               | <0.025                    | <0.05                     |              |     |              | 175.70         | 0.73               |              | 7.50 |               |            |      | >2419.2                              | 55                        |                      |                    |
|                           | 9/13/2016 |            | 102                                        | 96                                              | 108                                               | <0.025                    | 0.17                      | 13.70        |     |              | 183.30         | 0.61               |              | 8.17 |               |            |      | 1203.0                               | 70                        |                      |                    |
|                           | Mean      |            | 102                                        | 101                                             | 111                                               |                           |                           | 12.25        |     |              | 177.92         | 0.73               |              | 8.04 |               |            |      | 837.6                                | 77                        |                      |                    |
|                           | StDev     |            | 10                                         | 11                                              | 12                                                |                           |                           | 1.97         |     |              | 7.19           | 0.35               |              | 0.30 |               |            |      | 276.4                                | 55                        |                      |                    |

[EPA, 2001; MVWA, 2016](#)

Table C-9: Tributary Sampling Results – Taynter Brook, Site 6

| Date                   | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|------------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 1998                   | 4/28/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 40.00                                | 0.00                      | 305.00               |                    |
|                        | 5/5/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 340.00                               | 150.00                    | 465.00               |                    |
|                        | 5/13/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 200.00                               | 0.00                      | 684.00               |                    |
|                        | 5/19/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 690.00                               | 260.00                    | 20000.00             |                    |
|                        | 5/26/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 80.00                                | 10.00                     | 125.00               |                    |
|                        | 6/1/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 200.00                               | 200.00                    | 275.00               |                    |
|                        | 6/9/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 90.00                                | 0.00                      | 4650.00              |                    |
|                        | 6/16/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 10.00                                | 0.00                      | 396.00               |                    |
|                        | 6/22/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | TNTC                                 | TNTC                      | 455.00               |                    |
|                        | 6/29/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 540.00                               | 30.00                     | 270.00               |                    |
|                        | 7/7/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 210.00                               | 30.00                     | 335.00               |                    |
|                        | 7/13/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 790.00                               | 40.00                     | 270.00               |                    |
|                        | 7/28/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1150.00                              | 230.00                    | 280.00               |                    |
|                        | 8/4/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 120.00                               | 0.00                      | 175.00               |                    |
|                        | 8/11/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 490.00                               | 110.00                    | 17.00                |                    |
|                        | 8/18/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 950.00                               | 190.00                    | 115.00               |                    |
|                        | 8/25/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1650.00                              | 200.00                    | 400.00               |                    |
|                        | 9/2/1998   |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 160.00                               | 30.00                     | 290.00               |                    |
|                        | 9/22/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 150.00                               | 20.00                     | 125.00               |                    |
|                        | 9/29/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 120.00                               | 30.00                     | 175.00               |                    |
|                        | 10/6/1998  |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 50.00                                | 30.00                     | 1573.00              |                    |
|                        | 10/13/1998 |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 1200.00                              | 20.00                     | 1331.00              |                    |
|                        | 10/20/1998 |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 120.00                               | 0.00                      | 130.00               |                    |
|                        | 10/27/1998 |            |                                            |                                                 |                                                   |                           |                           |              |     |                  |                |                    |              |    |               |            |      | 25.00                                | 90.00                     | 2000.00              |                    |

| Date                   | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |  |
|------------------------|------------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|--|
| SITE 6 – TAYNTER BROOK |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       |                                      |                           |                      |                    |  |
| 12/15/1998             |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       | 40.00                                | 0.00                      | 968.00               |                    |  |
| Mean                   |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       | 392.00                               | 70.00                     | 1432.00              |                    |  |
| StDev                  |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       | 451.00                               | 86.00                     | 3987.00              |                    |  |
| 1999                   | 4/27/1999  | 2:55 PM    |                               |                                    |                                      |               |               | 9.53         | 97.9  | 10.81            | 145.5          | 0                  | -0.22        | 8    | 3.84          | 0.102      | 2.66  | 10                                   | 0                         | 565                  |                    |  |
|                        | 5/6/1999   | 2:46 PM    |                               |                                    |                                      |               |               | 15           | 100.5 | 9.81             | 168            | 0                  | 0.15         | 8.01 | 1.86          | 0.059      | 3.17  | 60                                   | 10                        | 96                   |                    |  |
|                        | 5/11/1999  | 2:46 PM    |                               |                                    |                                      |               |               | 12.86        | 103.8 | 10.62            | 167.2          | 0                  | 0.08         | 7.98 | 2.7           | 0.205      | 7.59  | 160                                  | 0                         | 119                  |                    |  |
|                        | 5/18/1999  | 2:50 PM    |                               |                                    |                                      |               |               | 16.25        | 103.5 | 10.31            | 180.7          | 0                  | 0.07         | 8.06 | 2.16          | 0.061      | 2.82  | 330                                  | 40                        | 2000                 |                    |  |
|                        | 6/2/1999   | 2:46 PM    |                               |                                    |                                      |               |               | 15.67        | 106.8 | 10.77            | 169.1          | 0                  | 0.11         | 8.02 | 2.16          | 0.063      | 2.92  | 150                                  | 10                        | 2000                 |                    |  |
|                        | 6/8/1999   | 2:40 PM    |                               |                                    |                                      |               |               | 17.89        | 97.2  | 9.36             | 22.8           | 0                  | 0.01         | 8.08 | 1.96          | 0.053      | 2.7   | 170                                  | 30                        | 9900                 |                    |  |
|                        | 6/15/1999  | 2:49 PM    |                               |                                    |                                      |               |               | 14.14        | 99.6  | 10.38            | 168            | 1.3                | 0.16         | 8.16 | 3.89          | 0.08       | 2.06  | 110                                  | 0                         | 1260                 |                    |  |
|                        | 6/21/1999  | 2:52 PM    | 0.11                          |                                    |                                      |               |               | 14.44        | 99    | 10.25            | 174.4          | 3.9                | 0.03         | 8.22 | 2.08          | 0.044      | 2.12  | 110                                  | 34                        | 72000                |                    |  |
|                        | 7/13/1999  | 2:30 PM    | 0.14                          | 68                                 | 50                                   | 64            | 0.1           | 0.4          | 16.66 | 97               | 9.57           | 2                  | 3.4          | 0.01 | 8.17          | 2.14       | 0.148 | 6.92                                 | 70                        | 10                   | 1765               |  |
|                        | 7/20/1999  | 2:54 PM    | 0.1                           | 74                                 | 52                                   | 80            | 0.088         | 0.2          | 17.43 | 95.7             | 9.3            | 168.5              | 26.6         | 0.2  | 8.11          | 3.19       | 0.06  | 1.88                                 | 400                       | 160                  | 2000               |  |
|                        | 7/27/1999  | 2:54 PM    | 0.08                          | 62                                 | 54                                   | 62            | 0.26          | 0.1          | 19.53 | 91.7             | 8.54           | 177.8              | 0.7          | 0.19 | 8.29          | 1.85       | 0.065 | 3.51                                 | 330                       | 50                   | 2000               |  |
|                        | 8/3/1999   | 2:26 PM    | 0.07                          | 25                                 | 25                                   | 39            | 0.29          | 0.1          | 17    | 90               | 8.82           | 174.1              | 1.6          | 0.15 | 8.37          | 2.11       | 0.066 | 3.13                                 | 490                       | 50                   | 2000               |  |
|                        | 8/17/1999  | 2:49 PM    | 0.08                          | 66                                 | 68                                   | 84            | 0.71          | 0.2          | 17.46 | 81.7             | 7.93           | 157.2              | 0.1          | 0.11 | 8.46          | 2.19       | 0.065 | 2.97                                 | 390                       | 264                  | 1056               |  |
|                        | 8/24/1999  | 2:36 PM    | 0.07                          | 74                                 | 72                                   | 74            | 0.25          |              | 16.3  | 82.2             | 8.18           | 152.5              | 0            | 0.09 | 8.48          | 1.39       | 0.055 | 3.96                                 | 230                       | 30                   | 774                |  |
|                        | 8/31/1999  | 2:30 PM    | 0.1                           | 74                                 | 68                                   | 130           | 1.7           |              | 14.19 | 79.7             | 8.31           | 155.5              | 0            | 0.13 | 8.41          | 1.52       | 0.055 | 3.62                                 | 100                       | 10                   | 236                |  |
|                        | 9/8/1999   | 2:38 PM    | 0.2                           | 26                                 | 60                                   | 148           | 0.54          | 0.1          | 17.78 | 77               | 7.42           | 155                | 2.6          | 0.16 | 8.41          | 3.37       | 0.09  | 2.67                                 | 230                       | 30                   | 609                |  |
|                        | 9/15/1999  | 2:38 PM    | 0.1                           | 66                                 | 36                                   | 40            | 1.11          | 0.1          | 14.78 | 76.9             | 8              | 151.7              | 4.2          | 0.11 | 8.41          | 4.4        | 0.145 | 3.3                                  | 360                       | 210                  | 136                |  |
|                        | 9/21/1999  | 2:52 PM    | 0.11                          | 58                                 | 61                                   | 80            | 0.88          | 0.1          | 11.77 | 78.1             | 8.58           | 143.3              | 10.9         | 0.18 | 8.32          | 6.21       | 0.194 | 3.12                                 | 230                       | 40                   | 609                |  |
|                        | 9/28/1999  | 2:32 PM    | 0.11                          | 70                                 | 64                                   | 179           | 0.51          | 0.2          | 13.31 | 74.9             | 7.95           | 146.7              | 1.1          | 0.19 | 8.32          | 2.68       | 0.093 | 3.47                                 | 120                       | 30                   | 602                |  |
|                        | 10/5/1999  | 2:40 PM    | 0.09                          | 47                                 | 50                                   | 57            | 1.5           | 0.4          | 8.94  | 76.4             | 8.97           | 123                | 0            | 0.2  | 8.28          | 10.4       | 0.387 | 3.72                                 | 120                       | 20                   | 512                |  |
|                        | 10/19/1999 | 2:38 PM    | 0.17                          | 82                                 | 63                                   | 68            | 0.42          | 0            | 6.36  | 66.8             | 8.35           | 147.8              | 1.8          | 0.15 | 8.09          | 3.72       | 0.13  | 3.49                                 | 130                       | 20                   | 2000               |  |
|                        | 10/26/1999 | 2:41 PM    | 0.07                          | 62                                 | 62                                   | 69            | 0.46          | 0.1          | 6.5   | 63.8             | 7.94           | 146.7              | 0.1          | 0.19 | 8.04          | 3.54       | 0.121 | 3.42                                 | 130                       | 100                  | 560                |  |

| Date                   | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |     |
|------------------------|------------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|-----|
| SITE 6 – TAYNTER BROOK |            |            |                               |                                    |                                      |               |               |              |       |                  |                |                    |              |      |               |            |       |                                      |                           |                      |                    |     |
| Mean                   |            | 2:38       | 61                            | 56                                 | 84                                   | 0.63          | 0.2           | 14.26        | 88.2  | 9.1              | 145.3          | 2.7                | 0.11         | 8.21 | 3.15          | 0.106      | 3.42  | 201                                  | 52                        | 4673                 |                    |     |
| StDev                  |            | 0:57       | 17.22                         | 12.97                              | 40.6                                 | 0.5           | 0.12          | 3.65         | 12.76 | 1.07             | 45.3           | 5.91               | 0.09         | 0.17 | 1.98          | 0.08       | 1.36  | 128.85                               | 70.25                     | 15172.31             |                    |     |
| 2000                   | 1/4/2000   | 12:00 AM   | 0.72                          | 22                                 | 23                                   | 29            | 2.04          | 0.5          | 1.32  | 63.8             | 9.12           | 55.8               | 12.7         | 0.23 | 7.85          | 10.9       | 0.383 | 3.51                                 | 10                        | 0                    | 565                |     |
|                        | 3/21/2000  | 2:40 PM    | 0.18                          | 60                                 | 54                                   | 60            | 1.09          | 0.6          | 5.97  | 19               | 2.4            | 124.7              | 38.2         | 0.06 | 7.12          | 3.82       |       | 166                                  | 7                         |                      |                    |     |
|                        | 4/5/2000   | 2:26 PM    | 0.12                          | 62                                 | 52                                   | 58            | 1.1           | 0.3          | 2.64  | 88.7             | 11.96          | 84.2               | 0.5          | 0.33 | 6.49          | 7.69       | 0.293 | 3.81                                 | 613                       | 10                   | 2000               |     |
|                        | 4/13/2000  | 11:02 AM   | 0.22                          | 56                                 | 58                                   | 68            | 0.84          | 0.1          | 4.24  | 90.9             | 11.74          | 133.6              | 7.2          | 0.12 | 7.18          | 4.45       | 0.16  | 3.6                                  | 124                       | 7                    | 223                |     |
|                        | 4/18/2000  | 2:38 PM    | 0.16                          | 56                                 | 58                                   | 66            | 0.87          | 0.1          | 7.03  | 90.6             | 10.89          | 136.2              | 2.9          | 0.11 | 7.11          | 4.55       | 0.185 | 4.07                                 | 201                       | 11                   |                    |     |
|                        | 4/25/2000  | 2:31 PM    | 0.21                          | 56                                 | 56                                   | 64            | 0.99          | 0.1          | 10.21 | 84.1             | 9.36           | 126.9              | 3.4          | 0.18 | 6.07          | 5.26       | 0.203 | 3.86                                 | 276                       | 11                   | 538                |     |
|                        | 5/4/2000   | 1:29 PM    | 0.13                          | 66                                 | 64                                   | 76            | 0.88          | 0.1          | 12.5  | 90               | 9.51           | 141.8              | 4.5          | 0.2  | 7.24          | 4.85       | 0.171 | 3.53                                 | 517                       | 11                   | 688                |     |
|                        | 5/9/2000   | 2:44 PM    | 0.15                          | 67                                 | 65                                   | 78            | 1.08          | 0.1          | 15.69 | 84.2             | 8.29           | 147.8              | 6.5          | 0.22 | 7.42          | 4.18       | 0.166 | 3.97                                 | 461                       | 28                   | 632                |     |
|                        | 5/16/2000  | 2:59 PM    | 0.18                          | 70                                 | 58                                   | 68            | 1.59          | 0.3          | 11.36 | 83               | 9              | 124                | 3.1          | 0.38 | 6.91          | 6.71       | 0.299 | 4.46                                 | 649                       | 19                   | 2870               |     |
|                        | 5/30/2000  | 2:31 PM    | 0.16                          | 71                                 | 66                                   | 75            | 0.13          | 0.2          | 12.77 | 81.7             | 8.58           | 151.2              | 1.2          | 0.19 | 7.43          | 3.35       | 0.115 | 3.43                                 | 435                       | 9                    | 2650               | 0/0 |
|                        | 6/6/2000   | 2:34 PM    | 0.3                           | 56                                 | 58                                   | 65            | 1.23          | 0.2          | 9.51  | 85.7             | 9.7            | 123.7              | 2.5          | 0.24 | 7.46          | 6.89       | 0.269 | 3.9                                  | 1986                      | 106                  | 4090               |     |
|                        | 6/15/2000  |            | 0:00                          | 76                                 | 62                                   | 72            | 1.15          | 0.2          |       | 93.4             | 8.32           | 146.1              | 2.3          |      | 7.4           | 6.5        | 0.264 | 4.06                                 | 410                       | 16                   | 1960               |     |
|                        | 6/20/2000  | 2:28 PM    | 0.07                          | 74                                 | 73                                   | 81            | 0.22          | 0            | 14.37 | 80               | 8.11           | 158.2              | 0.8          | 0.21 | 7.25          | 2.38       | 0.077 | 3.24                                 | 613                       | 12                   | 5660               |     |
|                        | 6/27/2000  | 12:38 PM   | 0.21                          | 73                                 | 68                                   | 76            | 0.63          | 0.2          | 14.65 | 77.8             | 7.83           | 153                | 1.3          | 0.23 | 7.69          | 3.16       | 0.111 | 3.51                                 | 1553                      | 31                   | 2030               | 8/0 |
|                        | 7/11/2000  | 1:06 PM    | 0.18                          | 89                                 | 69                                   | 76            | 0.51          | 0.1          | 13.41 | 72.8             | 7.53           | 149.2              | 1.8          | 0    | 7.7           | 3.56       | 0.122 | 3.43                                 | 1046                      | 17                   | 2380               |     |
|                        | 7/18/2000  | 1:23 PM    | 0.15                          | 72                                 | 64                                   | 70            | 1.01          | 0.3          | 13.77 | 75.5             | 7.75           | 131                | 1.4          | 0.03 | 7.45          | 6.89       | 0.279 | 4.05                                 | 1733                      | 75                   | 4450               |     |
|                        | 7/25/2000  | 1:30 PM    | 0.16                          | 76                                 | 78                                   | 82            | 0             | 0            | 12.63 | 77.6             | 8.18           | 157.5              | 4            | 0.24 | 6.8           | 2.32       | 0.062 | 2.67                                 | 921                       | 26                   |                    |     |
|                        | 8/1/2000   | 1:13 PM    | 0.19                          | 75                                 | 62                                   | 70            | 1.42          | 0.3          |       |                  |                | 149.8              | 4.8          |      | 7.67          | 7.94       | 0.295 | 3.72                                 | 2419                      | 517                  | 4560               | 1/0 |
|                        | 8/8/2000   | 12:42 PM   | 0.15                          | 66                                 | 64                                   | 75            | 1.12          | 0.2          | 13.77 | 85.5             | 8.85           | 117.6              | 1.4          | 0.25 | 7.02          | 6.28       | 0.248 | 3.95                                 | 1733                      | 40                   | 1380               |     |
|                        | 8/22/2000  | 12:17 PM   | 0.2                           | 72                                 | 70                                   | 80            | 0.45          | 0.2          | 11.41 | 82.3             | 8.98           | 128.9              | 1.9          | 0.22 | 7.93          | 2.6        | 0.094 | 3.62                                 | 1120                      | 16                   | 2460               |     |
|                        | 8/29/2000  | 3:08 PM    | 0.18                          | 76                                 | 72                                   | 80            | 0.46          | 0.2          | 14.2  | 115.6            | 11.84          | 166.3              | 1.3          | 0.23 | 7.67          | 2.77       | 0.098 | 3.54                                 | 1733                      | 31                   |                    |     |
|                        | 9/19/2000  | 10:58 AM   | 0.17                          | 72                                 | 69                                   | 73            | 0.08          | 0.3          | 10.73 | 118.1            | 13.09          | 158.7              | 1.2          | 0.21 | 7.9           | 3.85       | 0.144 | 3.74                                 | 1553                      | 29                   | 1790               |     |
|                        | 10/24/2000 | 11:41 AM   |                               | 66                                 | 64                                   | 100           | 0.08          | 0.2          | 6.66  |                  |                | 146.6              | 1.1          | 0.22 | 7.76          | 3.79       | 0.122 | 3.22                                 | 1300                      | 4                    | 980                |     |

| Date                   | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |                  |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| Mean                   |            | 4:33       | 66                                         | 62                                              | 71                                                | 0.82                      | 0.2                       | 10.42        | 82.9  | 9.1              | 135.3          | 4.6                | 0.2          | 7.33 | 4.99          | 0.189      | 3.68 | 938                                  | 45                        | 2206                 |                    |
| StDev                  |            | 3:07       | 12.71                                      | 10.66                                           | 12.73                                             | 0.53                      | 0.14                      | 4.19         | 19.12 | 2.2              | 24.95          | 7.82               | 0.09         | 0.46 | 2.16          | 0.09       | 0.38 | 689.3                                | 105.65                    | 1554.04              |                    |
| 2001                   | 4/26/2001  |            | 44                                         | 48                                              | 56                                                | 0.110                     | 0.30                      |              |       |                  |                | 1.85               |              |      | 6.03          | 0.24       | 3.98 |                                      |                           |                      |                    |
|                        | 5/31/2001  |            | 68                                         | 72                                              | 86                                                | 0.110                     | 0.30                      | 8.42         | 83.9  | 10.21            | 134.40         | 1.44               |              | 7.69 | 3.91          | 0.14       | 3.50 | 579.0                                | 11                        |                      |                    |
|                        | 6/27/2001  | 1:06 PM    | 68                                         | 70                                              | 78                                                | 0.080                     | 0.30                      | 13.82        | 83.8  | 8.78             | 155.30         | 2.58               |              | 7.70 | 4.80          | 0.19       | 3.90 | 1986.0                               | 32                        |                      |                    |
|                        | 7/31/2001  | 11:35 AM   | 70                                         | 70                                              | 78                                                | 0.330                     | 0.20                      | 14.86        | 47.4  | 4.82             | 140.30         |                    | 0.04         | 7.44 | 3.25          | 0.10       | 2.98 | 2419.0                               | 27                        |                      |                    |
|                        | 8/22/2001  | 12:40 PM   | 72                                         | 70                                              | 78                                                | 0.870                     | 0.10                      | 14.35        | 13.4  | 1.40             | 139.30         | 1.82               |              | 7.33 | 4.25          | 0.14       | 3.34 | 1414.0                               | 29                        |                      |                    |
|                        | 9/20/2001  |            | 42                                         | 48                                              | 54                                                | 0.020                     | 0.60                      | 11.46        | 93.3  | 10.06            | 104.10         |                    |              | 7.33 | 16.00         | 0.60       | 3.74 | 2419.0                               | 199                       |                      |                    |
|                        | 10/29/2001 | 2:25 PM    | 62                                         | 60                                              | 67                                                | 0.580                     | 0.30                      | 4.39         | 83.6  | 11.06            | 137.50         | 2.34               | 0.09         | 7.32 | 4.79          | 0.16       | 3.34 | 488.0                                | 16                        |                      |                    |
|                        | Mean       |            | 61                                         | 63                                              | 71                                                | 0.300                     | 0.30                      | 11.22        | 67.6  | 7.72             | 135.15         | 2.01               | 0.07         | 7.47 | 6.15          | 0.22       | 3.54 | 1550.8                               | 52                        |                      |                    |
|                        | StDev      |            | 13                                         | 11                                              | 12                                                | 0.317                     | 0.15                      | 4.11         | 31.0  | 3.80             | 16.85          | 0.45               | 0.04         | 0.18 | 4.43          | 0.17       | 0.35 | 870.6                                | 72                        |                      |                    |
| 2002                   | 4/30/2002  | 1:19 PM    | 43                                         | 43                                              | 47                                                | 0.000                     | 0.40                      | 4.45         | 104.8 | 13.72            | 97.40          | 1.90               | 0.00         | 7.22 | 7.96          | 0.31       | 3.88 | 579.0                                | 18                        |                      |                    |
|                        | 5/29/2002  | 2:07 PM    | 68                                         | 68                                              | 70                                                | 0.190                     | 0.10                      | 13.97        | 72.3  | 7.51             | 176.00         | 1.35               | 0.00         | 7.35 | 3.73          | 0.10       | 2.79 | 1203.0                               | 3                         |                      |                    |
|                        | 7/2/2002   | 11:21 AM   | 72                                         | 68                                              | 77                                                | 0.000                     | 0.20                      | 13.79        | 64.9  | 6.80             | 184.90         | 1.56               | 0.11         | 7.38 | 4.58          | 0.18       | 3.93 | 2419.0                               | 42                        |                      |                    |
|                        | 8/1/2002   |            | 76                                         | 70                                              | 78                                                | 0.170                     | 0.20                      | 15.53        | 107.7 | 10.77            | 80.00          | 1.16               | 0.00         | 7.29 | 2.64          | 0.08       | 2.99 | 2419.0                               | 19                        |                      |                    |
|                        | 8/29/2002  |            | 72                                         | 70                                              | 84                                                | 0.280                     | 0.20                      | 13.50        |       | 8.40             | 180.00         | 3.74               |              | 7.64 | 2.44          | 0.05       | 2.17 | 1120.0                               | 16                        |                      |                    |
|                        | 9/25/2002  | 1:11 PM    | 68                                         | 66                                              | 76                                                | 0.780                     | 0.20                      | 10.76        | 101.0 | 11.20            | 124.00         | 1.74               | 0.00         | 7.73 | 4.69          | 0.14       | 3.05 | 2419.0                               | 22                        |                      |                    |
|                        | 10/24/2002 | 1:47 PM    | 52                                         | 52                                              | 60                                                | 1.210                     | 0.30                      | 4.06         | 99.7  | 13.04            | 106.00         | 2.03               | 0.90         | 7.77 | 7.16          | 0.26       | 3.62 | 1553.0                               | 15                        |                      |                    |
|                        | Mean       |            | 64                                         | 62                                              | 70                                                | 0.376                     | 0.23                      | 10.87        | 91.7  | 10.21            | 135.47         | 1.93               | 0.17         | 7.48 | 4.74          | 0.16       | 3.20 | 1673.1                               | 19                        |                      |                    |
|                        | StDev      |            | 12                                         | 11                                              | 13                                                | 0.452                     | 0.10                      | 4.73         | 18.3  | 2.70             | 43.96          | 0.86               | 0.36         | 0.22 | 2.12          | 0.09       | 0.64 | 753.6                                | 12                        |                      |                    |
| 2003                   | 4/28/2003  | 2:02 PM    | 50                                         | 48                                              | 54                                                | 0.063                     | 0.40                      | 10.24        | 117.9 | 13.23            | 112.00         | 1.48               | 0.51         | 7.54 | 5.82          | 0.24       | 4.04 | 228.2                                | 0                         |                      |                    |
|                        | 5/27/2003  | 1:38 PM    | 54                                         | 51                                              | 62                                                | 0.144                     | 0.40                      | 12.48        | 98.9  | 10.54            | 126.00         | 1.80               | 0.54         | 8.70 | 6.45          | 0.27       | 4.25 | 1732.9                               | 36                        |                      |                    |
|                        | 6/23/2003  | 1:45 PM    | 60                                         | 56                                              | 66                                                | 0.107                     | 0.50                      | 16.05        | 94.1  | 9.28             | 95.00          | 13.30              | 0.39         | 8.07 | 8.60          | 0.36       | 4.19 | 1300.0                               | 52                        |                      |                    |
|                        | 7/17/2003  | 1:03 PM    | 50                                         | 64                                              | 74                                                | 0.044                     | 0.20                      | 16.67        | 101.3 | 9.85             | 138.00         | 1.79               | 0.66         | 7.79 | 5.89          | 0.24       | 4.04 | 1986.3                               | 82                        |                      |                    |
|                        | 8/18/2003  | 1:26 PM    | 58                                         | 56                                              | 62                                                | 0.034                     | 0.60                      | 18.09        | 103.1 | 9.74             | 101.00         | 3.63               | 0.65         | 7.49 | 12.90         | 0.60       | 4.68 | >2419                                | 93                        |                      |                    |



| Date                   | Time     | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA  | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|-------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |          |            |                                            |                                                 |                                                   |                           |                           |              |       |                  |                |                    |              |      |               |            |       |                                      |                           |                      |                    |
| 9/24/2003              | 1:29 PM  |            | 46                                         | 42                                              | 50                                                | 0.016                     | 0.60                      | 13.37        | 97.1  | 10.14            | 83.00          | 2.65               | 0.60         | 7.61 | 13.30         | 0.58       | 4.38  | >2419                                | 48                        |                      |                    |
| 10/15/2003             | 1:20 PM  |            | 68                                         | 62                                              | 74                                                |                           |                           | 9.70         | 96.7  | 10.98            | 148.00         | 1.41               | 0.30         | 7.73 | 3.13          | 0.13       | 4.15  | 345.0                                | 0                         |                      |                    |
| Mean                   |          |            | 55                                         | 54                                              | 63                                                | 0.068                     | 0.45                      | 13.80        | 101.3 | 10.54            | 114.71         | 3.72               | 0.52         | 7.85 | 8.01          | 0.35       | 4.25  | 1118.5                               | 45                        |                      |                    |
| StDev                  |          |            | 7                                          | 8                                               | 9                                                 | 0.048                     | 0.15                      | 3.24         | 7.9   | 1.31             | 23.69          | 4.30               | 0.14         | 0.42 | 3.82          | 0.18       | 0.23  | 799.1                                | 36                        |                      |                    |
| 4/19/2004              | 12:48 PM |            | 46                                         | 48                                              | 50                                                |                           |                           | 9.74         | 88.1  | 11.14            | 98.00          | 2.18               | 0.10         | 7.62 | 5.44          | 0.23       | 4.25  | 727.0                                | 1                         |                      |                    |
| 5/25/2004              | 2:26 PM  |            | 24                                         | 24                                              | 29                                                | 0.010                     | 0.07                      | 16.99        | 75.5  | 7.28             | 44.00          | 2.46               | 0.35         | 7.10 | 14.40         | 0.66       | 4.61  | >2419.2                              | 222                       |                      |                    |
| 6/14/2004              | 12:23 PM |            | 70                                         | 98                                              | 98                                                | 0.010                     | 0.07                      | 14.32        | 91.4  | 9.35             | 144.00         | 2.03               | 0.15         | 7.86 | 3.23          | 0.10       | 3.19  | 755.5                                | 7                         |                      |                    |
| 7/19/2004              | 10:31 AM |            | 66                                         | 70                                              | 78                                                | 0.006                     | 0.10                      | 15.34        | 108.8 | 10.88            | 144.00         | 4.02               | 0.18         | 8.06 | 5.47          | 0.21       | 3.91  | 1299.7                               | 60                        |                      |                    |
| 8/30/2004              | 12:31 PM |            | 70                                         | 60                                              | 74                                                | 0.026                     | 0.20                      | 13.94        | 105.5 | 10.88            | 120.00         | 3.66               | 0.40         | 7.84 | 6.04          | 0.24       | 4.02  | 1413.6                               | 14                        |                      |                    |
| 9/14/2004              | 2:29 PM  |            | 72                                         | 62                                              | 74                                                | -0.003                    | 0.12                      | 15.50        | 97.6  | 9.74             | 133.00         | 3.84               | 0.64         | 7.62 | 5.77          | 0.23       | 3.97  | 1732.0                               | 16                        |                      |                    |
| 10/4/2004              | 1:20 PM  |            | 72                                         | 68                                              | 76                                                | 0.001                     | 0.04                      | 10.07        | 97.2  | 10.96            | 128.00         | 2.59               | 0.05         | 7.58 | 2.96          | 0.10       | 3.45  | 920.8                                | 3                         |                      |                    |
| Mean                   |          |            | 60                                         | 61                                              | 68                                                | 0.008                     | 0.10                      | 13.70        | 94.9  | 10.03            | 115.86         | 2.97               | 0.27         | 7.67 | 6.19          | 0.26       | 3.91  | 1141.4                               | 46                        |                      |                    |
| StDev                  |          |            | 18                                         | 23                                              | 22                                                | 0.010                     | 0.06                      | 2.77         | 11.2  | 1.39             | 35.41          | 0.84               | 0.21         | 0.30 | 3.83          | 0.19       | 0.48  | 404.3                                | 80                        |                      |                    |
| 4/24/2006              |          |            | 48                                         | 48                                              | 50                                                | <0.025                    | <0.25                     | 7.05         | 100.0 | 12.13            | 92.00          | 3.15               |              | 6.81 | 6.90          | 0.34       | 4.94  | 1986.3                               | 16                        |                      |                    |
| 5/15/2006              |          |            | 72                                         | 78                                              | 82                                                | <0.025                    | <0.25                     | 14.03        | 97.3  | 10.07            | 143.00         | 2.48               |              | 5.45 | 0.85          | 0.09       | 10.32 | 816.4                                | 30                        |                      |                    |
| 6/8/2006               |          |            | 68                                         | 66                                              | 72                                                | <0.025                    | <0.25                     | 14.35        | 96.2  | 9.84             | 141.00         | 3.73               |              | 7.42 |               |            |       | 2419.2                               | 236                       |                      |                    |
| 7/17/2006              |          |            | 74                                         | 78                                              | 84                                                | <0.025                    | <0.25                     | 19.93        | 92.1  | 8.38             | 141.00         | 0.80               |              | 7.55 |               |            |       | 1986.0                               | 43                        |                      |                    |
| 8/14/2006              |          |            | 76                                         | 80                                              | 90                                                | <0.025                    | <0.25                     | 14.81        | 99.4  | 10.06            | 145.00         | 2.20               |              | 7.70 |               |            |       | 1299.0                               | 31                        |                      |                    |
| 9/5/2006               |          |            | 70                                         | 64                                              | 78                                                | <0.025                    | <0.25                     | 13.48        | 91.9  | 9.58             | 131.00         | 1.94               |              | 7.55 |               |            |       | 1119.9                               | 12                        |                      |                    |
| 10/16/2006             |          |            | 63                                         | 70                                              | 78                                                | <0.025                    | <0.25                     | 6.55         | 94.7  | 11.63            | 132.00         | 2.66               |              | 7.27 |               |            |       | 344.0                                | 5                         |                      |                    |
| Mean                   |          |            | 67                                         | 69                                              | 76                                                |                           |                           | 12.89        | 95.9  | 10.24            | 132.14         | 2.42               |              | 7.11 | 3.88          | 0.21       | 7.63  | 1424.4                               | 53                        |                      |                    |
| StDev                  |          |            | 9                                          | 11                                              | 13                                                |                           |                           | 4.68         | 3.2   | 1.27             | 18.50          | 0.93               |              | 0.79 | 4.28          | 0.18       | 3.80  | 737.8                                | 82                        |                      |                    |
| 4/23/2007              |          |            | 44                                         | 50                                              | 60                                                | <0.025                    | <0.25                     | 8.55         | 100.5 | 11.74            | 94.00          | 0.98               |              | 6.77 | 4.21          | 0.20       |       | 435.2                                | 5                         |                      |                    |
| 5/4/2007               |          |            | 62                                         | 66                                              | 70                                                | <0.025                    | <0.25                     | 12.15        | 104.4 | 11.21            | 131.00         | 2.49               |              | 7.36 | 2.26          | 0.10       |       | 365.0                                | 16                        |                      |                    |
| 6/4/2007               |          |            | 76                                         | 64                                              | 78                                                | <0.025                    | <0.25                     | 13.88        | 104.6 | 10.81            | 152.00         | 1.64               |              | 7.43 | 1.49          | 0.08       |       | 2419.2                               | 55                        |                      |                    |

| Date                   | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L<br>) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|------------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |                  |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2007                   | 7/2/2007   |            | 86                                         | 80                                              | 84                                                | <0.025                    | <0.25                     | 12.99        | 116.4 | 12.27            | 136.00         | 2.74               |              | 7.54 | 1.88          | 0.05       |      | 613.0                                | 5                         |                      |                    |
|                        | 8/20/2007  |            | 72                                         | 24                                              | 114                                               | <0.025                    | <0.25                     |              | 102.4 | 11.08            | 0.16           | 1.12               |              | 7.73 | 2.35          | 0.06       |      | 980.4                                | 28                        |                      |                    |
|                        | 9/17/2007  |            | 29                                         | 52                                              | 69                                                | <0.025                    | <0.25                     | 10.16        | 102.6 | 11.53            | 0.14           | 1.16               |              | 7.73 | 3.09          | 0.06       |      | 1299.0                               | 40                        |                      |                    |
|                        | 10/9/2007  |            | 60                                         | 57                                              | 61                                                | <0.025                    | <0.25                     | 13.06        | 107.8 | 11.34            | 0.15           | 1.37               |              | 7.99 | 3.00          | 0.07       |      | 980.4                                | 31                        |                      |                    |
|                        | Mean       |            | 61                                         | 56                                              | 77                                                |                           |                           | 11.80        | 105.5 | 11.43            | 73.35          | 1.64               |              | 7.51 | 2.61          | 0.09       |      | 1013.2                               | 26                        |                      |                    |
|                        | StDev      |            | 20                                         | 17                                              | 19                                                |                           |                           | 2.03         | 5.3   | 0.48             | 70.64          | 0.70               |              | 0.39 | 0.91          | 0.05       |      | 704.2                                | 19                        |                      |                    |
| 2008                   | 4/21/2008  |            | 60                                         | 60                                              | 67                                                | <0.025                    | <0.25                     | 12.32        | 88.7  | 9.49             | 0.11           | 0.68               |              | 6.88 | 5.83          | 0.20       |      | 1732.9                               | 7                         |                      |                    |
|                        | 5/19/2008  |            | 65                                         | 65                                              | 82                                                | <0.025                    | <0.25                     | 7.81         | 94.6  | 11.25            | 0.12           | 0.71               |              | 7.76 | 3.50          | 0.09       |      | 727.0                                | 28                        |                      |                    |
|                        | 6/16/2008  |            | 65                                         | 71                                              | 72                                                | <0.025                    | <0.25                     | 16.74        | 92.4  | 8.98             | 0.15           | 2.41               |              | 7.66 | 4.39          | 0.11       |      | >2419.2                              | 2419                      |                      |                    |
|                        | 7/14/2008  |            | 72                                         | 48                                              | 50                                                | <0.025                    | <0.25                     | 16.08        | 102.1 | 10.06            | 0.12           | 1.46               |              | 7.62 | 10.10         | 0.33       |      | >2419.2                              | 435                       |                      |                    |
|                        | 8/4/2008   |            | 73                                         | 67                                              | 74                                                | <0.025                    | <0.25                     | 14.82        | 98.4  | 9.96             | 0.14           | 1.32               |              | 7.54 | 7.83          | 0.25       |      | >2419.2                              | 28                        |                      |                    |
|                        | 8/26/2008  |            | 69                                         | 72                                              | 74                                                | <0.025                    | <0.25                     | 14.91        | 116.1 | 11.73            | 0.15           | 1.45               |              | 7.80 | 4.43          | 0.14       |      | >2419.2                              | 71                        |                      |                    |
|                        | 9/23/2008  |            | 39                                         | 63                                              | 72                                                | <0.025                    | <0.25                     | 10.30        | 117.1 | 13.12            | 0.12           | 1.06               |              | 7.89 | 2.48          | 0.06       |      | 1206.0                               | 19                        |                      |                    |
|                        | 10/14/2008 |            | 70                                         | 106                                             | 160                                               | <0.025                    | <0.25                     | 9.70         | 102.8 | 11.68            | 0.16           | 0.83               |              | 7.90 | 3.16          | 0.06       |      | 920.4                                | 6                         |                      |                    |
|                        | Mean       |            | 64                                         | 69                                              | 81                                                |                           |                           | 12.84        | 101.5 | 10.78            | 0.13           | 1.24               |              | 7.63 | 5.22          | 0.15       |      | 1146.6                               | 377                       |                      |                    |
|                        | StDev      |            | 11                                         | 17                                              | 33                                                |                           |                           | 3.29         | 10.4  | 1.39             | 0.02           | 0.57               |              | 0.33 | 2.59          | 0.10       |      | 437.6                                | 838                       |                      |                    |
| 2009                   | 4/13/2009  |            | 63                                         | 32                                              | 64                                                | <0.025                    | <0.25                     | 7.49         | 96.7  | 11.59            | 0.13           | 0.97               |              | 7.40 |               |            |      | 410.6                                | 1                         |                      |                    |
|                        | 5/11/2009  |            | 72                                         | 64                                              | 66                                                | <0.025                    | <0.25                     | 12.62        | 103.4 | 11.19            | 0.13           | 1.30               |              | 7.68 |               |            |      | 1986.3                               | 4                         |                      |                    |
|                        | 5/27/2009  |            | 80                                         | 72                                              | 81                                                | <0.025                    | <0.25                     | 11.51        | 94.8  | 10.33            | 0.16           | 0.97               |              | 7.80 |               |            |      | 1553.0                               | 10                        |                      |                    |
|                        | 6/8/2009   |            | 75                                         | 80                                              | 83                                                | <0.025                    | <0.25                     | 13.42        | 111.2 | 11.60            | 0.16           | 0.49               |              | 8.01 |               |            |      | 1203.3                               | 3                         |                      |                    |
|                        | 6/22/2009  |            | 74                                         | 68                                              | 76                                                | <0.025                    | <0.25                     | 16.01        | 101.3 | 10.00            | 0.13           | 0.69               |              | 7.58 |               |            |      | 1299.0                               | 27                        |                      |                    |
|                        | 7/6/2009   |            | 70                                         | 74                                              | 80                                                | <0.025                    | <0.25                     | 13.50        | 100.6 | 10.47            | 0.15           | 0.95               |              | 7.82 |               |            |      | 2419.2                               | 14                        |                      |                    |
|                        | 7/20/2009  |            | 81                                         | 86                                              | 91                                                | <0.025                    | <0.25                     | 13.63        | 110.9 | 11.52            | 0.14           | 0.96               |              | 7.83 |               |            |      | 1203.0                               | 10                        |                      |                    |
|                        | 8/4/2009   |            | 63                                         | 63                                              | 89                                                | <0.025                    | <0.25                     | 15.73        | 94.1  | 9.34             | 0.14           | 1.04               |              | 7.68 |               |            |      | >2419.2                              | 32                        |                      |                    |
|                        | 8/18/2009  |            | 76                                         | 83                                              | 96                                                | <0.025                    | <0.25                     | 15.57        | 103.8 | 10.33            | 0.14           | 0.84               |              | 7.82 |               |            |      | >2419.2                              | 15                        |                      |                    |

| Date                   | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 8/31/2009              |           |            | 71                                         | 67                                              | 80                                                | <0.025                    | <0.25                     | 12.18        | 81.2  | 8.72         | 0.05           | 1.49               |              | 7.79 |               |            |      | 2419.0                               | 35                        |                      |                    |
| 9/14/2009              |           |            | 70                                         | 73                                              | 96                                                | <0.025                    | <0.25                     | 12.19        | 91.6  | 9.82         | 0.17           | 1.47               |              | 7.90 |               |            |      | 2419.2                               | 5                         |                      |                    |
| 9/28/2009              |           |            | 72                                         | 52                                              | 65                                                | <0.025                    | <0.25                     | 11.76        | 94.9  | 10.28        | 0.10           | 2.13               |              | 7.52 |               |            |      | >2419.2                              | 199                       |                      |                    |
| 10/14/2009             |           |            | 66                                         | 66                                              | 77                                                | <0.025                    | <0.25                     | 6.57         | 96.3  | 11.81        | 0.13           | 0.92               |              | 7.51 |               |            |      | 613.1                                | 3                         |                      |                    |
| Mean                   |           |            | 72                                         | 68                                              | 80                                                |                           |                           | 12.48        | 98.5  | 10.54        | 0.13           | 1.09               |              | 7.72 |               |            |      | 1552.6                               | 27                        |                      |                    |
| StDev                  |           |            | 6                                          | 14                                              | 11                                                |                           |                           | 2.85         | 8.1   | 0.96         | 0.03           | 0.42               |              | 0.18 |               |            |      | 740.6                                | 53                        |                      |                    |
| 2010                   | 5/3/2010  |            | 77                                         | 11                                              | 14                                                | <0.025                    | <0.25                     | 14.16        | 97.2  | 9.98         | 0.11           | 0.93               |              | 7.49 |               |            |      | 1299.0                               | 4                         |                      |                    |
|                        | 5/17/2010 |            | 71                                         | 72                                              | 74                                                | <0.025                    | <0.25                     | 11.48        | 99.3  | 10.82        | 0.15           | 0.61               |              | 7.57 |               |            |      | 727.0                                | 5                         |                      |                    |
|                        | 6/1/2010  |            | 76                                         | 72                                              | 76                                                | <0.025                    | <0.25                     | 14.11        | 97.5  | 10.02        | 0.15           | 12.90              |              | 7.54 |               |            |      | >2419                                | 272                       |                      |                    |
|                        | 6/14/2010 |            | 52                                         | 57                                              | 67                                                | <0.025                    | <0.25                     | 12.74        | 96.1  | 10.18        | 0.12           | 1.02               |              | 7.44 |               |            |      | 2419.2                               | 40                        |                      |                    |
|                        | 6/29/2010 |            | 55                                         | 43                                              | 58                                                | <0.025                    | <0.25                     | 17.78        | 94.7  | 9.00         | 0.07           | 0.92               |              | 7.20 |               |            |      | >2419                                | 1553                      |                      |                    |
|                        | 7/12/2010 |            | 81                                         | 74                                              | 86                                                | <0.025                    | <0.25                     | 15.93        | 105.9 | 10.47        | 0.15           | 0.65               |              | 7.86 |               |            |      | 2419.2                               | 39                        |                      |                    |
|                        | 8/9/2010  |            | 80                                         | 78                                              | 96                                                | <0.025                    | <0.25                     | 15.04        | 111.9 | 11.27        | 0.14           | 0.96               |              | 7.88 |               |            |      | >2419.2                              | 45                        |                      |                    |
|                        | 8/23/2010 |            | 41                                         | 47                                              | 50                                                | <0.025                    | <0.25                     | 14.90        |       |              | 0.08           | 1.61               |              | 7.56 |               |            |      | >2419.2                              | 517                       |                      |                    |
|                        | 9/7/2010  |            | 80                                         | 81                                              | 97                                                | <0.025                    | <0.25                     | 13.04        | 95.9  | 10.09        | 0.15           | 0.64               |              | 7.78 |               |            |      | 1986.0                               | 32                        |                      |                    |
|                        | 9/20/2010 |            | 88                                         | 93                                              | 124                                               | <0.025                    | <0.25                     | 10.61        | 100.4 | 11.16        | 0.14           | 0.68               |              | 7.95 |               |            |      | 1119.9                               | 10                        |                      |                    |
|                        | 10/4/2010 |            | 27                                         | 27                                              | 38                                                | <0.025                    | <0.25                     | 10.60        | 97.1  | 10.81        | 0.10           | 0.87               |              | 7.22 |               |            |      | >2419                                | 28                        |                      |                    |
|                        | Mean      |            | 66                                         | 60                                              | 71                                                |                           |                           | 13.67        | 99.6  | 10.38        | 0.12           | 1.98               |              | 7.59 |               |            |      | 1661.7                               | 231                       |                      |                    |
|                        | StDev     |            | 19                                         | 25                                              | 31                                                |                           |                           | 2.25         | 5.4   | 0.68         | 0.03           | 3.63               |              | 0.25 |               |            |      | 714.4                                | 466                       |                      |                    |
| 2011                   | 5/9/2011  |            | 59                                         | 66                                              | 75                                                | <0.025                    | <0.25                     | 11.94        | 103.1 | 11.12        | 0.13           | 0.51               |              | 7.51 |               |            |      | 1553.0                               | 4                         |                      |                    |
|                        | 5/23/2011 |            | 58                                         | 54                                              | 63                                                | <0.025                    | 0.10                      | 11.71        | 95.0  | 10.31        | 0.12           | 0.88               |              | 7.57 |               |            |      | >2419                                | 36                        |                      |                    |
|                        | 6/6/2011  |            | 82                                         | 58                                              | 70                                                | <0.025                    | 0.13                      | 13.02        | 105.2 | 11.07        | 0.15           | 0.52               |              | 7.77 |               |            |      | >2419                                | 41                        |                      |                    |
|                        | 6/19/2011 |            | 76                                         | 88                                              | 90                                                | <0.025                    | 0.11                      | 12.84        | 77.7  | 8.21         | 0.15           | 0.48               |              | 7.72 |               |            |      | 1203.0                               | 9                         |                      |                    |
|                        | 7/11/2011 |            | 78                                         | 73                                              | 82                                                | <0.025                    | 0.16                      | 12.91        | 70.2  | 7.41         | 0.16           | 0.56               |              | 7.77 |               |            |      | 1413.6                               | 21                        |                      |                    |
|                        | 7/25/2011 |            | 98                                         | 92                                              | 101                                               | <0.025                    | 0.16                      | 13.01        | 98.3  | 10.35        | 0.12           | 1.89               |              | 7.61 |               |            |      | >2419                                | >2419                     |                      |                    |

| Date                   | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%  | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |      |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 8/8/2011               |           |            | 70                                         | 68                                              | 77                                                | <0.025                    | 0.12                      | 14.78        |      |              | 0.12           | 0.84               |              | 7.94 |               |            |      | >2419                                | 135                       |                      |                    |
| 9/12/2011              |           |            | 60                                         | 56                                              | 75                                                | <0.025                    | 0.12                      | 11.71        |      |              | 0.14           | 0.89               |              | 7.05 |               |            |      | 2419.2                               | 19                        |                      |                    |
| 9/27/2011              |           |            | 71                                         | 74                                              | 86                                                | <0.25                     | 0.19                      | 11.86        |      |              | 0.14           | 0.99               |              | 7.79 |               |            |      | 1732.0                               | 25                        |                      |                    |
| 10/11/2011             |           |            | 88                                         | 86                                              | 92                                                | 0.039                     | 0.18                      | 9.88         | 87.8 | 9.93         | 0.14           | 0.70               |              | 7.56 |               |            |      | 980.0                                | 6                         |                      |                    |
| 10/24/2011             |           |            | 69                                         | 66                                              | 73                                                | <0.025                    | 0.15                      | 6.93         |      |              | 0.13           | 0.56               |              | 7.24 |               |            |      | 1203.0                               | 31                        |                      |                    |
| Mean                   |           |            | 74                                         | 71                                              | 80                                                |                           |                           | 11.87        | 91.0 | 9.77         | 0.14           | 0.80               |              | 7.59 |               |            |      | 1500.5                               | 33                        |                      |                    |
| StDev                  |           |            | 13                                         | 13                                              | 11                                                |                           |                           | 2.04         | 13.1 | 1.42         | 0.01           | 0.40               |              | 0.26 |               |            |      | 475.4                                | 38                        |                      |                    |
| 2012                   | 4/23/2012 |            | 40                                         | 40                                              | 42                                                | <0.025                    | <0.05                     | 7.50         |      |              | 72.60          | 8.79               |              | 7.62 |               |            |      | >2419                                | 58                        |                      |                    |
|                        | 5/7/2012  |            | 69                                         | 68                                              | 76                                                | <0.025                    | 0.18                      | 13.60        |      |              |                | 2.20               |              | 8.10 |               |            |      | 920.8                                | 5                         |                      |                    |
|                        | 7/10/2012 |            | 80                                         | 76                                              | 82                                                | <0.025                    | 0.20                      | 13.70        |      |              | 161.50         | 1.41               |              | 8.10 |               |            |      |                                      |                           |                      |                    |
|                        | 8/1/2012  |            | 68                                         | 64                                              | 68                                                | <0.025                    | 0.06                      | 16.00        |      |              | 145.00         | 5.65               |              | 7.87 |               |            |      |                                      |                           |                      |                    |
|                        | 8/13/2012 |            | 72                                         | 74                                              | 80                                                | <0.025                    | <0.05                     | 1.86         |      |              | 193.60         | 1.86               |              | 8.12 |               |            |      |                                      |                           |                      |                    |
|                        | 9/17/2012 |            | 80                                         | 70                                              | 78                                                | <0.025                    | 0.17                      | 10.90        |      |              | 162.20         | 0.90               |              | 7.69 |               |            |      |                                      |                           |                      |                    |
|                        | 10/1/2012 |            | 66                                         | 64                                              | 66                                                | <0.025                    | 0.10                      | 11.50        |      |              | 138.30         | 1.71               |              | 7.92 |               |            |      | >2419                                | 38                        |                      |                    |
|                        | Mean      |            | 68                                         | 65                                              | 70                                                |                           |                           | 10.72        |      |              | 145.53         | 3.22               |              | 7.92 |               |            |      |                                      | 34                        |                      |                    |
|                        | StDev     |            | 13                                         | 12                                              | 14                                                |                           |                           | 4.74         |      |              | 40.53          | 2.91               |              | 0.20 |               |            |      |                                      | 27                        |                      |                    |
| 2013                   | 5/20/2013 |            | 76                                         | 72                                              | 80                                                |                           | 0.18                      | 13.90        |      | 11.30        | 158.30         | 1.15               |              | 7.89 |               |            |      | 920.0                                | 14                        |                      |                    |
|                        | 6/3/2013  |            | 76                                         | 72                                              | 80                                                | <0.025                    | 0.17                      | 12.40        |      | 8.90         | 154.20         | 1.41               |              | 7.97 |               |            |      | >2419                                | 85                        |                      |                    |
|                        | 6/25/2013 |            | 76                                         | 70                                              | 80                                                | <0.025                    | 0.13                      | 14.70        |      |              | 151.60         | 1.77               |              | 7.93 |               |            |      | >2419                                | 25                        |                      |                    |
|                        | 7/15/2013 |            | 74                                         | 74                                              | 78                                                | <0.025                    | 0.17                      | 17.70        |      | 8.80         | 152.80         | 1.62               |              | 7.82 |               |            |      | >2419                                | 31                        |                      |                    |
|                        | 7/29/2013 |            | 88                                         | 88                                              | 94                                                | <0.025                    | 0.16                      | 13.00        |      | 10.60        | 153.90         | 1.30               |              | 7.89 |               |            |      | 1986.0                               | 54                        |                      |                    |
|                        | 8/12/2013 |            | 76                                         | 74                                              | 82                                                | <0.025                    | 0.19                      | 14.30        |      | 12.60        | 159.80         | 0.66               |              | 7.91 |               |            |      | 866.4                                | 44                        |                      |                    |
|                        | 9/9/2013  |            | 74                                         | 78                                              | 82                                                | <0.025                    | 0.19                      | 10.10        |      | 7.60         | 153.30         | 0.79               |              | 8.07 |               |            |      | 686.7                                | 27                        |                      |                    |
|                        | 9/24/2013 |            | 70                                         | 66                                              | 78                                                | <0.025                    | 0.18                      | 9.40         |      | 10.80        | 144.00         | 0.94               |              | 7.98 |               |            |      | 1413.6                               | 20                        |                      |                    |
|                        | Mean      |            | 76                                         | 74                                              | 82                                                |                           |                           | 13.19        |      | 10.09        | 153.49         | 1.21               |              | 7.93 |               |            |      | 1174.5                               | 37                        |                      |                    |

| Date                   | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|------------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 6 – TAYNTER BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| StDev                  |           |            | 5                                          | 7                                               | 5                                                 |                           |                           | 2.64         |     | 1.72         | 4.75           | 0.39               |              | 0.07 |               |            |      | 527.6                                | 23                        |                      |                    |
| 2014                   | 5/20/2014 |            | 64                                         | 62                                              | 72                                                | <0.025                    | 0.08                      | 12.20        |     |              | 123.70         | 0.78               |              | 7.77 |               |            |      | 770.1                                | 20                        |                      |                    |
|                        | 6/17/2014 |            | 66                                         | 64                                              | 66                                                | <0.025                    | 0.13                      | 14.10        |     |              | 128.80         | 1.30               |              | 7.48 |               |            |      | >2419                                | 648                       |                      |                    |
|                        | 7/17/2014 |            | 78                                         | 74                                              | 80                                                | <0.025                    | 0.15                      | 13.80        |     |              | 144.80         | 1.71               |              | 7.61 |               |            |      | 1986.0                               | 387                       |                      |                    |
|                        | 8/19/2014 |            | 72                                         | 70                                              | 80                                                | <0.025                    | 0.10                      | 15.30        |     |              | 141.60         | 1.35               |              | 7.59 |               |            |      | 1986.0                               | 20                        |                      |                    |
|                        | 9/23/2014 |            | 64                                         | 60                                              | 66                                                | <0.025                    | 0.10                      | 10.50        |     |              | 137.80         | 1.77               |              | 7.57 |               |            |      | 1986.0                               | 23                        |                      |                    |
|                        | Mean      |            | 69                                         | 66                                              | 73                                                |                           |                           | 13.18        |     |              | 135.34         | 1.38               |              | 7.60 |               |            |      | 1682.0                               | 220                       |                      |                    |
|                        | StDev     |            | 6                                          | 6                                               | 7                                                 |                           |                           | 1.86         |     |              | 8.85           | 0.40               |              | 0.11 |               |            |      | 607.9                                | 287                       |                      |                    |
| 2015                   | 4/26/2015 |            | 64                                         | 64                                              | 66                                                | <0.025                    | 0.17                      | 8.70         |     |              | 135.80         | 3.84               |              | 7.74 |               |            |      | 387.0                                | 4                         |                      |                    |
|                        | 5/21/2015 |            | 70                                         | 70                                              | 74                                                | <0.025                    | 0.15                      | 13.30        |     |              | 150.50         | 2.39               |              | 7.96 |               |            |      | >2419                                | 21                        |                      |                    |
|                        | 7/28/2015 |            | 74                                         | 52                                              | 80                                                | 0.060                     | 0.13                      | 18.20        |     |              | 165.80         | 1.13               |              | 7.81 |               |            |      | >2419                                | 63                        |                      |                    |
|                        | 8/31/2015 |            | 76                                         | 76                                              | 82                                                | <0.025                    | 0.12                      | 16.00        |     |              | 161.50         | 1.21               |              | 8.01 |               |            |      | 517.0                                | 7                         |                      |                    |
|                        | 9/21/2015 |            | 76                                         | 72                                              | 80                                                | <0.025                    | 0.05                      | 11.80        |     |              | 160.10         | 12.30              |              | 7.98 |               |            |      | 579.0                                | 31                        |                      |                    |
|                        | Mean      |            | 72                                         | 67                                              | 76                                                |                           |                           | 13.60        |     |              | 154.74         | 4.17               |              | 7.90 |               |            |      | 494.3                                | 25                        |                      |                    |
|                        | StDev     |            | 5                                          | 9                                               | 7                                                 |                           |                           | 3.68         |     |              | 11.97          | 4.67               |              | 0.12 |               |            |      | 98.0                                 | 24                        |                      |                    |
| 2016                   | 5/10/2016 |            | 70                                         | 68                                              | 70                                                | <0.025                    | 0.12                      | 12.10        |     |              | 151.00         | 1.96               |              | 7.96 |               |            |      | 687.0                                | 9                         |                      |                    |
|                        | 6/13/2016 |            | 70                                         | 68                                              | 70                                                | <0.025                    | 0.11                      | 10.90        |     |              | 131.60         | 0.60               |              | 7.94 |               |            |      | 579.4                                | 19                        |                      |                    |
|                        | 7/6/2016  |            | 80                                         | 78                                              | 84                                                | <0.025                    | 0.10                      | 18.70        |     |              | 146.90         | 0.78               |              | 8.02 |               |            |      | 1119.8                               | 37                        |                      |                    |
|                        | 8/13/2016 |            | 68                                         | 68                                              | 76                                                | 0.025                     | 0.09                      |              |     |              | 132.50         | 1.65               |              | 7.20 |               |            |      | >2419                                | 101                       |                      |                    |
|                        | 9/13/2016 |            | 80                                         | 78                                              | 88                                                | <0.025                    | 0.10                      | 16.00        |     |              | 151.90         | 2.08               |              | 7.96 |               |            |      | 980.0                                | 48                        |                      |                    |
|                        | Mean      |            | 74                                         | 72                                              | 78                                                |                           |                           | 14.43        |     |              | 142.78         | 1.41               |              | 7.82 |               |            |      | 841.6                                | 43                        |                      |                    |
|                        | StDev     |            | 6                                          | 5                                               | 8                                                 |                           |                           | 3.59         |     |              | 9.98           | 0.68               |              | 0.35 |               |            |      | 251.1                                | 36                        |                      |                    |

EPA, 2001; MVWA, 2016

Table C-10: Tributary Sampling Results – Remus Brook, Site 7

| Date                 | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|----|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      |                                      |                           |                      |                    |
| 4/28/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 110.00                               | 0.00                      | 503.00               |                    |
| 5/5/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 0.00                                 | 0.00                      | 350.00               |                    |
| 5/13/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 40.00                                | 20.00                     | 373.00               |                    |
| 5/19/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20.00                                | 0.00                      | 3500.00              |                    |
| 5/26/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 170.00                               | 100.00                    | 130.00               |                    |
| 6/1/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 100.00                               | 100.00                    | 255.00               |                    |
| 6/9/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 260.00                               | 170.00                    | 325.00               |                    |
| 6/16/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 360.00                               | 70.00                     | 380.00               |                    |
| 6/22/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90.00                                | 30.00                     | 280.00               |                    |
| 6/29/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20.00                                | 10.00                     | 163.00               |                    |
| 7/7/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 80.00                                | 0.00                      | 170.00               |                    |
| 7/13/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 320.00                               | 10.00                     | 300.00               |                    |
| 7/28/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 20.00                                | 0.00                      | 49.00                |                    |
| 8/4/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 50.00                                | 10.00                     | 2000.00              |                    |
| 8/11/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 140.00                               | 0.00                      | 220.00               |                    |
| 8/18/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 10.00                                | 10.00                     | 245.00               |                    |
| 8/25/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 120.00                               | 120.00                    | 310.00               |                    |
| 9/2/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 50.00                                | 0.00                      | 270.00               |                    |
| 9/22/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 90.00                                | 10.00                     | 75.00                |                    |
| 9/29/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 450.00                               | 190.00                    | 390.00               |                    |
| 10/6/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 30.00                                | 30.00                     | 2000.00              |                    |
| 10/13/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 700.00                               | 90.00                     | 1089.00              |                    |
| 10/20/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 160.00                               | 10.00                     | 2000.00              |                    |
| 10/27/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |            |      | 200.00                               | 120.00                    | 2000.00              |                    |



| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 12/15/1998           |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      | 0.00                                 | 0.00                      | 1573.00              |                    |
| Mean                 |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      | 144.00                               | 44.00                     | 758.00               |                    |
| StDev                |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      | 166.00                               | 58.00                     | 891.00               |                    |
| 1999                 | 4/27/1999  | 3:13 PM    |                                            |                                                 |                                                   |                           |                           | 11.41        | 101.4 | 10.72        | 28.7           | 0                  | -0.21        | 5.65 | 5.96          | 0.198      | 3.32 | 210                                  | 0                         | 615                  |                    |
|                      | 5/6/1999   | 3:04 PM    |                                            |                                                 |                                                   |                           |                           | 17.15        | 103.4 | 9.64         | 37.5           | 0                  | 0.4          | 5.39 | 5.18          | 0.164      | 3.17 | 550                                  | 0                         | 68                   |                    |
|                      | 5/11/1999  | 3:02 PM    |                                            |                                                 |                                                   |                           |                           | 14.06        | 97    | 9.67         | 36.8           | 33.1               | 0.4          | 5.76 | 5.88          | 0.091      | 1.55 | 40                                   | 10                        | 484                  |                    |
|                      | 5/18/1999  | 3:07 PM    |                                            |                                                 |                                                   |                           |                           | 19.44        | 94.1  | 8.78         | 46.1           | 0                  | 0.4          | 6.11 | 4.68          | 0.155      | 3.31 | 490                                  | 20                        | 340                  |                    |
|                      | 6/2/1999   | 3:05 PM    |                                            |                                                 |                                                   |                           |                           | 21.08        | 101.6 | 9.17         | 41             | 8.9                | 0.31         | 5.51 | 6.21          | 0.374      | 6.02 | 60                                   | 60                        | 4000                 |                    |
|                      | 6/8/1999   | 2:56 PM    |                                            |                                                 |                                                   |                           |                           | 25.17        | 97    | 8.11         | 61.7           | 0                  | 0            | 6.36 | 6.13          | 0.226      | 3.69 | 850                                  | 790                       | 1152                 |                    |
|                      | 6/15/1999  | 3:06 PM    |                                            |                                                 |                                                   |                           |                           | 21.33        | 85.1  | 7.65         | 66.4           | 0                  | 0.3          | 6.58 | 6.46          | 0.274      | 4.24 | 840                                  | 240                       | 2130                 |                    |
|                      | 6/21/1999  | 3:07 PM    |                                            |                                                 |                                                   |                           |                           | 20.77        | 81.2  | 7.37         | 69.7           | 17.4               | 0.13         | 6.38 | 6.48          | 0.27       | 4.17 | 410                                  | 410                       | 3260                 |                    |
|                      | 7/13/1999  | 2:50 PM    | 8                                          | 10                                              | 10                                                | 0.012                     | 0.4                       | 21.36        | 92.5  | 8.3          | 44.1           | 11.1               | 0.31         | 6.7  | 7.86          | 0.304      | 3.87 | 0                                    | 0                         | 598                  |                    |
|                      | 7/20/1999  | 3:08 PM    | 6                                          | 4                                               | 12                                                | 0.022                     | 0.3                       | 23.94        | 90.3  | 7.72         | 46.9           | 7.6                | 0.31         | 6.96 | 6.81          | 0.231      | 3.39 | 50                                   | 40                        | 1694                 |                    |
|                      | 7/27/1999  | 3:09 PM    | 5                                          | 6                                               | 8                                                 | 1.37                      | 0.2                       | 26.5         | 96.5  | 7.87         | 94.2           | 24.3               | 0.2          | 7.2  | 6.8           | 0.251      | 3.69 | 20                                   | 0                         | 464                  |                    |
|                      | 8/3/1999   | 2:42 PM    | 3                                          | 4                                               | 4                                                 | 1.37                      | 0.3                       | 23.14        | 91.1  | 7.9          | 47.4           | 19.9               | 0.37         | 7.65 | 6.29          | 0.248      | 3.94 | 200                                  | 0                         | 832                  |                    |
|                      | 8/17/1999  | 2:59 PM    | 3                                          | 4                                               | 6                                                 | 0.94                      |                           | 24.55        | 93.6  | 7.91         | 18.9           | 0                  | 0.06         | 7.63 | 5.67          | 0.24       | 4.23 | 710                                  | 710                       | 1474                 |                    |
|                      | 8/24/1999  | 2:54 PM    | 3                                          | 4                                               | 10                                                | 2.15                      |                           | 20.9         | 88.9  | 8.05         | 18.2           | 18.1               | 0.2          | 7.92 | 5.49          | 0.18       | 3.28 | 370                                  | 0                         | 2000                 |                    |
|                      | 8/31/1999  | 2:46 PM    | 2                                          | 4                                               | 10                                                | 1.3                       |                           | 19.79        | 83.9  | 7.77         | 16.3           | 11.1               | 0.17         | 7.5  | 5.4           | 0.17       | 3.15 | 2000                                 | 2000                      | 2000                 |                    |
|                      | 9/8/1999   | 2:55 PM    | 6                                          | 8                                               | 22                                                | 0.87                      | 0.1                       | 23.87        | 81.9  | 7.01         | 16.6           | 34.3               | 0.12         | 7.63 | 5.62          | 0.151      | 2.69 | 60                                   | 0                         | 346                  |                    |
|                      | 9/15/1999  | 2:54 PM    | 3                                          | 10                                              | 20                                                | 1.23                      | 0.1                       | 18.8         | 78.4  | 7.4          | 19.5           | 3                  | 0            | 7.55 | 6.02          | 0.182      | 3.02 | 2000                                 | 2000                      | 2000                 |                    |
|                      | 9/21/1999  | 3:04 PM    | 2                                          | 6                                               | 64                                                | 0.8                       | 0                         | 14.99        | 81    | 8.29         | 25.5           | 28.7               | 0.15         | 7.18 | 6.48          | 0.189      | 2.92 | 530                                  | 0                         | 346                  |                    |
|                      | 9/28/1999  | 2:49 PM    | 5                                          | 6                                               | 96                                                | 0.63                      | 0.1                       | 14.14        | 79    | 8.24         | 24.5           | 12.8               | 0.25         | 7.29 | 5.38          | 0.157      | 2.92 | 140                                  | 0                         | 132                  |                    |
|                      | 10/5/1999  | 2:54 PM    | 2                                          | 6                                               | 8                                                 | 0.63                      | 0.2                       | 10.44        | 75.2  | 8.52         | 31.3           | 10.9               | 0.38         | 6.5  | 5.31          | 0.16       | 3.01 | 250                                  | 150                       | 2000                 |                    |
|                      | 10/19/1999 | 2:54 PM    | 0                                          | 6                                               | 10                                                | 0.48                      | 0                         | 7.22         | 6.4   | 7.76         | 35.7           | 0                  | 0.34         | 6.36 | 4.7           | 0.14       | 2.98 | 110                                  | 10                        | 162                  |                    |
|                      | 10/26/1999 | 2:56 PM    | 2                                          | 6                                               | 8                                                 | 0.15                      | 0                         | 5.73         | 61.6  | 7.83         | 33.7           | 35.1               | 0.36         | 5.99 | 4.48          | 0.128      | 2.86 | 420                                  | 300                       | 384                  |                    |

| Date                 | Time     | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |          |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| Mean                 |          |            | 4                                          | 6                                               | 21                                                | 0.85                      | 0.2                       | 18.44        | 84.6  | 8.26         | 39.1           | 12.6               | 0.23         | 6.72 | 5.88          | 0.204      | 3.43 | 469                                  | 306                       | 1204                 |                    |
| StDev                |          |            | 2.14                                       | 2.08                                            | 26.4                                              | 0.6                       | 0.14                      | 5.85         | 20.16 | 0.87         | 19.89          | 12.25              | 0.16         | 0.78 | 0.8           | 0.07       | 0.84 | 560.42                               | 593.91                    | 1070.99              |                    |
| 4/13/2000            |          |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 4/18/2000            | 2:55 PM  |            | 1                                          | 6                                               | 8                                                 | 1.07                      | 0.1                       | 6            | 85.8  | 10.59        | 33.5           | 1.9                | 0.43         | 4.44 | 6.54          | 0.251      | 3.84 | 365                                  | 0                         |                      |                    |
| 4/25/2000            | 2:48 PM  |            | 2                                          | 6                                               | 7                                                 | 1.21                      | 0.2                       | 9.38         | 84    | 9.54         | 25.7           | 2.5                | 0.32         | 4.38 | 7.1           | 0.264      | 3.72 | 866                                  | 0                         | 612                  |                    |
| 5/4/2000             | 1:46 PM  |            | 3                                          | 4                                               | 6                                                 | 0.59                      | 0.1                       | 12.64        | 83.9  | 8.85         | 20             | 1.5                | 0.38         | 4.53 | 4.85          | 0.171      | 3.53 | 387                                  | 0                         | 1186                 |                    |
| 5/9/2000             | 2:58 PM  |            | 3                                          | 3                                               | 8                                                 | 0.97                      | 0                         | 17.51        | 80.3  | 7.61         | 24.5           | 1.6                | 0.47         | 5.08 | 4.73          | 0.17       | 3.59 | 416                                  | 15                        | 1152                 |                    |
| 5/16/2000            | 3:13 PM  |            | 2                                          | 5                                               | 8                                                 | 1.52                      | 0.3                       | 11.07        | 82.4  | 9            | 24             | 0.8                | 0.56         | 4.11 | 9.31          | 0.401      | 4.31 | 1203                                 | 53                        | 5770                 |                    |
| 5/30/2000            | 2:48 PM  |            | 4                                          | 5                                               | 8                                                 | 1.08                      | 0.2                       | 13.27        | 79.3  | 8.24         | 24.8           | 1.4                | 0.54         | 4.58 | 6.98          | 0.276      | 3.95 | 2419                                 | 9                         | 6410                 |                    |
| 6/6/2000             | 2:48 PM  |            | 2                                          | 4                                               | 7                                                 | 0.61                      | 0.2                       | 12.39        | 52    | 5.51         | 29.7           | 1.3                | 0.61         | 5.42 | 4.74          | 0.18       | 3.8  | 2419                                 | 13                        | 3820                 | 0/0                |
| 6/15/2000            |          |            | 2                                          | 3                                               | 10                                                | 1.25                      | 0.2                       |              | 86.4  | 7.84         | 29.9           | 0                  |              | 5.42 | 6.47          | 0.279      | 4.31 | 2419                                 | 114                       | 2580                 |                    |
| 6/20/2000            | 2:50 PM  |            | 2                                          | 3                                               | 6                                                 | 0.9                       | 0.1                       | 18.61        | 79.9  | 7.42         | 18.4           | 1.5                | 0.44         | 5.27 | 4.68          | 0.201      | 4.29 | 361                                  | 14                        | 2670                 |                    |
| 6/27/2000            | 12:55 PM |            | 4                                          | 4                                               | 5                                                 | 1.26                      | 0.2                       | 20.24        | 78.7  | 7.06         | 19.6           | 1.7                | 0.41         | 5.68 | 5.44          | 0.218      | 4.01 | 1120                                 | 102                       | 1760                 |                    |
| 7/11/2000            | 1:32 PM  |            | 4                                          | 5                                               | 5                                                 | 0.8                       | 0.1                       | 17.95        | 69.6  | 6.54         | 17.7           | 2.1                | 0.51         | 5.75 | 3.96          | 0.153      | 3.86 | 308                                  | 0                         | 2420                 | 0/0                |
| 7/18/2000            | 12:56 PM |            | 5                                          | 5                                               | 10                                                | 1.51                      | 0.3                       | 16.12        | 63.3  | 6.19         | 19             | 1                  | 0.49         | 4.67 | 9.09          | 0.368      | 4.05 | 1553                                 | 20                        | 2940                 |                    |
| 7/25/2000            | 1:10 PM  |            | 2                                          | 2                                               | 5                                                 | 1.15                      | 0.2                       | 18.01        | 64    | 5.99         | 17.3           | 4.3                | 0.55         | 5.61 | 5.22          | 0.2        | 3.83 | 2419                                 | 15                        | 3490                 |                    |
| 8/1/2000             | 1:20 PM  |            | 5                                          | 4                                               | 8                                                 | 0.92                      | 0.1                       |              |       |              | 20.3           | 1.7                |              |      | 4.62          | 0.189      | 4.09 | 2419                                 | 16                        | 2800                 |                    |
| 8/8/2000             | 12:20 PM |            | 2                                          | 5                                               | 8                                                 | 1.96                      | 0.4                       | 16.29        | 31.8  | 3.12         | 0              | 2.2                | 1.78         | 5.85 | 10.4          | 0.412      | 3.96 | 2419                                 | 12                        | 5280                 |                    |
| 8/22/2000            | 12:34 PM |            | 0                                          | 6                                               | 13                                                | 1.91                      | 0.5                       | 15.15        | 56.7  | 5.7          | 0              | 1.3                | 0.53         | 6.61 | 10.1          | 0.449      | 4.45 | 1733                                 | 4                         | 1310                 |                    |
| 8/29/2000            | 2:40 PM  |            | 4                                          | 4                                               | 10                                                | 1.71                      | 0.5                       | 18.15        | 105.3 | 9.98         | 25.7           | 1.3                | 0.51         | 5.3  | 9             | 0.4        | 4.44 | 1414                                 | 2                         |                      |                    |
| 9/19/2000            | 11:14 AM |            | 2                                          | 5                                               | 7                                                 | 0.28                      | 0.3                       | 14.07        | 99.3  | 10.2         | 32.2           | 1.7                | 0.5          | 6.35 | 7.09          | 0.304      | 4.29 | 276                                  | 7                         | 1650                 |                    |
| 10/24/2000           | 11:55 AM |            | 0                                          | 4                                               | 12                                                | 0.17                      | 0.3                       | 5.58         |       |              | 42.1           | 1                  | 0.56         | 6.34 | 7.95          | 0.338      | 4.25 | 2419                                 | 2                         | 2360                 |                    |
| Mean                 |          |            | 3                                          | 4                                               | 8                                                 | 1.1                       | 0.2                       | 14.26        | 75.5  | 7.61         | 22.3           | 1.6                | 0.56         | 5.3  | 6.75          | 0.275      | 4.03 | 1418                                 | 21                        | 2836                 |                    |
| StDev                |          |            | 1.46                                       | 1.12                                            | 2.25                                              | 0.49                      | 0.14                      | 4.34         | 17.8  | 1.99         | 10.13          | 0.85               | 0.32         | 0.74 | 2.05          | 0.09       | 0.28 | 894.44                               | 33.03                     | 1670.58              |                    |
| 4/26/2001            |          |            | 1                                          | 4                                               | 6                                                 | 0.210                     | 0.30                      |              |       |              |                | 1.58               |              |      | 7.24          | 0.28       | 3.87 |                                      |                           |                      |                    |

| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2001                 | 5/31/2001  |            | 0                                          | 12                                              | 40                                                | 0.070                     | 0.30                      | 12.40        | 68.3  | 7.34         | 13.40          | 2.71               |              | 5.63 | 6.96          | 0.29       | 4.11 | 2419.0                               | 7                         |                      |                    |
|                      | 6/27/2001  | 1:28 PM    | 2                                          | 6                                               | 10                                                | 0.120                     | 0.60                      | 21.66        | 29.6  | 2.64         | 18.50          | 1.10               |              | 5.85 | 11.30         | 0.51       | 4.54 | 2419.0                               | 23                        |                      |                    |
|                      | 7/31/2001  | 11:53 AM   | 4                                          | 4                                               | 6                                                 | 0.720                     | 0.20                      | 21.15        | 20.3  | 1.81         | 16.30          |                    | 0.07         | 6.27 | 3.90          | 0.18       | 4.69 | 291.0                                | 120                       |                      |                    |
|                      | 8/22/2001  | 1:00 PM    | 6                                          | 4                                               | 7                                                 | 1.280                     | 0.10                      | 20.92        | 8.1   | 0.73         | 16.10          | 1.25               |              | 6.20 | 3.94          | 0.19       | 4.72 | 67.0                                 | 6                         |                      |                    |
|                      | 9/20/2001  |            | 4                                          | 6                                               | 8                                                 | 0.380                     | 0.10                      | 14.23        | 87.5  | 8.84         | 17.60          |                    |              | 6.60 | 5.05          | 0.19       | 3.72 | 2419.0                               | 135                       |                      |                    |
|                      | 10/29/2001 | 2:48 PM    | 5                                          | 4                                               | 7                                                 | 0.310                     | 0.10                      | 6.92         | 90.1  | 11.16        | 16.90          | 2.22               | 0.00         | 4.97 | 3.70          | 0.14       | 3.73 | 2419.0                               | 0                         |                      |                    |
|                      | Mean       |            | 3                                          | 6                                               | 12                                                | 0.441                     | 0.24                      | 16.21        | 50.7  | 5.42         | 16.47          | 1.77               | 0.04         | 5.92 | 6.01          | 0.25       | 4.20 | 1672.3                               | 49                        |                      |                    |
|                      | StDev      |            | 2                                          | 3                                               | 12                                                | 0.428                     | 0.18                      | 6.02         | 35.8  | 4.27         | 1.74           | 0.68               | 0.05         | 0.58 | 2.75          | 0.13       | 0.45 | 1158.9                               | 62                        |                      |                    |
| 2002                 | 4/30/2002  | 1:33 PM    | 2                                          | 6                                               | 7                                                 | 0.300                     | 0.30                      | 4.53         |       |              | 7.40           | 0.62               | 0.50         | 5.20 | 7.14          | 0.28       | 3.96 | 276.0                                | 3                         |                      |                    |
|                      | 5/29/2002  | 2:22 PM    | 2                                          | 4                                               | 4                                                 | 0.080                     | 0.20                      | 19.07        | 102.7 | 9.58         | 1.30           | 3.74               | 0.00         | 5.35 | 4.47          | 0.17       | 3.83 | 2419.0                               | 0                         |                      |                    |
|                      | 7/2/2002   | 11:36 AM   | 2                                          | 3                                               | 5                                                 | 0.000                     | 0.50                      | 21.14        | 78.7  | 7.08         | 20.00          | 1.37               | 0.06         | 5.76 | 10.50         | 0.46       | 4.39 | 1413.0                               | 5                         |                      |                    |
|                      | 8/1/2002   |            | 6                                          | 6                                               | 9                                                 | 0.930                     | 0.30                      | 24.80        | 106.6 | 8.86         | 16.00          | 3.15               | 0.05         | 5.82 | 5.13          | 0.18       | 3.53 | 2419.0                               | 1                         |                      |                    |
|                      | 8/29/2002  |            | 6                                          | 4                                               | 6                                                 | 0.720                     | 0.20                      | 18.20        |       | 8.00         | 30.00          | 1.14               |              | 6.31 | 4.12          | 0.12       | 2.86 | 613.0                                | 1                         |                      |                    |
|                      | 9/25/2002  | 1:27 PM    | 4                                          | 4                                               | 8                                                 | 0.390                     | 0.10                      | 15.88        | 98.8  | 9.78         | 17.00          | 1.14               | 0.00         | 6.16 | 5.19          | 0.14       | 2.74 | 1414.0                               | 20                        |                      |                    |
|                      | 10/24/2002 | 2:07 PM    | 2                                          | 6                                               | 10                                                | 1.050                     | 0.20                      | 6.67         | 99.2  | 12.15        | 21.00          | 1.82               | 1.45         | 4.89 | 6.99          | 0.23       | 3.28 | 2419.0                               | 0                         |                      |                    |
|                      | Mean       |            | 3                                          | 5                                               | 7                                                 | 0.496                     | 0.26                      | 15.76        | 97.2  | 9.24         | 16.10          | 1.85               | 0.34         | 5.64 | 6.22          | 0.23       | 3.51 | 1567.6                               | 4                         |                      |                    |
|                      | StDev      |            | 2                                          | 1                                               | 2                                                 | 0.411                     | 0.13                      | 7.49         | 10.8  | 1.74         | 9.38           | 1.16               | 0.57         | 0.52 | 2.22          | 0.12       | 0.60 | 894.6                                | 7                         |                      |                    |
| 2003                 | 4/28/2003  | 2:18 PM    | 2                                          | 4                                               | 6                                                 | 0.036                     | 0.30                      | 12.71        | 126.3 | 13.40        | 20.00          | 1.44               | 0.30         | 5.01 | 5.79          | 0.22       | 3.78 | 648.8                                | 0                         |                      |                    |
|                      | 5/27/2003  | 1:53 PM    | 2                                          | 3                                               | 6                                                 | 0.041                     | 0.50                      | 15.43        | 108.3 | 10.83        | 18.00          | 1.75               | 0.43         | 6.26 | 8.86          | 0.37       | 4.15 | >2419                                | 2                         |                      |                    |
|                      | 6/23/2003  | 2:03 PM    | 6                                          | 6                                               | 8                                                 | 0.042                     | 0.50                      | 18.13        | 98.5  | 9.30         | 14.00          | 2.08               | 0.28         | 5.25 | 11.40         | 0.46       | 4.04 | 1733.0                               | 10                        |                      |                    |
|                      | 7/17/2003  | 1:23 PM    | 0                                          | 4                                               | 8                                                 | 0.026                     | 0.20                      | 18.87        | 90.0  | 8.37         | 17.00          | 1.20               | 1.94         | 5.10 | 4.67          | 0.20       | 4.33 | >2419                                | 3                         |                      |                    |
|                      | 8/18/2003  | 1:41 PM    | 4                                          | 4                                               | 8                                                 | 0.037                     | 0.50                      | 19.69        | 106.2 | 9.71         | 18.00          | 2.23               | 0.71         | 4.66 | 16.60         | 0.90       | 5.44 | >2419                                | 82                        |                      |                    |
|                      | 9/24/2003  | 1:44 PM    | 4                                          | 4                                               | 5                                                 | 0.024                     | 0.70                      | 14.34        | 89.3  | 9.13         | 15.00          | 2.26               | 0.50         | 4.78 | 12.40         | 0.58       | 4.69 | >2419                                | 55                        |                      |                    |
|                      | 10/15/2003 | 1:35 PM    | 4                                          | 4                                               | 4                                                 |                           |                           | 9.49         | 88.7  | 10.13        | 19.00          | 1.20               | 0.86         | 5.26 | 7.96          | 0.38       | 4.74 | >2419                                | 2                         |                      |                    |
|                      | Mean       |            | 3                                          | 4                                               | 6                                                 | 0.034                     | 0.45                      | 15.52        | 101.0 | 10.12        | 17.29          | 1.74               | 0.72         | 5.19 | 9.67          | 0.44       | 4.45 | 1190.9                               | 22                        |                      |                    |

| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| StDev                |            |            | 2                                          | 1                                               | 2                                                 | 0.008                     | 0.18                      | 3.68         | 13.8  | 1.64         | 2.14           | 0.47               | 0.58         | 0.52 | 4.13          | 0.24       | 0.55 | 766.6                                | 33                        |                      |                    |
| 2004                 | 4/19/2004  | 1:03 PM    | 3                                          | 4                                               | 7                                                 |                           |                           | 10.01        | 100.9 | 11.39        | 19.00          | 0.76               | 0.08         | 4.79 | 5.55          | 0.23       | 4.16 | 461.0                                | 0                         |                      |                    |
|                      | 5/25/2004  | 2:38 PM    | 2                                          | 3                                               | 7                                                 | 0.023                     | 0.10                      | 17.02        | 78.5  | 7.59         | 19.00          | 1.81               | 0.03         | 4.46 | 13.30         | 0.60       | 4.50 | >2419.2                              | 102                       |                      |                    |
|                      | 6/14/2004  | 12:39 PM   | 2                                          | 4                                               | 8                                                 | 0.010                     | -0.06                     | 16.53        | 94.5  | 9.23         | 17.00          | 1.00               | 0.12         | 5.15 | 4.01          | 0.17       | 4.24 | 913.9                                | <1                        |                      |                    |
|                      | 7/19/2004  | 10:46 AM   | 8                                          | 6                                               | 8                                                 | 0.020                     | 0.03                      | 19.08        | 110.7 | 10.25        | 18.00          | 2.58               | 0.12         | 5.70 | 6.10          | 0.24       | 3.98 | 1553.1                               | 12                        |                      |                    |
|                      | 8/30/2004  | 12:47 PM   | 4                                          | 6                                               | 8                                                 | 0.007                     | -0.01                     | 16.42        | 98.8  | 9.67         | 14.00          | 4.18               | 0.32         | 5.26 | 9.47          | 0.44       | 4.67 | 1986.3                               | 60                        |                      |                    |
|                      | 9/14/2004  | 2:02 PM    | 4                                          | 4                                               | 8                                                 | 0.033                     | 0.26                      | 16.09        | 67.2  | 6.62         | 18.00          | 2.74               | 1.17         | 5.07 | 9.86          | 0.48       | 4.83 | >2419                                | 7                         |                      |                    |
|                      | 10/4/2004  | 12:58 PM   | 3                                          | 4                                               | 6                                                 | 0.002                     | 0.00                      | q            | 63.6  | 7.11         | 16.00          | 2.10               | 0.08         | 5.39 | 5.78          | 0.31       | 5.35 | 1986.3                               | 2                         |                      |                    |
|                      | Mean       |            | 4                                          | 4                                               | 7                                                 | 0.016                     | 0.05                      | 15.86        | 87.7  | 8.84         | 17.29          | 2.17               | 0.27         | 5.12 | 7.72          | 0.35       | 4.53 | 1380.1                               | 31                        |                      |                    |
|                      | StDev      |            | 2                                          | 1                                               | 1                                                 | 0.012                     | 0.11                      | 3.06         | 18.1  | 1.77         | 1.80           | 1.16               | 0.40         | 0.40 | 3.26          | 0.16       | 0.46 | 675.8                                | 42                        |                      |                    |
| 2006                 | 4/24/2006  |            | 2                                          | 6                                               | 8                                                 | <0.025                    | <.25                      | 6.26         | 93.7  | 11.59        | 23.00          | 6.35               |              | 4.61 | 9.08          | 0.41       | 4.56 | >2419.2                              | 4                         |                      |                    |
|                      | 5/15/2006  |            | 4                                          | 6                                               | 10                                                | <0.025                    | <0.25                     | 15.32        | 95.6  | 9.57         | 17.00          | 2.87               |              | 5.45 | 5.89          | 0.29       | 4.96 | 2419.2                               | 17                        |                      |                    |
|                      | 6/8/2006   |            | 4                                          | 4                                               | 6                                                 | <0.025                    | <0.25                     | 17.08        | 86.2  | 8.32         | 19.00          | 1.53               |              | 5.25 |               |            |      | >2419.2                              | 10                        |                      |                    |
|                      | 7/17/2006  |            | 4                                          | 8                                               | 10                                                | <0.025                    | <0.25                     | 24.96        | 112.4 | 9.29         | 19.00          | 3.23               |              | 5.62 |               |            |      | 1732.0                               | 687                       |                      |                    |
|                      | 8/14/2006  |            | 6                                          | 6                                               | 6                                                 | <0.025                    | <0.25                     | 16.67        | 102.1 | 9.94         | 19.00          | 7.50               |              | 6.03 |               |            |      | 307.0                                | 4                         |                      |                    |
|                      | 9/5/2006   |            | 4                                          | 5                                               | 6                                                 | <0.025                    | <0.25                     | 14.62        | 79.4  | 8.08         | 18.00          | 2.61               |              | 5.81 |               |            |      | 435.0                                | 1                         |                      |                    |
|                      | 10/16/2006 |            | 2                                          | 6                                               | 6                                                 | <0.025                    | <0.25                     | 6.02         | 79.0  | 9.83         | 18.00          | 1.82               |              | 5.81 |               |            |      | 2419.0                               | 1                         |                      |                    |
|                      | Mean       |            | 4                                          | 6                                               | 7                                                 |                           |                           | 14.42        | 92.6  | 9.52         | 19.00          | 3.70               |              | 5.51 | 7.49          | 0.35       | 4.76 | 1462.4                               | 103                       |                      |                    |
|                      | StDev      |            | 1                                          | 1                                               | 2                                                 |                           |                           | 6.60         | 12.2  | 1.16         | 1.91           | 2.30               |              | 0.47 | 2.26          | 0.09       | 0.28 | 1036.1                               | 257                       |                      |                    |
| 2007                 | 4/23/2007  |            | 0                                          | 3                                               | 6                                                 | <0.025                    | <0.25                     | 6.12         | 99.6  | 12.37        | 19.00          | 1.45               |              | 5.00 | 5.77          | 0.22       |      | 1046.2                               | 0                         |                      |                    |
|                      | 5/4/2007   |            | 2                                          | 4                                               | 6                                                 | <0.025                    | <0.25                     | 11.71        | 103.1 | 11.18        | 17.00          | 3.70               |              | 5.67 | 5.61          | 0.22       |      | 2419.0                               | 5                         |                      |                    |
|                      | 6/4/2007   |            | 0                                          | 4                                               | 6                                                 | <0.025                    | <0.25                     | 18.50        | 113.7 | 10.65        | 20.00          | 2.04               |              | 6.18 | 2.47          | 0.09       |      | >2419.2                              | 579                       |                      |                    |
|                      | 7/2/2007   |            | 4                                          | 4                                               | 7                                                 | <0.025                    | <0.25                     | 18.55        | 99.6  | 9.32         | 20.00          | 3.80               |              | 6.18 | 5.50          | 0.23       |      | 866.0                                | 3                         |                      |                    |
|                      | 8/20/2007  |            | 28                                         | 20                                              | 74                                                | <0.025                    | <0.25                     |              | 84.6  | 8.36         | 0.02           | 1.26               |              | 6.48 | 5.51          | 0.21       |      | >2419.2                              | 5                         |                      |                    |
|                      | 9/17/2007  |            | 4                                          | 28                                              | 40                                                | <0.025                    | <0.25                     |              | 95.1  | 9.78         | 0.02           | 1.13               |              | 6.70 | 4.21          | 0.16       |      | >2419                                | <1                        |                      |                    |

| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 10/9/2007            |            |            | 26                                         | 3                                               | 14                                                | <0.025                    | <0.25                     | 16.20        | 106.0 | 10.42        | 0.02           | 1.80               |              | 7.52 | 3.77          | 0.13       |      | >2419.2                              | 4                         |                      |                    |
| Mean                 |            |            | 9                                          | 9                                               | 22                                                |                           |                           | 14.22        | 100.2 | 10.30        | 10.87          | 2.17               |              | 6.25 | 4.69          | 0.18       |      | 1443.7                               | 99                        |                      |                    |
| StDev                |            |            | 12                                         | 10                                              | 26                                                |                           |                           | 5.31         | 9.1   | 1.30         | 10.19          | 1.12               |              | 0.79 | 1.25          | 0.05       |      | 849.4                                | 235                       |                      |                    |
| 2008                 | 4/21/2008  |            | 5                                          | 8                                               | 11                                                | <0.025                    | <0.25                     | 12.02        | 80.0  | 8.62         | 0.02           | 1.07               |              | 5.68 | 6.44          | 0.23       |      | 2419.7                               | 1                         |                      |                    |
|                      | 5/19/2008  |            | 5                                          | 8                                               | 35                                                | <0.025                    | <0.25                     | 9.24         | 87.7  | 10.08        | 0.02           | 0.98               |              | 5.87 | 4.73          | 0.16       |      | >2419.2                              | 105                       |                      |                    |
|                      | 6/16/2008  |            | 19                                         | 39                                              | 41                                                | <0.025                    | <0.25                     | 19.66        | 95.1  | 8.70         | 0.02           | 0.99               |              | 5.61 | 4.44          | 0.13       |      | >2419.2                              | 5                         |                      |                    |
|                      | 7/14/2008  |            | 13                                         | 9                                               | 31                                                | <0.025                    | <0.25                     | 18.44        | 86.1  | 8.08         | 0.02           | 2.38               |              | 5.70 | 4.91          | 0.20       |      | >2419.2                              | 411                       |                      |                    |
|                      | 8/4/2008   |            | 6                                          | 5                                               | 15                                                | <0.025                    | <0.25                     | 19.34        | 97.1  | 8.95         | 0.02           | 1.34               |              | 5.67 | 9.84          | 0.45       |      | >2419.2                              | 104                       |                      |                    |
|                      | 8/26/2008  |            | 9                                          | 12                                              | 14                                                | <0.025                    | <0.25                     | 19.99        | 113.4 | 10.31        | 0.02           | 1.14               |              | 6.52 | 5.93          | 0.27       |      | >2419.2                              | 0                         |                      |                    |
|                      | 9/23/2008  |            | 5                                          | 8                                               | 14                                                | <0.025                    | <0.25                     | 14.18        | 106.8 | 10.96        | 0.02           | 1.03               |              | 7.07 | 2.75          | 0.10       |      | >2419                                | <1                        |                      |                    |
|                      | 10/14/2008 |            | 6                                          | 24                                              | 30                                                | <0.025                    | <0.25                     | 10.16        | 98.0  | 11.02        | 0.02           | 1.04               |              | 7.53 | 3.56          | 0.11       |      | 980.4                                | 0                         |                      |                    |
|                      | Mean       |            | 9                                          | 14                                              | 24                                                |                           |                           | 15.38        | 95.5  | 9.59         | 0.02           | 1.25               |              | 6.21 | 5.33          | 0.21       |      | 1700.1                               | 89                        |                      |                    |
|                      | StDev      |            | 5                                          | 12                                              | 12                                                |                           |                           | 4.51         | 11.0  | 1.14         | 0.00           | 0.47               |              | 0.75 | 2.17          | 0.11       |      | 1017.7                               | 150                       |                      |                    |
| 2009                 | 4/13/2009  |            | 4                                          | 7                                               | 14                                                | <0.025                    | <0.25                     | 6.34         | 103.2 | 12.74        | 0.02           | 0.40               |              | 5.35 |               |            |      | 344.8                                | 0                         |                      |                    |
|                      | 5/11/2009  |            | 7                                          | 6                                               | 14                                                | <0.025                    | <0.25                     | 12.66        | 99.9  | 10.60        | 0.01           | 1.52               |              | 5.91 |               |            |      | >2419.2                              | 79                        |                      |                    |
|                      | 5/27/2009  |            | 6                                          | 9                                               | 14                                                | <0.025                    | <0.25                     | 14.76        | 99.4  | 10.08        | 0.02           | 1.56               |              | 6.24 |               |            |      | >2419                                | 10                        |                      |                    |
|                      | 6/8/2009   |            | 5                                          | 2                                               | 9                                                 | <0.025                    | <0.25                     | 17.84        | 108.7 | 10.33        | 0.02           | 0.93               |              | 6.30 |               |            |      | 2419.2                               | 0                         |                      |                    |
|                      | 6/22/2009  |            | 7                                          | 8                                               | 23                                                | <0.025                    | <0.25                     | 23.03        | 80.6  | 6.91         | 0.02           | 1.01               |              | 5.59 |               |            |      | 1732.0                               | 5                         |                      |                    |
|                      | 7/6/2009   |            | 9                                          | 5                                               | 18                                                | <0.025                    | <0.25                     | 16.71        | 101.5 | 9.87         | 0.02           | 1.29               |              | 6.41 |               |            |      | 1553.1                               | 22                        |                      |                    |
|                      | 7/20/2009  |            | 5                                          | 26                                              | 29                                                | <0.025                    | <0.25                     | 19.60        | 104.1 | 9.54         | 0.02           | 2.04               |              | 6.64 |               |            |      | >2419                                | 144                       |                      |                    |
|                      | 8/4/2009   |            | 9                                          | 10                                              | 22                                                | <0.025                    | <0.25                     | 19.38        | 84.2  | 7.75         | 0.03           | 3.50               |              | 6.57 |               |            |      | >2419.2                              | 21                        |                      |                    |
|                      | 8/18/2009  |            | 11                                         | 16                                              | 24                                                | <0.025                    | <0.25                     | 23.49        | 96.0  | 8.16         | 0.03           | 4.68               |              | 7.00 |               |            |      | >2419.2                              | 11                        |                      |                    |
|                      | 8/31/2009  |            | 6                                          | 8                                               | 25                                                | <0.025                    | <0.25                     | 15.97        | 71.3  | 7.58         | 0.03           | 2.21               |              | 7.08 |               |            |      | >2419                                | 179                       |                      |                    |
|                      | 9/14/2009  |            | 9                                          | 10                                              | 26                                                | <0.025                    | <0.25                     | 15.69        | 94.3  | 9.37         | 0.03           | 1.33               |              | 7.50 |               |            |      | >2419.2                              | 1                         |                      |                    |
|                      | 9/28/2009  |            | 8                                          | 7                                               | 26                                                | <0.025                    | <0.25                     | 12.57        | 87.0  | 9.25         | 0.02           | 2.50               |              | 7.44 |               |            |      | >2419.2                              | 613                       |                      |                    |

| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 10/14/2009           |           |            | 18                                         | 75                                              | 89                                                | <0.025                    | <0.25                     | 6.91         | 74.9  | 9.11         | 0.02           | 0.63               |              | 6.32 |               |            |      | >2419.2                              | 5                         |                      |                    |
| Mean                 |           |            | 8                                          | 15                                              | 26                                                |                           |                           | 15.77        | 92.7  | 9.33         | 0.02           | 1.82               |              | 6.49 |               |            |      | 1512.3                               | 84                        |                      |                    |
| StDev                |           |            | 4                                          | 19                                              | 20                                                |                           |                           | 5.27         | 11.9  | 1.53         | 0.01           | 1.20               |              | 0.65 |               |            |      | 863.2                                | 169                       |                      |                    |
| 2010                 | 5/3/2010  |            | 6                                          | 3                                               | 9                                                 | <0.025                    | <0.25                     | 15.98        | 101.6 | 10.03        | 0.02           | 0.71               |              | 6.64 |               |            |      | 1119.0                               | <1                        |                      |                    |
|                      | 5/17/2010 |            | 4                                          | 5                                               | 13                                                | <0.025                    | <0.25                     | 13.94        | 89.0  | 9.19         | 0.02           | 0.86               |              | 6.16 |               |            |      | 1986.3                               | 2                         |                      |                    |
|                      | 6/1/2010  |            | 7                                          | 6                                               | 8                                                 | <0.025                    | <0.25                     | 21.60        | 75.3  | 6.64         | 0.02           | 5.13               |              | 6.32 |               |            |      | >2419                                | 16                        |                      |                    |
|                      | 6/14/2010 |            | 57                                         | 10                                              | 28                                                | <0.025                    | <0.25                     | 15.09        | 77.8  | 7.83         | 0.02           | 1.89               |              | 6.52 |               |            |      | >2419.2                              | 71                        |                      |                    |
|                      | 6/29/2010 |            | 21                                         | 23                                              | 24                                                | <0.025                    | <0.25                     | 19.86        | 52.6  | 4.79         | 0.06           | 17.60              |              | 7.79 |               |            |      | >2419                                | 117                       |                      |                    |
|                      | 7/12/2010 |            | 13                                         | 15                                              | 27                                                | <0.025                    | <0.25                     | 23.84        | 67.3  | 5.68         | 0.02           | 3.16               |              | 6.14 |               |            |      | 2419.2                               | 18                        |                      |                    |
|                      | 8/9/2010  |            | 9                                          | 10                                              | 19                                                | <0.025                    | <0.25                     | 20.29        | 79.7  | 7.21         | 0.02           | 1.86               |              | 6.56 |               |            |      | >2419.2                              | 14                        |                      |                    |
|                      | 8/23/2010 |            | 11                                         | 17                                              | 23                                                | <0.025                    | <0.25                     | 17.41        |       |              | 0.02           | 2.16               |              | 6.50 |               |            |      | >2419.2                              | 548                       |                      |                    |
|                      | 9/7/2010  |            | 10                                         | 12                                              | 24                                                | <0.025                    | <0.25                     | 17.29        | 81.7  | 7.85         | 0.02           | 1.58               |              | 6.42 |               |            |      | >2419                                | 15                        |                      |                    |
|                      | 9/20/2010 |            | 28                                         | 12                                              | 72                                                | <0.025                    | <0.25                     | 13.69        | 91.1  | 9.46         | 0.02           | 0.89               |              | 6.58 |               |            |      | >2419.2                              | 5                         |                      |                    |
|                      | 10/4/2010 |            | 5                                          | 6                                               | 33                                                | <0.025                    | <0.25                     | 10.24        | 82.2  | 9.22         | 0.02           | 1.04               |              | 5.58 |               |            |      | >2419                                | 25                        |                      |                    |
|                      | Mean      |            | 16                                         | 11                                              | 25                                                |                           |                           | 17.20        | 79.8  | 7.79         | 0.02           | 3.35               |              | 6.47 |               |            |      | 1841.5                               | 83                        |                      |                    |
|                      | StDev     |            | 16                                         | 6                                               | 17                                                |                           |                           | 3.97         | 13.4  | 1.73         | 0.01           | 4.90               |              | 0.53 |               |            |      | 662.1                                | 167                       |                      |                    |
| 2011                 | 5/9/2011  |            | 4                                          | 10                                              | 12                                                | <0.025                    | <0.25                     | 11.69        | 95.6  | 10.37        | 0.02           | 1.89               |              | 6.50 |               |            |      | 980.0                                | <1                        |                      |                    |
|                      | 5/23/2011 |            | 5                                          | 14                                              | 16                                                | <0.025                    | <0.05                     | 13.51        | 84.9  | 8.85         | 0.02           | 0.97               |              | 5.84 |               |            |      | >2419                                | 7                         |                      |                    |
|                      | 6/6/2011  |            | 14                                         | 14                                              | 16                                                | <0.025                    | <0.05                     | 13.30        | 87.0  | 9.10         | 0.03           | 2.93               |              | 7.12 |               |            |      | 1299.0                               | 3                         |                      |                    |
|                      | 6/19/2011 |            | 7                                          | 5                                               | 13                                                | <0.025                    | <0.05                     | 17.08        | 70.6  | 6.82         | 0.02           | 1.24               |              | 6.69 |               |            |      | 613.0                                | <1                        |                      |                    |
|                      | 7/11/2011 |            | 8                                          | 8                                               | 10                                                | <0.025                    | <0.05                     | 18.07        | 63.8  | 6.03         | 0.04           | 1.41               |              | 7.83 |               |            |      | 344.8                                | <1                        |                      |                    |
|                      | 7/25/2011 |            | 16                                         | 15                                              | 18                                                | <0.025                    | <0.05                     | 19.76        | 97.2  | 8.88         | 0.04           | 3.10               |              | 7.48 |               |            |      | >2419                                | 291                       |                      |                    |
|                      | 8/8/2011  |            | 19                                         | 17                                              | 21                                                | <0.025                    | <0.05                     | 19.20        |       |              | 0.04           | 4.41               |              | 7.19 |               |            |      | >2419                                | 150                       |                      |                    |
|                      | 9/12/2011 |            | 9                                          | 8                                               | 12                                                | <0.025                    | <0.05                     | 19.48        |       |              | 0.04           | 2.81               |              | 6.22 |               |            |      | >2419                                | 18                        |                      |                    |
|                      | 9/27/2011 |            | 5                                          | 6                                               | 34                                                | <0.025                    | <0.05                     | 15.68        |       |              | 0.02           | 1.37               |              | 6.92 |               |            |      | >2419                                | 4                         |                      |                    |



| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%  | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|------|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |      |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 10/11/2011           |           |            | 14                                         | 8                                               | 11                                                | <0.025                    | <0.05                     | 10.22        | 75.9 | 8.52         | 0.02           | 2.34               |              | 7.45 |               |            |      | 2419.0                               | 1                         |                      |                    |
| 10/24/2011           |           |            | 6                                          | 4                                               | 5                                                 | <0.025                    | <0.05                     | 6.90         |      |              | 0.02           | 0.88               |              | 6.80 |               |            |      | 2419.0                               | 1                         |                      |                    |
| Mean                 |           |            | 10                                         | 10                                              | 15                                                |                           |                           | 14.99        | 82.1 | 8.37         | 0.03           | 2.12               |              | 6.91 |               |            |      | 1345.8                               | 59                        |                      |                    |
| StDev                |           |            | 5                                          | 4                                               | 8                                                 |                           |                           | 4.23         | 12.6 | 1.47         | 0.01           | 1.10               |              | 0.59 |               |            |      | 892.0                                | 106                       |                      |                    |
| 2012                 | 4/23/2012 |            | 6                                          | 6                                               | 8                                                 | <0.025                    | <0.05                     | 8.40         |      |              | 12.41          | 5.59               |              | 5.86 |               |            |      | >2419                                | 58                        |                      |                    |
|                      | 5/7/2012  |            | 7                                          | 6                                               | 8                                                 | <0.025                    | <0.05                     | 16.10        |      |              |                | 2.32               |              | 6.16 |               |            |      | >2419                                | 9                         |                      |                    |
|                      | 7/10/2012 |            | 11                                         | 12                                              | 12                                                | <0.025                    | <0.05                     | 24.20        |      |              | 29.40          | 5.48               |              | 7.05 |               |            |      |                                      |                           |                      |                    |
|                      | 8/1/2012  |            | 18                                         | 20                                              | 24                                                | <0.025                    | <0.05                     | 26.20        |      |              | 51.80          | 26.70              |              | 8.45 |               |            |      |                                      |                           |                      |                    |
|                      | 8/13/2012 |            | 12                                         | 16                                              | 20                                                | <0.025                    | <0.05                     | 22.80        |      |              | 29.90          | 3.03               |              | 7.07 |               |            |      |                                      |                           |                      |                    |
|                      | 9/17/2012 |            | 10                                         | 10                                              | 10                                                | <0.025                    | <0.05                     | 18.20        |      |              | 26.60          | 1.54               |              | 6.64 |               |            |      |                                      |                           |                      |                    |
|                      | 10/1/2012 |            | 8                                          | 8                                               | 10                                                | <0.025                    | <0.05                     | 13.50        |      |              | 22.10          | 1.32               |              | 6.83 |               |            |      | >2419                                | <1                        |                      |                    |
|                      | Mean      |            | 10                                         | 11                                              | 13                                                |                           |                           | 18.49        |      |              | 28.70          | 6.57               |              | 6.87 |               |            |      |                                      | 33                        |                      |                    |
|                      | StDev     |            | 4                                          | 5                                               | 6                                                 |                           |                           | 6.37         |      |              | 13.03          | 9.04               |              | 0.83 |               |            |      |                                      | 35                        |                      |                    |
| 2013                 | 5/20/2013 |            | 6                                          | 6                                               | 8                                                 |                           | <0.05                     | 18.10        |      | 7.80         | 17.84          | 1.40               |              | 6.30 |               |            |      | 435.0                                | <1                        |                      |                    |
|                      | 6/3/2013  |            | 4                                          | 4                                               | 8                                                 | <0.025                    | <0.05                     | 18.50        |      | 8.80         | 15.42          | 1.55               |              | 6.13 |               |            |      | >2419                                | 6                         |                      |                    |
|                      | 6/25/2013 |            | 10                                         | 10                                              | 12                                                | <0.025                    | <0.05                     | 23.30        |      |              | 20.80          | 4.59               |              | 6.56 |               |            |      | 836.0                                | 23                        |                      |                    |
|                      | 7/15/2013 |            | 6                                          | 6                                               | 8                                                 | <0.025                    | <0.05                     | 27.60        |      | 7.70         | 15.32          | 1.71               |              | 5.26 |               |            |      | >2419                                | 1                         |                      |                    |
|                      | 7/29/2013 |            | 8                                          | 8                                               | 10                                                | <0.025                    | <0.05                     | 21.70        |      | 8.40         | 21.80          | 2.55               |              | 6.43 |               |            |      | >2419                                | 6                         |                      |                    |
|                      | 8/12/2013 |            | 8                                          | 8                                               | 12                                                | <0.025                    | <0.05                     | 21.50        |      | 8.80         | 26.80          | 1.47               |              | 6.44 |               |            |      | 270.0                                | 1                         |                      |                    |
|                      | 9/9/2013  |            | 8                                          | 8                                               | 9                                                 | <0.025                    | <0.05                     | 14.70        |      | 10.70        | 20.86          | 2.08               |              | 6.69 |               |            |      | 325.5                                | 1                         |                      |                    |
|                      | 9/24/2013 |            | 10                                         | 9                                               | 12                                                | <0.025                    | <0.05                     | 15.20        |      | 10.70        | 19.19          | 2.29               |              | 6.91 |               |            |      | 1732.9                               | 17                        |                      |                    |
|                      | Mean      |            | 8                                          | 7                                               | 10                                                |                           |                           | 20.08        |      | 8.99         | 19.75          | 2.21               |              | 6.34 |               |            |      | 719.9                                | 8                         |                      |                    |
|                      | StDev     |            | 2                                          | 2                                               | 2                                                 |                           |                           | 4.32         |      | 1.25         | 3.75           | 1.05               |              | 0.50 |               |            |      | 608.0                                | 9                         |                      |                    |
| 5/20/2014            |           |            | 3                                          | 4                                               | 8                                                 | <0.025                    | <0.05                     | 14.80        |      |              | 12.90          | 0.58               |              | 5.31 |               |            |      | >2419                                | 2                         |                      |                    |
| 6/17/2014            |           |            | 6                                          | 6                                               | 6                                                 | <0.025                    | <0.05                     | 20.50        |      |              | 12.83          | 0.99               |              | 5.17 |               |            |      | 1553.0                               | 4                         |                      |                    |

| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-<br>254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|------------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 7 – REMUS BROOK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |            |      |                                      |                           |                      |                    |
| 2014                 | 7/17/2014 |            | 6                                          | 8                                               | 8                                                 | <0.025                    | <0.05                     | 20.60        |     |              | 17.25          | 1.86               |              | 6.32 |               |            |      | 2419.0                               | 2                         |                      |                    |
|                      | 8/19/2014 |            | 4                                          | 10                                              | 10                                                | <0.025                    | <0.05                     | 18.70        |     |              | 6.35           | 1.35               |              | 5.99 |               |            |      | 648.0                                | 2                         |                      |                    |
|                      | 9/23/2014 |            | 6                                          | 2                                               | 8                                                 | <0.025                    | <0.05                     | 11.90        |     |              | 15.97          | 1.60               |              | 5.96 |               |            |      | >2419                                | 16                        |                      |                    |
|                      | Mean      |            | 5                                          | 6                                               | 8                                                 |                           |                           | 17.30        |     |              | 13.06          | 1.28               |              | 5.75 |               |            |      | 1540.0                               | 5                         |                      |                    |
|                      | StDev     |            | 1                                          | 3                                               | 1                                                 |                           |                           | 3.82         |     |              | 4.22           | 0.50               |              | 0.49 |               |            |      | 885.6                                | 6                         |                      |                    |
| 2015                 | 4/26/2015 |            | 1                                          | 4                                               | 6                                                 | <0.025                    | <0.05                     | 8.10         |     |              | 13.83          | 0.96               |              | 5.37 |               |            |      | 411.0                                | <1                        |                      |                    |
|                      | 5/21/2015 |            | 4                                          | 4                                               | 8                                                 | <0.025                    | <0.05                     | 16.40        |     |              | 13.58          | 1.91               |              | 5.74 |               |            |      | 686.7                                | 17                        |                      |                    |
|                      | 7/28/2015 |            | 12                                         | 14                                              | 14                                                | <0.025                    | <0.05                     | 26.40        |     |              | 32.00          | 6.04               |              | 6.72 |               |            |      | 866.0                                | 3                         |                      |                    |
|                      | 8/31/2015 |            | 4                                          | 4                                               | 6                                                 | <0.025                    | <0.05                     | 1.74         |     |              | 18.82          | 1.74               |              | 6.41 |               |            |      | 1120.0                               | 76                        |                      |                    |
|                      | 9/21/2015 |            | 6                                          | 4                                               | 6                                                 | <0.025                    | <0.05                     | 16.50        |     |              | 19.47          | 14.80              |              | 6.35 |               |            |      | 1986.0                               | 2                         |                      |                    |
|                      | Mean      |            | 5                                          | 6                                               | 8                                                 |                           |                           | 13.83        |     |              | 19.54          | 5.09               |              | 6.12 |               |            |      | 1013.9                               | 25                        |                      |                    |
|                      | StDev     |            | 4                                          | 4                                               | 3                                                 |                           |                           | 9.36         |     |              | 7.48           | 5.78               |              | 0.55 |               |            |      | 601.8                                | 35                        |                      |                    |
| 2016                 | 5/10/2016 |            | 4                                          | 4                                               | 4                                                 | <0.025                    | <0.05                     | 12.60        |     |              | 13.65          | 1.48               |              | 5.51 |               |            |      | 320.0                                | <1                        |                      |                    |
|                      | 6/13/2016 |            | 0                                          | 6                                               | 8                                                 | <0.025                    | <0.05                     | 12.60        |     |              | 12.44          | 1.15               |              | 5.65 |               |            |      | 579.4                                | 19                        |                      |                    |
|                      | 7/6/2016  |            | 3                                          | 4                                               | 6                                                 | <0.025                    | <0.05                     | 25.60        |     |              | 13.66          | 1.27               |              | 6.07 |               |            |      | >2419                                | 34                        |                      |                    |
|                      | 8/13/2016 |            | 4                                          | 4                                               | 6                                                 | **0.77**                  | <0.05                     |              |     |              | 14.37          | 1.98               |              | 5.02 |               |            |      | >2419                                | 56                        |                      |                    |
|                      | 9/13/2016 |            | 6                                          | 6                                               | 8                                                 | <0.025                    | <0.05                     | 15.40        |     |              | 15.39          | 1.82               |              | 6.32 |               |            |      | >2419                                | 1                         |                      |                    |
|                      | Mean      |            | 3                                          | 5                                               | 6                                                 |                           |                           | 16.55        |     |              | 13.90          | 1.54               |              | 5.71 |               |            |      | 449.7                                | 28                        |                      |                    |
|                      | StDev     |            | 2                                          | 1                                               | 2                                                 |                           |                           | 6.18         |     |              | 1.08           | 0.35               |              | 0.51 |               |            |      | 183.4                                | 23                        |                      |                    |

[EPA, 2001; MVWA, 2016](#)

Table C-11: Tributary Sampling Results – Black Creek, Site 8

| Date                 | Time | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|----|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      |                                      |                           |                      |                    |
| 4/28/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 80.00                                | 20.00                     | 395.00               |                    |
| 5/5/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 780.00                               | 270.00                    | 600.00               |                    |
| 5/13/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 140.00                               | 100.00                    | 969.00               |                    |
| 5/19/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 190.00                               | 7.00                      | 4300.00              |                    |
| 5/26/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 270.00                               | 20.00                     | 105.00               |                    |
| 6/1/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 20.00                                | 20.00                     | 2850.00              |                    |
| 6/9/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 280.00                               | 0.00                      | 480.00               |                    |
| 6/16/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 20.00                                | 10.00                     | 645.00               |                    |
| 6/22/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 260.00                               | 260.00                    | 679.00               |                    |
| 6/29/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 160.00                               | 160.00                    | 100.00               |                    |
| 7/7/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 20.00                                | 0.00                      | 280.00               |                    |
| 7/13/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 90.00                                | 30.00                     | 380.00               |                    |
| 7/28/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 0.00                                 | 0.00                      | 50.00                |                    |
| 8/4/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 10.00                                | 0.00                      | 235.00               |                    |
| 8/11/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 260.00                               | 120.00                    | 430.00               |                    |
| 8/18/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 260.00                               | 40.00                     | 190.00               |                    |
| 8/25/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 760.00                               | 760.00                    | 118.00               |                    |
| 9/2/1998             |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 0.00                                 | 0.00                      | 105.00               |                    |
| 9/22/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 130.00                               | 20.00                     | 275.00               |                    |
| 9/29/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 60.00                                | 20.00                     | 190.00               |                    |
| 10/6/1998            |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 90.00                                | 50.00                     | 605.00               |                    |
| 10/13/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 50.00                                | 10.00                     | 386.00               |                    |
| 10/20/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 210.00                               | 0.00                      | 116.00               |                    |
| 10/27/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 40.00                                | 20.00                     | 110.00               |                    |
| 12/15/1998           |      |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |    |               |        |      | 0.00                                 | 0.00                      | 726.00               |                    |

| Date                 | Time    | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|---------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| Mean                 |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |        |      | 167.00                               | 77.00                     | 613.00               |                    |
| StDev                |         |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |        |      | 206.00                               | 161.00                    | 947.00               |                    |
| 4/27/1999            | 3:29 PM |            |                               |                                    |                                      |               |               | 8.82         | 97.1  | 10.91        | 43             | 0                  | -0.13        | 6.61 | 4.86          | 0.149  | 3.07 | 30                                   | 0                         | 205                  |                    |
| 5/6/1999             | 3:18 PM |            |                               |                                    |                                      |               |               | 13.82        | 100.6 | 10.09        | 60.7           | 0                  | 0.51         | 6.84 | 4.62          | 0.16   | 3.46 | 70                                   | 30                        | 2000                 |                    |
| 5/11/1999            | 3:15 PM |            |                               |                                    |                                      |               |               | 15.76        | 100.9 | 9.7          | 69.6           | 0                  | 0.59         | 6.99 | 4.73          | 0.088  | 1.86 | 90                                   | 40                        | 605                  |                    |
| 5/18/1999            | 3:20 PM |            |                               |                                    |                                      |               |               | 15.41        | 95.2  | 9.65         | 114            | 0                  | 0.56         | 7.15 | 3.95          | 0.149  | 3.77 | 80                                   | 20                        | 709                  |                    |
| 6/2/1999             | 3:22 PM |            |                               |                                    |                                      |               |               | 19.94        | 89.9  | 8.3          | 111.8          | 0                  | 0.35         | 7.02 | 5.24          | 0.216  | 4.12 | 70                                   | 0                         | 2000                 |                    |
| 6/8/1999             | 3:11 PM |            |                               |                                    |                                      |               |               | 24.67        | 101.3 | 8.54         | 228.3          | 11.4               | 0.26         | 7.21 | 5.09          | 0.219  | 4.3  | 160                                  | 40                        | 1210                 |                    |
| 6/15/1999            | 3:23 PM |            |                               |                                    |                                      |               |               | 21.85        | 94.7  | 8.42         | 202.3          | 5                  | 0.36         | 7.47 | 4.15          | 0.141  | 3.4  | 90                                   | 40                        | 318                  |                    |
| 6/21/1999            | 3:17 PM | 0.05       |                               |                                    |                                      |               |               | 22.48        | 100.2 | 8.8          | 161.5          | 1.2                | 0.47         | 7.38 | 4.11          | 0.121  | 2.94 | 30                                   | 30                        | 2940                 |                    |
| 7/13/1999            | 3:10 PM | 0.09       | 14                            | 16                                 | 16                                   | 0.03          | 0.4           | 25.16        | 98.8  | 8.25         | 154.5          | 0                  | 0.45         | 7.53 | 5.05          | 0.146  | 2.89 | 0                                    | 0                         | 790                  |                    |
| 7/20/1999            | 3:22 PM |            | 20                            | 22                                 | 28                                   | 0.02          | 0.2           | 25.94        | 96    | 7.91         | 152.4          | 0                  | 0.34         | 7.54 | 4.95          | 0.103  | 2.08 | 120                                  | 30                        | 592                  |                    |
| 7/27/1999            | 3:21 PM | 0.09       | 20                            | 16                                 | 18                                   | 0.47          | 0.1           | 27.9         | 97.4  | 7.79         | 103.6          | 12.3               | 0.47         | 7.94 | 4.52          | 0.137  | 3.03 | 50                                   | 10                        | 326                  |                    |
| 8/3/1999             | 2:54 PM |            | 10                            | 7.5                                | 19                                   | 0.73          | 0.2           | 25.95        | 92.1  | 7.58         | 180.4          | 46.8               | 0.26         | 7.88 | 4.96          | 0.142  | 2.86 | 0                                    | 0                         | 1089                 |                    |
| 8/17/1999            | 3:12 PM | 0.06       | 44                            | 36                                 | 48                                   | 0.73          |               | 21.37        | 94.2  | 8.46         | 102.1          | 0                  | 0.2          | 8.16 | 2.95          | 0.121  | 4.1  | 100                                  | 13                        | 1080                 |                    |
| 8/24/1999            | 3:09 PM | 0.16       | 42                            | 38                                 | 48                                   | 1.68          |               | 18.73        | 91.8  | 8.68         | 102.7          | 0                  | 0.24         | 8.27 | 3.73          | 0.105  | 2.82 | 40                                   | 30                        | 990                  |                    |
| 8/31/1999            | 3:00 PM | 0.71       | 40                            | 34                                 | 144                                  | 0.8           |               | 18.4         | 89.6  | 8.53         | 91.8           | 0                  | 0.11         | 7.93 | 3.33          | 0.117  | 3.51 | 400                                  | 20                        | 648                  |                    |
| 9/8/1999             | 3:08 PM | 0.69       | 18                            | 32                                 | 40                                   | 1.9           | 0.3           | 20.39        | 84.3  | 7.71         | 102.8          | 0                  | 0            | 8.19 | 2.54          | 0.077  | 3.03 | 140                                  | 20                        | 725                  |                    |
| 9/15/1999            | 3:09 PM | 0.9        | 40                            | 20                                 | 28                                   | 1.4           | 0.3           | 16.5         | 84.1  | 8.31         | 98.1           | 0                  | 0.18         | 8.35 | 3.31          | 0.117  | 3.53 | 260                                  | 220                       | 532                  |                    |
| 9/21/1999            | 3:14 PM | 0.52       | 18                            | 22                                 | 64                                   | 1.77          | 0.2           | 14.21        | 75.9  | 7.9          | 0              | 6.6                | 0            | 7.46 | 9.05          | 0.304  | 3.36 | 710                                  | 39                        | 725                  |                    |
| 9/28/1999            | 3:04 PM | 0.07       | 26                            | 25                                 | 136                                  | 1.01          | 0.2           | 14.25        | 78.7  | 8.19         | 69.6           | 15.5               | 0.3          | 7.35 | 5.1           | 0.194  | 3.8  | 350                                  | 110                       | 350                  |                    |
| 10/5/1999            | 3:07 PM | 0.35       | 15                            | 18                                 | 22                                   | 1.48          | 0.3           | 9.99         | 77.7  | 8.9          | 63.2           | 3.5                | 0.3          | 7.2  | 8.46          | 0.316  | 3.74 | 370                                  | 160                       | 620                  |                    |
| 10/19/1999           | 3:10 PM | 0.06       | 22                            | 20                                 | 25                                   | 0.74          | 0.1           | 9.49         | 68.4  | 7.93         | 68.5           | 0                  | 0.19         | 6.58 | 4.93          | 0.185  | 3.75 | 140                                  | 30                        | 392                  |                    |
| 10/26/1999           | 3:09 PM | 0.38       | 19                            | 18                                 | 22                                   | 0.75          | 0             | 6.51         | 64.6  | 8.05         | 56.8           | 1.5                | 0.23         | 7.37 | 5.9           | 0.214  | 3.63 | 2000                                 | 0                         | 2000                 |                    |
| Mean                 |         | 0.32       | 25.00                         | 23                                 | 47                                   | 0.96          | 0.2           | 18.07        | 89.7  | 8.57         | 106.3          | 4.7                | 0.28         | 7.47 | 4.8           | 0.16   | 3.32 | 241                                  | 40                        | 948                  |                    |
| StDev                |         | 0.30       | 11.57                         | 8.8                                | 41.8                                 | 0.6           | 0.11          | 6.13         | 10.71 | 0.84         | 54.91          | 10.48              | 0.19         | 0.52 | 1.53          | 0.06   | 0.61 | 427.72                               | 54.79                     | 696.76               |                    |

| Date                 | Time     | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO3/L) | Ca-<br>Hardness<br>(mg<br>CaCO3/L) | Total<br>Hardness<br>(mg<br>CaCO3/L) | PO4<br>(mg/L) | NO3<br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|----------|------------|-------------------------------|------------------------------------|--------------------------------------|---------------|---------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |          |            |                               |                                    |                                      |               |               |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 1/4/2000             | 3:05 PM  | 1.41       | 26                            | 21                                 | 25                                   | 3.57          | 0.6           | 0.3          | 62.9  | 9.22         | 0              | 42                 | 0.2          | 7.57 | 6.11          | 0.209  | 3.42 | 210                                  | 0                         | 615                  |                    |
| 3/21/2000            | 2:54 PM  | 0.06       | 21                            | 15                                 | 22                                   | 0.64          | 0.7           | 4.3          | 19.9  | 2.63         | 49.2           | 1.2                | 0.32         | 6.07 | 3.76          |        |      | 90                                   | 2                         |                      |                    |
| 4/5/2000             | 2:58 PM  |            | 32                            | 8                                  | 12                                   | 1.73          | 0.4           | 4.14         | 89.6  | 11.61        | 34.5           | 17.4               | 0.31         | 6.01 | 8.03          | 0.282  | 3.51 | 2420                                 | 10                        | 2000                 |                    |
| 4/13/2000            | 12:13 PM |            | 12                            | 12                                 | 16                                   | 0.84          | 0.3           | 3.8          | 88.8  | 11.6         | 44.5           | 11.1               | 0.39         | 6.88 | 5             | 0.182  | 3.64 | 102                                  | 1                         | 228                  |                    |
| 4/18/2000            | 3:08 PM  |            | 11                            | 15                                 | 16                                   | 0.94          | 0.2           | 6.37         | 89.1  | 10.93        | 48.3           | 2.1                | 0.4          | 5.8  | 5.08          | 0.189  | 3.72 | 219                                  | 60                        |                      |                    |
| 4/25/2000            | 3:08 PM  |            | 12                            | 13                                 | 16                                   | 0.81          | 0.1           | 8.98         | 84.7  | 9.72         | 37.4           | 1.9                | 0.81         | 6.06 | 5.2           | 0.198  | 3.81 | 249                                  | 11                        | 964                  |                    |
| 5/4/2000             | 1:58 PM  |            | 14                            | 16                                 | 21                                   | 0.97          | 0.1           | 12.01        | 88.3  | 9.43         | 42.3           | 2.6                | 0.66         | 6.46 | 4.94          | 0.178  | 3.6  | 387                                  | 5                         | 524                  |                    |
| 5/9/2000             | 3:09 PM  |            | 16                            | 16                                 | 22                                   | 1.15          | 0.1           | 19.99        | 81.7  | 7.35         | 51.5           | 3                  | 0.51         | 5.23 | 4.99          | 0.187  | 3.75 | 130                                  | 12                        | 972                  |                    |
| 5/16/2000            | 3:23 PM  |            | 9                             | 10                                 | 20                                   | 1.57          | 0.3           | 12           | 81.8  | 8.74         | 28.9           | 1.8                | 1.2          | 5.63 | 7.75          | 0.309  | 3.99 | 1413                                 | 31                        | 3780                 |                    |
| 5/30/2000            | 2:59 PM  |            | 10                            | 13                                 | 16                                   | 1.07          | 0.2           | 14.79        | 82.7  | 8.31         | 39.6           | 2.1                | 0.84         | 5.91 | 6.11          | 0.236  | 3.86 | 1046                                 | 17                        | 8300                 |                    |
| 6/6/2000             | 3:03 PM  |            | 2                             | 20                                 | 26                                   | 1.02          | 0.2           | 14.16        | 82    | 8.35         | 63.4           | 2.4                | 0.39         | 6.64 | 5.79          | 0.219  | 3.78 | 2419                                 | 31                        | 4450                 | 1/0                |
| 6/15/2000            |          |            | 19                            | 20                                 | 24                                   | 1.63          | 0.2           |              | 87.6  | 7.9          | 62.6           | 3                  |              | 6.76 | 7.88          | 0.317  | 4.02 | 1986                                 | 73                        | 2970                 |                    |
| 6/20/2000            | 3:00 PM  |            | 23                            | 15                                 | 17                                   | 1.3           | 0.1           | 22.42        | 84.1  | 7.23         | 40.9           | 5.3                | 0.61         | 6.65 | 5.8           | 0.232  | 4    | 1553                                 | 11                        | 5620                 |                    |
| 6/27/2000            | 1:30 AM  |            | 14                            | 14                                 | 17                                   | 1.38          | 0.3           | 23.58        | 78.5  | 6.61         | 49.7           | 8.8                | 0.7          | 6.82 | 5.47          | 0.215  | 3.93 | 2419                                 | 55                        | 3910                 |                    |
| 7/11/2000            | 1:44 PM  |            | 21                            | 16                                 | 16                                   | 2.18          | 0.3           | 20.63        | 76.3  | 6.79         | 55.9           | 23.7               | 0.79         | 6.91 | 5.95          | 0.221  | 3.71 | 1987                                 | 107                       | 2070                 | 0/0                |
| 7/18/2000            | 1:07 PM  |            | 18                            | 12                                 | 16                                   | 1.07          | 0.3           | 19.38        | 73.6  | 6.72         | 33.8           | 1.6                | 0.98         | 6.45 | 5.95          | 0.211  | 3.55 | 2419                                 | 186                       | 2770                 |                    |
| 7/25/2000            | 1:20 PM  |            | 12                            | 14                                 | 15                                   | 1.22          | 0.1           | 22.21        | 80.5  | 6.95         | 40.7           | 6.2                | 0.62         | 7.04 | 5.41          | 0.205  | 3.79 | 1553                                 | 16                        | 4000                 |                    |
| 8/1/2000             | 1:35 PM  |            | 18                            | 18                                 | 21                                   | 1.96          | 0.4           |              |       |              | 49.5           | 3.9                |              | 7.99 | 8.69          | 0.351  | 4.04 | 2419                                 | 435                       | 5530                 |                    |
| 8/8/2000             | 12:32 PM |            | 13                            | 13                                 | 16                                   | 1.02          | 0.2           | 22.44        | 73.6  | 6.38         | 12.8           | 1.89               | 0.66         | 6.48 | 5.74          | 0.207  | 3.61 | 2419                                 | 77                        | 2230                 |                    |
| 8/22/2000            | 12:57 PM |            | 10                            | 13                                 | 16                                   | 1             | 0.3           | 21.02        | 82    | 7.31         | 12.8           | 1.33               | 0.55         | 6.35 | 6.17          | 0.226  | 3.66 | 2419                                 | 8                         | 1930                 |                    |
| 8/29/2000            | 2:57 PM  |            | 11                            | 12                                 | 19                                   | 1.08          | 0.3           | 21.56        | 103.3 | 9.09         | 50.9           | 1.7                | 0.51         | 6.67 | 6.14          | 0.221  | 3.6  | 2419                                 | 2                         |                      |                    |
| 9/19/2000            | 11:27 AM |            | 20                            | 20                                 | 24                                   | 0.15          | 0.4           | 13.73        | 113.8 | 11.8         | 70.2           | 2.2                | 0.94         | 6.71 | 7             | 0.29   | 4.14 | 1986                                 | 25                        | 2280                 |                    |
| 10/24/2000           | 12:07 PM |            | 16                            | 16                                 | 20                                   | 0.01          | 0.3           | 7.3          |       |              | 66.4           | 2.7                | 0.09         | 6.6  | 6.33          | 0.243  | 3.84 | 2419                                 | 11                        | 1250                 |                    |
| Mean                 |          | 0.73       | 16                            | 15                                 | 19                                   | 1.23          | 0.3           | 14.05        | 81.2  | 8.32         | 42.9           | 6.5                | 0.59         | 6.51 | 6.06          | 0.233  | 3.77 | 1508                                 | 52                        | 2820                 |                    |
| StDev                |          | 0.96       | 6.46                          | 3.32                               | 3.74                                 | 0.71          | 0.15          | 7.54         | 17.46 | 2.17         | 17.35          | 9.55               | 0.27         | 0.61 | 1.16          | 0.05   | 0.19 | 964.33                               | 94.34                     | 2055.06              |                    |

| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 2001                 | 4/26/2001  |            | 3                                          | 9                                               | 12                                                | 0.050                     | 0.60                      |              |       |              |                | 6.54               |              |      | 5.53          | 0.21   | 3.73 |                                      |                           |                      |                    |
|                      | 5/31/2001  |            | 8                                          | 18                                              | 30                                                | 0.020                     | 0.30                      | 12.31        | 70.2  | 7.53         | 34.80          | 2.62               |              | 6.72 | 6.45          | 0.26   | 4.00 | 2419.0                               | 26                        |                      |                    |
|                      | 6/27/2001  | 1:47 PM    | 10                                         | 12                                              | 16                                                | 0.300                     | 0.40                      | 24.79        | 77.4  | 6.51         | 37.40          | 1.92               |              | 6.95 | 5.38          | 0.19   | 3.51 | 2419.0                               | 326                       |                      |                    |
|                      | 7/31/2001  | 12:08 PM   | 12                                         | 14                                              | 18                                                | 0.800                     | 0.20                      | 24.49        | 28.9  | 2.41         | 38.30          |                    | 0.10         | 7.54 | 5.47          | 0.19   | 3.44 | LE                                   | LE                        |                      |                    |
|                      | 8/22/2001  | 1:20 PM    | 38                                         | 32                                              | 42                                                | 1.510                     | 0.40                      | 20.53        | 19.2  | 1.73         | 85.40          | 4.40               |              | 7.57 | 4.72          | 0.22   | 4.60 | 2419.0                               | 21                        |                      |                    |
|                      | 9/20/2001  |            | 20                                         | 22                                              | 26                                                | 0.030                     | 0.30                      | 14.41        | 115.4 | 11.70        | 64.10          |                    |              | 7.41 | 9.49          | 0.35   | 3.72 | 2419.0                               | 194                       |                      |                    |
|                      | 10/29/2001 | 2:37 PM    | 26                                         | 15                                              | 33                                                | 0.560                     | 0.20                      | 5.71         | 112.9 | 14.41        | 74.40          | 2.82               | 0.00         | 7.24 | 5.14          | 0.19   | 3.60 | 649.0                                | 14                        |                      |                    |
|                      | Mean       |            | 17                                         | 17                                              | 25                                                | 0.467                     | 0.34                      | 17.04        | 70.7  | 7.38         | 55.73          | 3.66               | 0.05         | 7.24 | 6.03          | 0.23   | 3.80 | 2065.0                               | 116                       |                      |                    |
|                      | StDev      |            | 12                                         | 8                                               | 11                                                | 0.548                     | 0.14                      | 7.56         | 40.6  | 5.01         | 21.80          | 1.85               | 0.07         | 0.34 | 1.61          | 0.06   | 0.40 | 791.6                                | 139                       |                      |                    |
| 2002                 | 4/30/2002  | 1:45 PM    | 13                                         | 12                                              | 16                                                | 0.230                     | 0.30                      | 5.16         | 110.2 | 14.21        | 35.00          | 1.49               | 0.24         | 5.91 | 6.21          | 0.24   | 3.85 | 387.0                                | 15                        |                      |                    |
|                      | 5/29/2002  | 2:34 PM    | 22                                         | 20                                              | 26                                                | 0.120                     | 0.20                      | 15.29        | 102.6 | 10.44        | 59.70          | 1.68               | 0.26         | 6.96 | 4.41          | 0.16   | 3.63 | 2419.0                               | 10                        |                      |                    |
|                      | 7/2/2002   | 11:49 AM   | 12                                         | 12                                              | 14                                                | 0.170                     | 0.20                      | 26.53        | 81.6  | 6.64         | 42.80          | 1.40               | 0.28         | 7.38 | 5.92          | 0.21   | 3.58 | 2419.0                               | 46                        |                      |                    |
|                      | 8/1/2002   |            | 24                                         | 20                                              | 24                                                | 0.660                     | 0.20                      | 27.71        | 110.8 | 8.74         | 54.00          | 2.19               | 0.19         | 7.70 | 4.72          | 0.16   | 3.33 | 2419.0                               | 5                         |                      |                    |
|                      | 8/29/2002  |            | 32                                         | 32                                              | 38                                                | 0.690                     | 0.40                      | 16.60        |       | 8.40         | 100.00         | 3.16               |              | 7.59 | 5.02          | 0.16   | 3.11 | 1733.0                               | 19                        |                      |                    |
|                      | 9/25/2002  | 1:40 PM    | 18                                         | 18                                              | 26                                                | 1.340                     | 0.40                      | 15.54        | 104.0 | 10.36        | 46.00          | 1.94               | 0.00         | 7.11 | 8.82          | 0.32   | 3.62 | 2419.0                               | 167                       |                      |                    |
|                      | 10/24/2002 | 2:20 PM    | 14                                         | 18                                              | 22                                                | 1.110                     | 0.30                      | 5.73         | 102.4 | 12.84        | 43.00          | 1.81               | 1.06         | 6.61 | 6.19          | 0.23   | 3.67 | 1553.0                               | 11                        |                      |                    |
|                      | Mean       |            | 19                                         | 19                                              | 24                                                | 0.617                     | 0.29                      | 16.08        | 101.9 | 10.23        | 54.36          | 1.95               | 0.34         | 7.04 | 5.90          | 0.21   | 3.54 | 1907.0                               | 39                        |                      |                    |
|                      | StDev      |            | 7                                          | 7                                               | 8                                                 | 0.478                     | 0.09                      | 8.87         | 10.6  | 2.62         | 21.68          | 0.60               | 0.37         | 0.62 | 1.48          | 0.06   | 0.24 | 765.4                                | 58                        |                      |                    |
| 2003                 | 4/28/2003  | 2:32 PM    | 12                                         | 14                                              | 18                                                | 0.048                     | 0.40                      | 11.01        | 113.9 | 12.56        | 37.00          | 2.30               | 0.37         | 6.82 | 4.73          | 0.17   | 3.66 | 275.5                                | 18                        |                      |                    |
|                      | 5/27/2003  | 2:27 PM    | 14                                         | 12                                              | 16                                                | 0.045                     | 0.40                      | 14.00        | 99.1  | 10.21        | 38.00          | 1.18               | 0.50         | 7.65 | 7.04          | 0.27   | 3.82 | >2419                                | 135                       |                      |                    |
|                      | 6/23/2003  | 2:24 PM    | 16                                         | 14                                              | 16                                                | 0.046                     | 0.30                      | 22.72        | 99.9  | 8.62         | 32.00          | 5.47               | 0.50         | 7.11 | 5.27          | 0.21   | 3.95 | >2419                                | 816                       |                      |                    |
|                      | 7/17/2003  | 1:38 PM    | 16                                         | 14                                              | 22                                                | 0.039                     | 0.10                      | 24.24        | 102.1 | 8.55         | 50.00          | 0.97               | 1.96         | 7.36 | 4.25          | 0.15   | 3.51 | 1986.3                               | 15                        |                      |                    |
|                      | 8/18/2003  | 1:55 PM    | 10                                         | 10                                              | 16                                                | 0.034                     | 0.60                      | 19.59        | 91.2  | 8.36         | 23.00          | 3.81               | 1.30         | 6.09 | 13.80         | 0.59   | 4.26 | >2419                                | 687                       |                      |                    |
|                      | 9/24/2003  | 1:58 PM    | 14                                         | 14                                              | 16                                                | 0.027                     | 0.60                      | 15.06        | 93.7  | 9.44         | 33.00          | 4.51               | 1.12         | 6.57 | 11.00         | 0.46   | 4.20 | >2419                                | 199                       |                      |                    |
|                      | 10/15/2003 | 1:49 PM    | 16                                         | 16                                              | 20                                                |                           |                           | 12.88        | 94.3  | 9.96         | 52.00          | 1.00               | 1.17         | 6.74 | 5.67          | 0.22   | 3.95 | 1120.0                               | 8                         |                      |                    |



| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| Mean                 |            |            | 14                                         | 13                                              | 18                                                | 0.040                     | 0.40                      | 17.07        | 99.2  | 9.67         | 37.86          | 2.75               | 0.99         | 6.91 | 7.39          | 0.30   | 3.91 | 1127.3                               | 268                       |                      |                    |
| StDev                |            |            | 2                                          | 2                                               | 2                                                 | 0.008                     | 0.19                      | 5.12         | 7.6   | 1.46         | 10.22          | 1.85               | 0.57         | 0.52 | 3.62          | 0.16   | 0.27 | 855.4                                | 340                       |                      |                    |
| 2004                 | 4/19/2004  | 1:16 PM    | 12                                         | 12                                              | 12                                                |                           |                           | 9.34         | 96.3  | 11.04        | 32.00          | 3.63               | 0.13         | 6.43 | 4.67          | 0.18   | 3.85 | 613.0                                | 2                         |                      |                    |
|                      | 5/25/2004  | 2:38 PM    | 14                                         | 14                                              | 18                                                | 0.021                     | 0.13                      | 16.18        | 70.2  | 6.90         | 31.00          | 7.49               | 0.05         | 6.30 | 10.40         | 0.41   | 3.94 | >2419.2                              | 1986                      |                      |                    |
|                      | 6/14/2004  | 12:53 PM   | 14                                         | 15                                              | 18                                                | 0.006                     | 0.13                      | 19.96        | 92.2  | 8.39         | 35.00          | 1.42               | 0.15         | 6.74 | 5.61          | 0.20   | 3.64 | 829.7                                | 74                        |                      |                    |
|                      | 7/19/2004  | 10:59 AM   | 14                                         | 18                                              | 20                                                | 0.004                     | 0.11                      | 20.82        | 108.6 | 9.71         | 50.00          | 1.55               | 0.37         | 7.15 | 5.64          | 0.21   | 3.76 | 1732.9                               | 46                        |                      |                    |
|                      | 8/30/2004  | 1:00 PM    | 14                                         | 16                                              | 20                                                | 0.005                     | 0.04                      | 22.16        | 105.5 | 9.19         | 42.00          | 2.32               | 0.96         | 6.97 | 5.51          | 0.20   | 3.63 | >2419.2                              | 24                        |                      |                    |
|                      | 9/14/2004  | 2:19 PM    | 17                                         | 16                                              | 20                                                | 0.024                     | 0.12                      | 22.42        | 101.9 | 8.84         | 46.00          | 2.18               | 1.15         | 7.06 | 5.92          | 0.22   | 3.72 | 1203.0                               | 4                         |                      |                    |
|                      | 10/4/2004  | 1:11 PM    | 36                                         | 34                                              | 38                                                | 0.005                     | 0.08                      | 11.19        | 94.6  | 10.39        | 71.00          | 3.08               | 1.24         | 6.88 | 4.55          | 0.19   | 4.11 | 1986.3                               | 26                        |                      |                    |
|                      | Mean       |            | 17                                         | 18                                              | 21                                                | 0.011                     | 0.10                      | 17.44        | 95.6  | 9.21         | 43.86          | 3.10               | 0.58         | 6.79 | 6.04          | 0.23   | 3.81 | 1273.0                               | 309                       |                      |                    |
|                      | StDev      |            | 8                                          | 7                                               | 8                                                 | 0.009                     | 0.04                      | 5.34         | 12.7  | 1.36         | 13.95          | 2.09               | 0.52         | 0.32 | 1.99          | 0.08   | 0.17 | 582.5                                | 740                       |                      |                    |
| 2006                 | 4/24/2006  |            | 10                                         | 12                                              | 12                                                | <0.025                    | <0.25                     | 5.82         | 94.4  | 11.81        | 26.00          | 3.04               |              | 6.22 | 7.51          | 0.33   | 4.43 | 2419.2                               | 27                        |                      |                    |
|                      | 5/15/2006  |            | 10                                         | 12                                              | 17                                                | <0.025                    | <0.25                     | 13.22        | 91.6  | 9.60         | 30.00          | 2.59               |              | 6.48 | 6.43          | 0.28   | 4.34 | >2419.2                              | 61                        |                      |                    |
|                      | 6/8/2006   |            | 14                                         | 13                                              | 14                                                | <0.025                    | <0.25                     | 20.51        | 93.3  | 8.40         | 40.00          | 1.61               |              | 6.80 |               |        |      | 2419.2                               | 345                       |                      |                    |
|                      | 7/17/2006  |            | 12                                         | 16                                              | 16                                                | <0.025                    | <0.25                     | 29.03        | 109.6 | 8.42         | 33.00          | 6.78               |              | 6.95 |               |        |      | >2419.2                              | 115                       |                      |                    |
|                      | 8/14/2006  |            | 14                                         | 18                                              | 22                                                | <0.025                    | <0.25                     | 24.21        | 96.8  | 8.12         | 42.00          | 1.72               |              | 7.09 |               |        |      | 435.0                                | <1                        |                      |                    |
|                      | 9/5/2006   |            | 30                                         | 30                                              | 34                                                | <0.025                    | <0.25                     | 14.84        | 95.7  | 9.68         | 44.00          | 2.21               |              | 7.08 |               |        |      | 1299.0                               | 19                        |                      |                    |
|                      | 10/16/2006 |            | 22                                         | 30                                              | 44                                                | <0.025                    | <0.25                     | 7.84         | 95.6  | 11.37        | 56.00          | 2.33               |              | 6.70 |               |        |      | 816.0                                | 3                         |                      |                    |
|                      | Mean       |            | 16                                         | 19                                              | 23                                                |                           |                           | 16.50        | 96.7  | 9.63         | 38.71          | 2.90               |              | 6.76 | 6.97          | 0.31   | 4.39 | 1477.7                               | 95                        |                      |                    |
|                      | StDev      |            | 7                                          | 8                                               | 12                                                |                           |                           | 8.52         | 5.9   | 1.47         | 10.08          | 1.78               |              | 0.32 | 0.76          | 0.04   | 0.07 | 912.4                                | 129                       |                      |                    |
| 2007                 | 4/23/2007  |            | 4                                          | 12                                              | 12                                                | <0.025                    | 0.33                      | 7.96         | 99.0  | 11.74        | 27.00          | 1.53               |              | 6.12 | 4.71          | 0.17   |      | 387.3                                | 3                         |                      |                    |
|                      | 5/4/2007   |            | 9                                          | 14                                              | 16                                                | <0.025                    | <0.25                     | 17.00        | 102.7 | 9.93         | 33.00          | 3.52               |              | 6.69 | 6.12          | 0.23   |      | 1203.0                               | 23                        |                      |                    |
|                      | 6/4/2007   |            | 24                                         | 24                                              | 26                                                | <0.025                    | <0.25                     | 20.19        | 104.3 | 9.45         | 66.00          | 1.79               |              | 6.94 | 4.50          | 0.19   |      | 2419.7                               | 78                        |                      |                    |
|                      | 7/2/2007   |            | 36                                         | 36                                              | 38                                                | <0.025                    | <0.25                     | 19.64        | 118.0 | 10.81        | 72.00          | 3.49               |              | 6.97 | 3.54          | 0.12   |      | 1414.0                               | 23                        |                      |                    |
|                      | 8/20/2007  |            | 34                                         | 60                                              | 66                                                | <0.025                    | <0.25                     |              | 105.2 | 10.52        | 0.11           | 1.38               |              | 7.57 | 3.74          | 0.13   |      | 1203.3                               | 29                        |                      |                    |

| Date                 | Time       | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|------------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |            |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 9/17/2007            |            |            | 12                                         | 27                                              | 45                                                | <0.025                    | <0.25                     | 14.93        | 109.3 | 11.00        | 0.08           | 1.45               |              | 7.39 | 6.02          | 0.22   |      | 1553.0                               | 31                        |                      |                    |
| 10/9/2007            |            |            | 46                                         | 46                                              | 49                                                | <0.025                    | <0.25                     | 16.02        | 112.6 | 11.11        | 0.10           | 1.33               |              | 7.87 | 3.93          | 0.13   |      | 517.2                                | 22                        |                      |                    |
| Mean                 |            |            | 24                                         | 31                                              | 36                                                |                           |                           | 15.96        | 107.3 | 10.65        | 28.33          | 2.07               |              | 7.08 | 4.65          | 0.17   |      | 1242.5                               | 30                        |                      |                    |
| StDev                |            |            | 16                                         | 17                                              | 19                                                |                           |                           | 4.42         | 6.5   | 0.77         | 30.93          | 0.99               |              | 0.59 | 1.05          | 0.05   |      | 679.7                                | 23                        |                      |                    |
| 2008                 | 4/21/2008  |            | 8                                          | 9                                               | 11                                                | <0.025                    | <0.25                     | 12.41        | 87.9  | 9.38         | 0.03           | 0.93               |              | 6.38 | 5.27          | 0.18   |      | 1299.7                               | 5                         |                      |                    |
|                      | 5/19/2008  |            | 26                                         | 23                                              | 26                                                | <0.025                    | <0.25                     | 11.76        | 89.7  | 9.72         | 0.06           | 0.99               |              | 7.09 | 4.19          | 0.14   |      | >2419.2                              | 411                       |                      |                    |
|                      | 6/16/2008  |            | 11                                         | 32                                              | 34                                                | <0.025                    | <0.25                     | 25.74        | 93.2  | 7.59         | 0.04           | 4.95               |              | 7.23 | 5.48          | 0.17   |      | >2419.2                              | 517                       |                      |                    |
|                      | 7/14/2008  |            | 24                                         | 21                                              | 22                                                | <0.025                    | <0.25                     | 20.36        | 96.8  | 8.74         | 0.05           | 3.75               |              | 6.84 | 11.10         | 0.42   |      | >2419.2                              | 2419                      |                      |                    |
|                      | 8/4/2008   |            | 18                                         | 21                                              | 38                                                | <0.025                    | <0.25                     | 23.04        | 111.2 | 9.53         | 0.05           | 0.92               |              | 6.95 | 5.60          | 0.18   |      | >2419.2                              | 29                        |                      |                    |
|                      | 8/26/2008  |            | 20                                         | 18                                              | 22                                                | 0.042                     | <0.25                     | 23.13        | 104.6 | 8.95         | 0.05           | 0.77               |              | 7.42 | 5.86          | 0.18   |      | 2419.2                               | 38                        |                      |                    |
|                      | 9/23/2008  |            | 10                                         | 12                                              | 16                                                | <0.025                    | <0.25                     | 17.19        | 102.5 | 9.87         | 0.07           | 1.39               |              | 7.37 | 5.54          | 0.21   |      | 1413.0                               | 10                        |                      |                    |
|                      | 10/14/2008 |            | 30                                         | 92                                              | 138                                               | <0.025                    | <0.25                     | 11.66        | 104.4 | 11.34        | 0.07           | 1.13               |              | 7.58 | 5.90          | 0.19   |      | 1046.2                               | 26                        |                      |                    |
|                      | Mean       |            | 18                                         | 28                                              | 38                                                |                           |                           | 18.16        | 98.8  | 9.39         | 0.05           | 1.85               |              | 7.11 | 6.12          | 0.21   |      | 1544.5                               | 432                       |                      |                    |
|                      | StDev      |            | 8                                          | 27                                              | 41                                                |                           |                           | 5.71         | 8.2   | 1.07         | 0.01           | 1.58               |              | 0.38 | 2.08          | 0.09   |      | 602.9                                | 828                       |                      |                    |
| 2009                 | 4/13/2009  |            | 15                                         | 13                                              | 13                                                | <0.025                    | <0.25                     | 5.79         | 99.1  | 12.40        | 0.03           | 0.75               |              | 6.49 |               |        |      | 93.3                                 | 0                         |                      |                    |
|                      | 5/11/2009  |            | 17                                         | 12                                              | 18                                                | <0.025                    | <0.25                     | 13.39        | 88.6  | 9.25         | 0.03           | 1.18               |              | 6.76 |               |        |      | >2419.2                              | 54                        |                      |                    |
|                      | 5/27/2009  |            | 26                                         | 20                                              | 23                                                | <0.025                    | <0.25                     | 16.62        | 87.3  | 8.51         | 0.05           | 2.29               |              | 6.94 |               |        |      | >2419                                | 46                        |                      |                    |
|                      | 6/8/2009   |            | 18                                         | 18                                              | 19                                                | <0.025                    | <0.25                     | 20.55        | 108.0 | 9.71         | 0.05           | 1.20               |              | 7.79 |               |        |      | 2419.2                               | 16                        |                      |                    |
|                      | 6/22/2009  |            | 11                                         | 19                                              | 22                                                | <0.025                    | <0.25                     | 21.89        | 96.1  | 8.42         | 0.03           | 0.91               |              | 6.92 |               |        |      | >2419                                | 23                        |                      |                    |
|                      | 7/6/2009   |            | 14                                         | 14                                              | 20                                                | <0.025                    | <0.25                     | 21.91        | 97.2  | 8.51         | 0.04           | 0.82               |              | 7.19 |               |        |      | >2419.2                              | 27                        |                      |                    |
|                      | 7/20/2009  |            | 16                                         | 53                                              | 73                                                | <0.025                    | <0.25                     | 23.79        | 123.8 | 10.46        | 0.04           | 1.13               |              | 7.41 |               |        |      | >2419                                | 36                        |                      |                    |
|                      | 8/4/2009   |            | 16                                         | 16                                              | 27                                                | <0.025                    | <0.25                     | 18.69        | 83.8  | 7.82         | 0.04           | 2.34               |              | 6.86 |               |        |      | >2419.2                              | 1230                      |                      |                    |
|                      | 8/18/2009  |            | 19                                         | 18                                              | 26                                                | <0.025                    | <0.25                     | 28.00        | 101.7 | 7.96         | 0.04           | 1.45               |              | 7.57 |               |        |      | >2419.2                              | 55                        |                      |                    |
|                      | 8/31/2009  |            | 13                                         | 17                                              | 21                                                | <0.025                    | <0.25                     | 17.42        | 79.1  | 7.58         | 0.04           | 1.60               |              | 7.27 |               |        |      | >2419                                | 166                       |                      |                    |
|                      | 9/14/2009  |            | 21                                         | 19                                              | 23                                                | <0.025                    | <0.25                     | 20.66        | 88.6  | 7.96         | 0.06           | 1.62               |              | 7.50 |               |        |      | 1986.3                               | 16                        |                      |                    |

| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 9/28/2009            |           |            | 16                                         | 20                                              | 36                                                | <0.025                    | <0.25                     | 12.87        | 94.0  | 9.93         | 0.05           | 2.44               |              | 7.32 |               |        |      | >2419.2                              | 613                       |                      |                    |
| 10/14/2009           |           |            | 21                                         | 84                                              | 114                                               | <0.025                    | <0.25                     | 7.45         | 90.1  | 10.81        | 0.05           | 1.12               |              | 6.88 |               |        |      | 1299.7                               | 14                        |                      |                    |
| Mean                 |           |            | 17                                         | 25                                              | 33                                                |                           |                           | 17.62        | 95.2  | 9.18         | 0.04           | 1.45               |              | 7.15 |               |        |      | 1449.6                               | 176                       |                      |                    |
| StDev                |           |            | 4                                          | 21                                              | 28                                                |                           |                           | 6.37         | 11.6  | 1.43         | 0.01           | 0.58               |              | 0.37 |               |        |      | 1014.9                               | 356                       |                      |                    |
| 2010                 | 5/3/2010  |            | 27                                         | 7                                               | 8                                                 | <0.025                    | <0.25                     | 16.36        | 93.9  | 9.20         | 0.06           | 0.88               |              | 7.13 |               |        |      | 1299.0                               | 11                        |                      |                    |
|                      | 5/17/2010 |            | 17                                         | 18                                              | 22                                                | <0.025                    | <0.25                     | 14.31        | 94.5  | 9.67         | 0.05           | 1.19               |              | 6.93 |               |        |      | 2419.2                               | 7                         |                      |                    |
|                      | 6/1/2010  |            | 46                                         | 46                                              | 50                                                | <0.025                    | <0.25                     | 19.54        | 94.5  | 8.67         | 0.09           | 17.60              |              | 7.26 |               |        |      | >2419.2                              |                           |                      |                    |
|                      | 6/14/2010 |            | 12                                         | 16                                              | 23                                                | <0.025                    | <0.25                     | 15.32        | 88.7  | 8.89         | 0.04           | 1.10               |              | 6.85 |               |        |      | >2419.2                              | 76                        |                      |                    |
|                      | 6/29/2010 |            | 18                                         | 14                                              | 19                                                | <0.025                    | <0.25                     | 23.32        | 103.4 | 8.81         | 0.04           | 1.08               |              | 7.49 |               |        |      | >2419                                | 290                       |                      |                    |
|                      | 7/12/2010 |            | 23                                         | 22                                              | 27                                                | <0.025                    | <0.25                     | 26.69        | 106.8 | 8.56         | 0.05           | 1.46               |              | 7.23 |               |        |      | 2419.2                               | 34                        |                      |                    |
|                      | 8/9/2010  |            | 16                                         | 16                                              | 23                                                | <0.025                    | <0.25                     | 25.48        | 110.1 | 9.02         | 0.04           | 0.92               |              | 7.47 |               |        |      | >2419.2                              | 26                        |                      |                    |
|                      | 8/23/2010 |            | 16                                         | 20                                              | 23                                                | <0.025                    | <0.25                     | 16.95        |       |              | 0.04           | 2.89               |              | 6.85 |               |        |      | >2419.2                              | 1986                      |                      |                    |
|                      | 9/7/2010  |            | 19                                         | 18                                              | 30                                                | <0.025                    | <0.25                     | 20.97        | 92.8  | 8.28         | 0.04           | 0.85               |              | 7.15 |               |        |      | 1413.0                               | 4                         |                      |                    |
|                      | 9/20/2010 |            | 36                                         | 40                                              | 87                                                | <0.025                    | <0.25                     | 15.95        | 95.7  | 9.46         | 0.05           | 1.10               |              | 7.21 |               |        |      | 1553.1                               | 36                        |                      |                    |
|                      | 10/4/2010 |            | 13                                         | 13                                              | 16                                                | <0.025                    | <0.25                     | 12.75        | 82.9  | 8.78         | 0.04           | 1.10               |              | 6.59 |               |        |      | >2419                                | 162                       |                      |                    |
|                      | Mean      |            | 22                                         | 21                                              | 30                                                |                           |                           | 18.88        | 96.3  | 8.93         | 0.05           | 2.74               |              | 7.11 |               |        |      | 1820.7                               | 263                       |                      |                    |
|                      | StDev     |            | 11                                         | 12                                              | 22                                                |                           |                           | 4.68         | 8.3   | 0.42         | 0.02           | 4.96               |              | 0.28 |               |        |      | 553.7                                | 612                       |                      |                    |
| 2011                 | 5/9/2011  |            | 13                                         | 17                                              | 26                                                | <0.025                    | 0.14                      | 12.18        | 100.8 | 10.82        | 0.04           | 1.77               |              | 6.93 |               |        |      | 687.0                                | <1                        |                      |                    |
|                      | 5/23/2011 |            | 22                                         | 20                                              | 26                                                | <0.025                    | <0.05                     | 15.43        | 88.5  | 8.85         | 0.04           | 1.11               |              | 6.81 |               |        |      | >2419                                | 46                        |                      |                    |
|                      | 6/6/2011  |            | 12                                         | 10                                              | 16                                                | <0.025                    | 0.06                      | 22.69        | 104.7 | 9.04         | 0.03           | 0.90               |              | 7.69 |               |        |      | >2419                                | 35                        |                      |                    |
|                      | 6/19/2011 |            | 15                                         | 14                                              | 22                                                | <0.025                    | <0.05                     | 23.82        | 75.5  | 6.38         | 0.04           | 1.06               |              | 7.22 |               |        |      | 1733.0                               | 9                         |                      |                    |
|                      | 7/11/2011 |            | 10                                         | 16                                              | 20                                                | <0.025                    | <0.05                     | 24.54        | 70.9  | 5.91         | 0.04           | 1.33               |              | 7.60 |               |        |      | >2419                                | 24                        |                      |                    |
|                      | 7/25/2011 |            | 17                                         | 20                                              | 21                                                | <0.025                    | <0.05                     | 24.35        | 79.4  | 6.52         | 0.04           | 1.94               |              | 7.50 |               |        |      | 1553.0                               | 7                         |                      |                    |
|                      | 8/11/2011 |            | 27                                         | 30                                              | 33                                                | <0.025                    | <0.05                     | 22.53        |       |              | 0.07           | 1.50               |              | 7.44 |               |        |      | >2419                                | 81                        |                      |                    |
|                      | 9/12/2011 |            | 18                                         | 17                                              | 25                                                | <0.025                    | <0.05                     | 14.12        |       |              | 0.02           | 1.09               |              | 7.72 |               |        |      | >2419                                | 517                       |                      |                    |

| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO%   | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-------|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |       |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 9/27/2011            |           |            | 19                                         | 21                                              | 27                                                | <0.025                    | 0.05                      | 18.90        |       |              | 0.05           | 1.21               |              | 6.42 |               |        |      | 1986.0                               | 23                        |                      |                    |
| 10/11/2011           |           |            | 18                                         | 20                                              | 24                                                | <0.025                    | <0.05                     | 17.62        | 105.5 | 10.06        | 0.04           | 1.16               |              | 7.25 |               |        |      | 461.1                                | 2                         |                      |                    |
| 10/24/2011           |           |            | 15                                         | 14                                              | 16                                                | <0.025                    | <0.05                     | 8.47         |       |              | 0.04           | 0.81               |              | 6.94 |               |        |      | >2419                                | 198                       |                      |                    |
| Mean                 |           |            | 17                                         | 18                                              | 23                                                |                           |                           | 18.60        | 89.3  | 8.23         | 0.04           | 1.26               |              | 7.23 |               |        |      | 1284.0                               | 94                        |                      |                    |
| StDev                |           |            | 5                                          | 5                                               | 5                                                 |                           |                           | 5.50         | 14.5  | 1.95         | 0.01           | 0.35               |              | 0.41 |               |        |      | 670.9                                | 159                       |                      |                    |
| 2012                 | 4/23/2012 |            | 20                                         | 20                                              | 22                                                | <0.025                    | 0.06                      | 10.00        |       |              | 49.20          | 6.83               |              | 7.30 |               |        |      | 1553.0                               | 166                       |                      |                    |
|                      | 5/7/2012  |            | 16                                         | 12                                              | 17                                                | <0.025                    | 0.14                      | 17.10        |       |              |                | 1.71               |              | 7.26 |               |        |      | 1732.9                               | 5                         |                      |                    |
|                      | 7/10/2012 |            | 20                                         | 18                                              | 20                                                | <0.025                    | 0.09                      | 27.10        |       |              | 53.10          | 3.48               |              | 7.57 |               |        |      |                                      |                           |                      |                    |
|                      | 8/1/2012  |            | 28                                         | 24                                              | 28                                                | <0.025                    | <0.05                     | 22.90        |       |              | 73.80          | 5.18               |              | 7.46 |               |        |      |                                      |                           |                      |                    |
|                      | 8/13/2012 |            | 18                                         | 16                                              | 20                                                | <0.025                    | 0.06                      | 20.90        |       |              | 56.00          | 4.59               |              | 7.42 |               |        |      |                                      |                           |                      |                    |
|                      | 9/17/2012 |            | 38                                         | 34                                              | 38                                                | <0.025                    | 0.08                      | 16.80        |       |              | 92.70          | 2.88               |              | 7.31 |               |        |      |                                      |                           |                      |                    |
|                      | 10/1/2012 |            | 24                                         | 22                                              | 28                                                | <0.025                    | 0.08                      | 12.70        |       |              | 65.00          | 9.74               |              | 7.38 |               |        |      | >2419                                | 261                       |                      |                    |
|                      | Mean      |            | 23                                         | 21                                              | 25                                                |                           |                           | 18.21        |       |              | 64.97          | 4.92               |              | 7.39 |               |        |      | 1642.9                               | 144                       |                      |                    |
|                      | StDev     |            | 8                                          | 7                                               | 7                                                 |                           |                           | 5.91         |       |              | 16.23          | 2.70               |              | 0.11 |               |        |      | 127.2                                | 129                       |                      |                    |
| 2013                 | 5/20/2013 |            | 28                                         | 30                                              | 30                                                |                           | 0.10                      | 17.60        |       | 8.30         | 65.70          | 1.27               |              | 7.14 |               |        |      | 886.0                                | 4                         |                      |                    |
|                      | 6/3/2013  |            | 20                                         | 18                                              | 20                                                | <0.025                    | <0.05                     | 21.20        |       | 8.00         | 49.90          | 1.52               |              | 7.31 |               |        |      | >2419.2                              | 240                       |                      |                    |
|                      | 6/25/2013 |            | 18                                         | 16                                              | 18                                                | <0.025                    | 0.05                      | 25.20        |       |              | 43.30          | 1.84               |              | 7.22 |               |        |      | 1986.0                               | 387                       |                      |                    |
|                      | 7/15/2013 |            | 12                                         | 12                                              | 12                                                | <0.025                    | <0.05                     | 30.00        |       | 7.30         | 29.20          | 1.41               |              | 6.98 |               |        |      | 1986.0                               | 68                        |                      |                    |
|                      | 7/29/2013 |            | 16                                         | 14                                              | 16                                                | <0.025                    | <0.05                     | 25.20        |       | 5.70         | 32.40          | 1.36               |              | 7.11 |               |        |      | 461.0                                | 1                         |                      |                    |
|                      | 8/12/2013 |            | 18                                         | 16                                              | 20                                                | <0.025                    | <0.05                     | 25.00        |       | 9.50         | 43.20          | 0.97               |              | 7.19 |               |        |      | 1299.7                               | 23                        |                      |                    |
|                      | 9/9/2013  |            | 34                                         | 32                                              | 36                                                | <0.025                    | 0.08                      | 16.80        |       | 7.00         | 80.40          | 1.79               |              | 7.83 |               |        |      | 1413.6                               | 55                        |                      |                    |
|                      | 9/24/2013 |            | 22                                         | 22                                              | 26                                                | <0.025                    | 0.06                      | 12.90        |       | 10.80        | 58.60          | 1.61               |              | 7.49 |               |        |      | 1732.9                               | 36                        |                      |                    |
|                      | Mean      |            | 21                                         | 20                                              | 22                                                |                           |                           | 21.74        |       | 8.09         | 50.34          | 1.47               |              | 7.28 |               |        |      | 1395.0                               | 102                       |                      |                    |
|                      | StDev     |            | 7                                          | 7                                               | 8                                                 |                           |                           | 5.64         |       | 1.68         | 17.23          | 0.28               |              | 0.27 |               |        |      | 570.6                                | 139                       |                      |                    |
| 5/20/2014            |           |            | 10                                         | 10                                              | 14                                                | <0.025                    | 0.21                      | 17.70        |       |              | 27.60          | 0.91               |              | 6.92 |               |        |      | 770.0                                | 34                        |                      |                    |

| Date                 | Time      | V<br>(m/s) | Alkalinity<br>(mg<br>CaCO <sub>3</sub> /L) | Ca-<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | Total<br>Hardness<br>(mg<br>CaCO <sub>3</sub> /L) | PO <sub>4</sub><br>(mg/L) | NO <sub>3</sub><br>(mg/L) | Temp<br>(°C) | DO% | DO<br>(mg/L) | SpC<br>(mS/cm) | Turbidity<br>(NTU) | Depth<br>(m) | pH   | TOC<br>(mg/L) | UV-254 | SUVA | Total<br>Coliform<br>(per 100<br>mL) | E.Coli<br>(per 100<br>mL) | R2A<br>(per 1<br>mL) | Giardia/<br>Crypto |
|----------------------|-----------|------------|--------------------------------------------|-------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|--------------|-----|--------------|----------------|--------------------|--------------|------|---------------|--------|------|--------------------------------------|---------------------------|----------------------|--------------------|
| SITE 8 – BLACK CREEK |           |            |                                            |                                                 |                                                   |                           |                           |              |     |              |                |                    |              |      |               |        |      |                                      |                           |                      |                    |
| 2014                 | 6/17/2014 |            | 14                                         | 14                                              | 16                                                | <0.025                    | 0.11                      | 24.30        |     |              | 33.70          | 1.12               |              | 7.01 |               |        |      | le                                   | le                        |                      |                    |
|                      | 7/17/2014 |            | 16                                         | 14                                              | 18                                                | <0.025                    | 0.06                      | 24.40        |     |              | 36.00          | 1.80               |              | 7.34 |               |        |      | 980.4                                | 3                         |                      |                    |
|                      | 8/19/2014 |            | 20                                         | 20                                              | 20                                                | <0.025                    | <0.05                     | 22.40        |     |              | 46.20          | 1.06               |              | 8.28 |               |        |      | 1046.0                               | 9                         |                      |                    |
|                      | 9/23/2014 |            | 30                                         | 30                                              | 34                                                | <0.025                    | 0.11                      | 12.80        |     |              | 77.50          | 1.76               |              | 7.50 |               |        |      | 1553.0                               | 15                        |                      |                    |
|                      | Mean      |            | 18                                         | 18                                              | 20                                                |                           |                           | 20.32        |     |              | 44.20          | 1.33               |              | 7.41 |               |        |      | 1087.4                               | 15                        |                      |                    |
|                      | StDev     |            | 8                                          | 8                                               | 8                                                 |                           |                           | 5.01         |     |              | 19.79          | 0.42               |              | 0.54 |               |        |      | 332.0                                | 14                        |                      |                    |
| 2015                 | 4/26/2015 |            | 16                                         | 14                                              | 20                                                | <0.025                    | 0.23                      | 6.90         |     |              | 37.90          | 1.15               |              | 6.93 |               |        |      | 206.0                                | 11                        |                      |                    |
|                      | 5/21/2015 |            | 14                                         | 12                                              | 16                                                | <0.025                    | 0.15                      | 19.10        |     |              | 39.90          | 1.83               |              | 7.35 |               |        |      | 1299.7                               | 13                        |                      |                    |
|                      | 7/28/2015 |            | 40                                         | 34                                              | 36                                                | <0.025                    | 0.08                      | 22.70        |     |              | 90.50          | 1.68               |              | 7.72 |               |        |      | 1733.0                               | 55                        |                      |                    |
|                      | 8/31/2015 |            | 34                                         | 32                                              | 40                                                | <0.025                    | 0.08                      | 0.20         |     |              | 89.70          | 2.03               |              | 7.74 |               |        |      | 1120.0                               | 76                        |                      |                    |
|                      | 9/21/2015 |            | 32                                         | 28                                              | 34                                                | <0.025                    | <0.05                     | 17.30        |     |              | 84.20          | 4.48               |              | 7.68 |               |        |      | >2419                                | 81                        |                      |                    |
|                      | Mean      |            | 27                                         | 24                                              | 29                                                |                           |                           | 13.24        |     |              | 68.44          | 2.23               |              | 7.48 |               |        |      | 1089.7                               | 47                        |                      |                    |
|                      | StDev     |            | 12                                         | 10                                              | 11                                                |                           |                           | 9.36         |     |              | 27.08          | 1.30               |              | 0.35 |               |        |      | 642.8                                | 33                        |                      |                    |
| 2016                 | 5/10/2016 |            | 18                                         | 18                                              | 20                                                | <0.025                    | <0.05                     | 12.90        |     |              | 49.80          | 2.50               |              | 7.44 |               |        |      | 649.0                                | 11                        |                      |                    |
|                      | 6/13/2016 |            | 18                                         | 22                                              | 26                                                | <0.025                    | 0.06                      | 12.20        |     |              | 43.60          | 1.36               |              | 7.34 |               |        |      | 1414.0                               | 56                        |                      |                    |
|                      | 7/6/2016  |            | 24                                         | 24                                              | 30                                                | <0.025                    | 0.06                      | 25.70        |     |              | 60.00          | 0.48               |              | 7.53 |               |        |      | 910.0                                | 10                        |                      |                    |
|                      | 8/13/2016 |            | 16                                         | 18                                              | 20                                                | <0.025                    | <0.05                     |              |     |              | 35.00          | 2.27               |              | 6.45 |               |        |      | >2419                                | 206                       |                      |                    |
|                      | 9/13/2016 |            | 32                                         | 30                                              | 40                                                | <0.025                    | 0.05                      | 19.60        |     |              | 74.80          | 1.80               |              | 7.68 |               |        |      | 2419.0                               | 44                        |                      |                    |
|                      | Mean      |            | 22                                         | 22                                              | 27                                                |                           |                           | 17.60        |     |              | 52.64          | 1.68               |              | 7.29 |               |        |      | 1348.0                               | 66                        |                      |                    |
|                      | StDev     |            | 7                                          | 5                                               | 8                                                 |                           |                           | 6.35         |     |              | 15.38          | 0.80               |              | 0.48 |               |        |      | 781.4                                | 81                        |                      |                    |

[EPA, 2001; MVWA, 2016](#)

**Appendix D – Tables Listing Potential Wildlife Species in the Vicinity of the Jarvis Project**



**Table D-1: Mammals that May be Found in the Vicinity of the Project**

| Common Name              | Scientific Name                 |
|--------------------------|---------------------------------|
| Virginia opossum         | <i>Didelphis virginiana</i>     |
| Long-tailed shrew        | <i>Sorex dispar</i>             |
| Masked shrew             | <i>Sorex cinereus</i>           |
| Pygmy shrew              | <i>Sorex hoyi</i>               |
| Smoky shrew              | <i>Sorex fumeus</i>             |
| Water shrew              | <i>Sorex palustris</i>          |
| Short-tailed shrew       | <i>Blarina brevicauda</i>       |
| Hairy-tailed mole        | <i>Parascalops breweri</i>      |
| Star-nosed mole          | <i>Condylura cristata</i>       |
| Eastern cottontail       | <i>Sylvilagus floridanus</i>    |
| Snowshoe hare            | <i>Lepus americanus</i>         |
| Eastern coyote           | <i>Canis latrans</i>            |
| Gray fox                 | <i>Urocyon cinereoargenteus</i> |
| Red fox                  | <i>Vulpes vulpes</i>            |
| Bobcat                   | <i>Lynx rufus</i>               |
| Canada lynx              | <i>Lynx canadensis</i>          |
| Striped skunk            | <i>Mephitis mephitis</i>        |
| Ermine                   | <i>Mustela erminea</i>          |
| Fisher                   | <i>Martes pennanti</i>          |
| Long-tailed weasel       | <i>Mustela frenata</i>          |
| American marten          | <i>Martes americana</i>         |
| American mink            | <i>Mustela vison</i>            |
| Northern river otter     | <i>Lontra canadensis</i>        |
| Raccoon                  | <i>Procyon lotor</i>            |
| Black bear               | <i>Ursa americana</i>           |
| American beaver          | <i>Castor canadensis</i>        |
| Muskrat                  | <i>Ondatra zibethicus</i>       |
| Rock vole                | <i>Microtus chrotorrhinus</i>   |
| Meadow vole              | <i>Microtus pennsylvanicus</i>  |
| Woodland vole            | <i>Microtus pinetorum</i>       |
| Southern red-backed vole | <i>Myodes gapperi</i>           |
| Southern bog lemming     | <i>Synaptomys cooperi</i>       |
| White-footed mouse       | <i>Peromyscus leucopus</i>      |
| Deer mouse               | <i>Peromyscus maniculatus</i>   |
| North American porcupine | <i>Erethizon dorsatum</i>       |
| Eastern chipmunk         | <i>Tamias striatus</i>          |
| Gray squirrel            | <i>Sciurus carolinensis</i>     |

---

| Common Name              | Scientific Name                |
|--------------------------|--------------------------------|
| Red squirrel             | <i>Tamiasciurus hudsonicus</i> |
| Northern flying squirrel | <i>Glaucomys sabrinus</i>      |
| Southern flying squirrel | <i>Glaucomys volans</i>        |
| Woodchuck                | <i>Marmota monax</i>           |
| Meadow jumping mouse     | <i>Zapus hudsonius</i>         |
| Woodland jumping mouse   | <i>Napaeozapus insignis</i>    |
| White-tailed deer        | <i>Odocoileus virginianus</i>  |

Source: [AEC, 2016](#)

**Table D-2: Birds that May be Found in the Vicinity of the Project**

| Common Name                  | Scientific Name                     |
|------------------------------|-------------------------------------|
| American black duck          | <i>Anas rubripes</i>                |
| American crow                | <i>Corvus brachyrhynchos</i>        |
| American goldfinch           | <i>Spinus tristis</i>               |
| American robin               | <i>Turdus migratorius</i>           |
| American tree sparrow        | <i>Spizella arborea</i>             |
| Bald eagle                   | <i>Haliaeetus leucocephalu</i>      |
| Barred owl                   | <i>Strix varia</i>                  |
| Black Scoter                 | <i>Melanitta americana</i>          |
| Black-capped chickadee       | <i>Poecile atricapillus</i>         |
| Black-throated green warbler | <i>Setophaga virens</i>             |
| Blue jay                     | <i>Cyanocitta cristata</i>          |
| Bonaparte's gull             | <i>Chroicocephalus philadelphia</i> |
| Broad-winged hawk            | <i>Buteo platypterus</i>            |
| Brown-headed cowbird         | <i>Molothrus ater</i>               |
| Bufflehead                   | <i>Bucephala albeola</i>            |
| Canada goose                 | <i>Branta canadensis</i>            |
| Cedar waxwing                | <i>Bombycilla cedrorum</i>          |
| Cerulean warbler             | <i>Setophaga cerulea</i>            |
| Common goldeneye             | <i>Bucephala clangula</i>           |
| Common raven                 | <i>Corvus corax</i>                 |
| Dark-eyed junco              | <i>Junco hyemalis</i>               |
| Double-crested cormorant     | <i>Phalacrocorax auritus</i>        |
| Downy woodpecker             | <i>Picoides pubescens</i>           |
| European starling            | <i>Sturnus vulgaris</i>             |
| Great horned owl             | <i>Bubo virginianus</i>             |
| Great-blue heron             | <i>Ardea herodias</i>               |
| Greater scaup                | <i>Aythya marila</i>                |
| Hairy woodpecker             | <i>Leuconotopicus villosus</i>      |
| Herring gull                 | <i>Larus argentatus</i>             |
| Hooded merganser             | <i>Lophodytes cucullatus</i>        |
| House finch                  | <i>Haemorhous mexicanus</i>         |
| House sparrow                | <i>Passer domesticus</i>            |
| Mallard duck                 | <i>Anas platyrhynchos</i>           |
| Mourning dove                | <i>Zenaida macroura</i>             |
| Mourning warbler             | <i>Geothlypis philadelphia</i>      |
| Northern cardinal            | <i>Cardinalis cardinalis</i>        |
| Northern pintail             | <i>Anas acuta</i>                   |

| Common Name              | Scientific Name              |
|--------------------------|------------------------------|
| Pileated woodpecker      | <i>Hylatomus pileatus</i>    |
| Red-bellied woodpecker   | <i>Melanerpes carolinus</i>  |
| Red-tailed hawk          | <i>Buteo jamaicensis</i>     |
| Ring-billed gull         | <i>Larus delawarensis</i>    |
| Ring-necked pheasant     | <i>Phasianus colchicus</i>   |
| Rock pigeon              | <i>Columba livia</i>         |
| Ruffed grouse            | <i>Bonasa umbellus</i>       |
| Saw-whet owl             | <i>Aegolius acadicus</i>     |
| Screech owl              | <i>Megascops asio</i>        |
| Snow bunting             | <i>Plectrophenax nivalis</i> |
| Snow goose               | <i>Chen caerulescens</i>     |
| Tufted titmouse          | <i>Baeolophus bicolor</i>    |
| Tundra swan              | <i>Cygnus columbianus</i>    |
| White-breasted nuthatch  | <i>Sitta carolinensis</i>    |
| White-winged scoter      | <i>Melanitta deglandi</i>    |
| Wild turkey              | <i>Meleagris gallopavo</i>   |
| Wood duck                | <i>Aix sponsa</i>            |
| Woodcock                 | <i>Scolopax minor</i>        |
| Yellow-bellied sapsucker | <i>Sphyrapicus varius</i>    |

Note: Table does not include Federally Listed Birds of Conservation Concern (shown in [Table 4.7.2-1](#)).

**Table D-3: Reptiles and Amphibians that May be Found in the Vicinity of the Project**

| Common Name               | Scientific Name                   |
|---------------------------|-----------------------------------|
| Spotted salamander        | <i>Ambystoma maculatum</i>        |
| Spring salamander         | <i>Gyrinophilus porphyriticus</i> |
| Four-toed salamander      | <i>Hemidactylium scutatum</i>     |
| Red-backed salamander     | <i>Plethodon cinereus</i>         |
| Two-lined salamander      | <i>Eurycea bislineata</i>         |
| Mountain dusky salamander | <i>Desmognathus ochrophaeus</i>   |
| Northern dusky salamander | <i>Desmognathus fuscus</i>        |
| Red-spotted newt          | <i>Notophthalmus viridescens</i>  |
| Mud puppy                 | <i>Necturus maculosus</i>         |
| American toad             | <i>Anaxyrus americanus</i>        |
| Spring peeper             | <i>Hyla crucifer</i>              |
| Gray tree frog            | <i>Hyla versicolor</i>            |
| American bullfrog         | <i>Lithobates catesbeiana</i>     |
| Green frog                | <i>Lithobates clamitans</i>       |
| Mink frog                 | <i>Lithobates septentrionalis</i> |
| Wood frog                 | <i>Lithobates sylvatica</i>       |
| Leopard frog              | <i>Lithobates pipiens</i>         |
| Pickerel frog             | <i>Lithobates palustris</i>       |
| Common snapping turtle    | <i>Chelydra serpentina</i>        |
| Painted turtle            | <i>Chrysemys picta</i>            |
| Five-lined skink          | <i>Eumeces fasciatus</i>          |
| Eastern racer             | <i>Coluber constrictor</i>        |
| Ringneck snake            | <i>Diadophis punctatus</i>        |
| Milk snake                | <i>Lampropeltis triangulum</i>    |
| Northern water snake      | <i>Nerodia sipedon</i>            |
| Smooth green snake        | <i>Opheodrys vernalis</i>         |
| Brown snake               | <i>Storeria dekayi</i>            |
| Red-bellied snake         | <i>Storeria occipitomaculata</i>  |
| Eastern ribbon snake      | <i>Thamnophis sauritus</i>        |
| Common garter snake       | <i>Thamnophis sirtalis</i>        |
| Timber rattlesnake        | <i>Crotalus horridus</i>          |

Source: [Saunders, 1989](#)