Migrant Flows in Libya: Demographic Information, Social Media Research, & GIS Mapping

James Madison College, Michigan State University

The Human Rights Data Science Lab

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Introduction

The James Madison College Human Rights Data Science Lab produced a three-part research project investigating migrant trafficking and smuggling networks in Libya from 2015 to 2019. The project included: a demographic information database and event timeline database, social media mining to identify smuggling vehicles, and route identification and visualization using Google Earth Pro and ArcGIS. All information used to compile this report is drawn from documents previously submitted to the International Criminal Court's Libya team, and cited at the end of this report, including: the Libya Migrant Flow Demographic Annual Database and Aggregate Database, the Libya Migrant Flow Annual Event Timeline and Aggregate Event Timeline, the Libya Migrant Stock and Fluctuation Charts, the FMP Coordinates Spreadsheet, the IOM DTM Libya Methodology Report, the Social Media Findings Database, the ArcGIS StoryMap of locations of interest, an interactive graph plotting the IOM's migrant stock data from 2016-2019 alongside major timeline events, and the Google Slideshow Presentation of findings from last semester.

Section 1: Demographic Data & Timeline Events in Libya (2015-2019)

I. Research Methodology & Data Collection

A. Research Focus

The lab's primary task was collecting monthly migrant-stock estimates and demographic data for Libya from 2015 to 2019. This work was guided by four key research questions: How did migrant demographics, such as gender, age, and nationality shift across this time period? Which routes and transit hubs were used most in each year, and how did they change over time? What types of political,

security, and humanitarian events were most frequently recorded, and when did they occur? And how did those events correspond to increases or decreases in migrant stock data?

B. Data Collection

The primary data source used for this section of the project was the International Organization for Migration (IOM), drawn from their Displacement Tracking Matrix (DTM) reports, datasets, and baseline assessments, using both their Mobility Tracking and Flow Monitoring data. The IOM's DTM reports are organized in rounds covering specified reporting periods with each round numbered sequentially and identified in the corresponding dataset. However, reporting intervals were not always consistent, with early rounds in 2016 covering very irregular multi-month spans. The lab organized this information into two formats: Annual, broken down by year, and Aggregate, combining all years together. Alongside the demographic database, the lab also collected major event data from 2015-2019 from institutional sources such as the United Nations High Commissioner for Refugees and Frontex, as well as from news outlets including Al Jazeera, Reuters, and local Libyan news sources.

II. Introduction to the IOM Displacement Tracking Matrix Survey Methodology (DTM)

The lab relied on the IOM's Survey Methodology Report, which detailed the Flow Monitoring Point (FMP) structure, the Baseline Assessment and Profile Survey tools, the frequency of data collection, and the limitations of the methodology. The lab used this report to interpret and contextualize the demographic data collected. The lab also recorded the geographic coordinates of the individual FMPs across several reporting periods from 2017-2019 to track how the FMPs moved geographically, and also how the coverage expanded over time.

The Displacement Tracking Matrix (DTM) is a suite of tools developed by the International Organization for Migration (IOM) to track and monitor vulnerable populations. In Libya, DTM operates through two components: Flow Monitoring (FM) and Mobility Tracking (MT). The IOM established the DTM program in Libya in October 2015, launched its first Mobility Tracking round in January 2016 (spanning observations from mid-November to mid-December 2015), and began Flow Monitoring assessments by July 2016.

Flow Monitoring used direct observation and key informant interviews at designated Flow Monitoring Points (FMPs). Two survey tools are used at each FMP. The first is the Baseline Assessment, which records migrant presence, arrivals, and departures at a specific point. The second is the Profile Survey, which was conducted periodically at monitoring points, and captures demographic information such as age, sex, nationality, education, motivation for migration, and the route taken.

At the end of 2017, IOM revised its methodology in three distinct ways. It expanded its Key Informant network from approximately 1,258 to over 1,426 informants, it added double-verification of all collected data, and it broadened its coverage of Flow Monitoring Points across Libya. This revision coincides with an increase of reported migrant stock between Round 15 (October-November 2017) and Round 16 (December 2017). The increase in migrant stock could possibly reflect improved counting methods and broader geographic coverage rather than a genuine spike in new migrant arrivals.

III. Displacement Tracking Matrix Flow Monitoring Points (FMPs)

As of 2017, the IOM operated 56 enumerators across 141 Flow Monitoring Points (FMPs) throughout Libya. Data were collected at FMPs for five hours a day, five days a week. FMPs were concentrated in major urban centers, including Tripoli, Misrata, and Sebha. Enumerators were stationed

in urban gathering points such as markets, bus stations, mosques, and parks rather than at the borders themselves. This placement reflects a key limitation of the methodology: a high percentage of migrants entered Libya through unofficial border crossings, and those held by smugglers in private properties (referred to as "Mobile & Invisible" migrants) are very difficult to count. Because of this, the data primarily reflects "Mobile & Visible" migrant populations rather than the full migrant population in Libya.

FMP coverage expanded significantly over the period the lab studied (2015-2019). In 2015, none of the FMPs were operational yet. Because of this, the first four rounds of the IOM's DTM reports Round 1 (observations spanning mid-November to mid-December 2015), Round 2 (observations spanning January to February 2016), Round 3 (observations spanning March to April 2016), and Round 4 (observations spanning May to June 2016) used Mobility Tracking to identify 28 to 55 migrant transit areas. These were areas where migrants were observed or reported to be passing through, not formal Flow Monitoring Points. Flow Monitoring began in July 2016. In 2017, the coverage of FMPs grew substantially, reaching 141 FMPs across 22 regions in Libya, supported by 56 enumerators. This level of coverage was maintained and strengthened into 2018 when the methodology was expanded even further to include double verification of data and a broader Key Informant Network. This continued through 2019 with FMP coverage active in all 22 regions.

The lab recorded the specific coordinates of the FMPs in the FMP Coordinates Spreadsheet for several recording periods from 2017-2019. The FMPs are also visualized across three layers of the ArcGIS Story Map which is discussed further in Section 3 of this report. The FMPs show changes in both location and distribution from 2017 to 2019, which may reflect shifts in which transit hubs and migration routes were most used during those years.

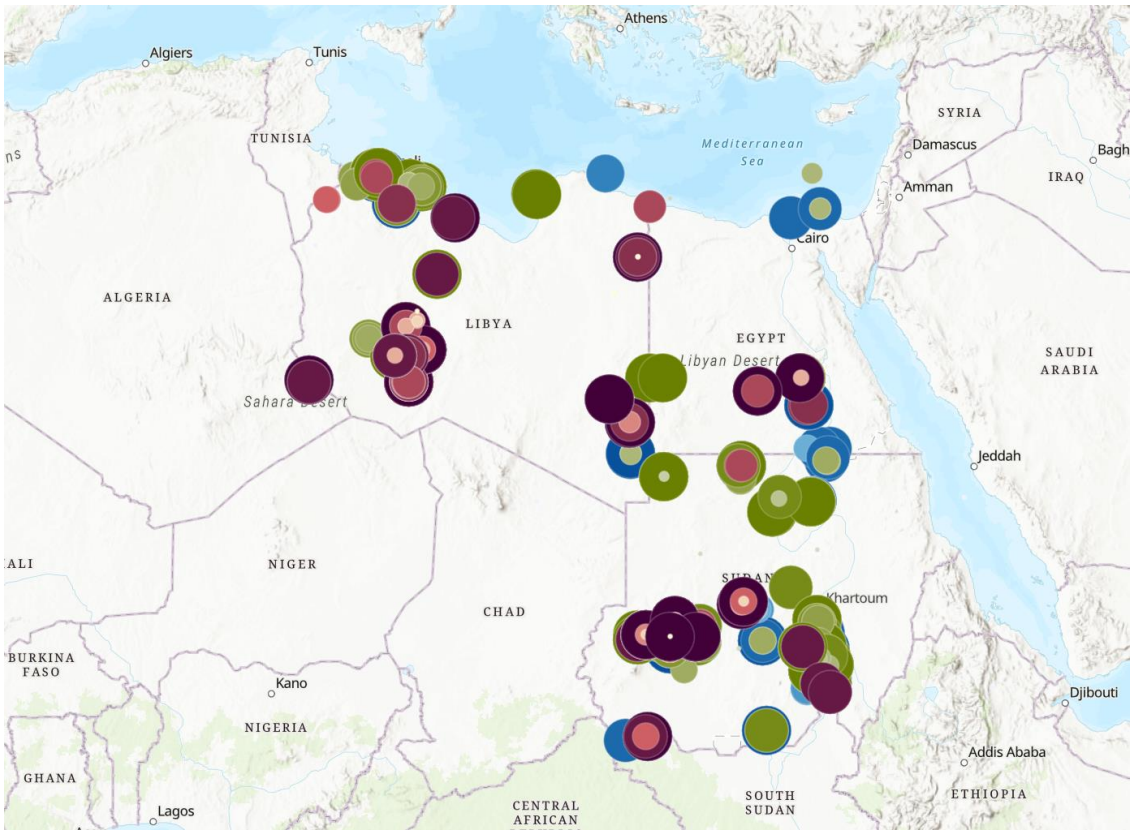


Figure 1: Heat Map of FMP Locations 2017-2019 (ArcGIS StoryMap)

IV. Demographic Data Trends

The demographic database the lab assembled was compiled from IOM DTM monthly reports spanning 2016-2019, and separate sources for 2015. The database is organized into an Annual Demographic Database broken down by year and an Aggregate Demographic Database combining all years for trend analysis. It is important to note that 2015 could not be tracked using the same IOM DTM data because the FMPs were not yet operational in Libya and no comparable DTM baseline exists for that year. Instead, 2015 figures were compiled from open-source institutional reports, primarily drawing on the United Nations High Commissioner for Refugees (UNHCR) and Frontex press releases and updates which tracked migrant departures from Libya across the Mediterranean toward Europe rather than migrant stock or arrivals within Libya itself. As a result, 2015 data reflects a different measure and

should be treated as contextual background rather than as a directly comparable data point alongside the 2016-2019 IOM data. For available reporting rounds for 2016 forward, the lab was able to use the IOM DTM reports, including the Mobility Tracking and Flow Monitoring, to collect data on migrant stock, observed arrivals, stock fluctuation, nationality breakdown, departure countries, gender distribution, primary motivation for migration, entry mode, and routes taken (where applicable).

Across the full 2016-2019 period, gender distribution ranged from 75% to 95% male, with the lowest share recorded in January 2016 and the highest in July 2016. The data stabilized around 87%-91% male by 2018-2019. The age distribution of migrants remained fairly consistent throughout the studied period. Adults made up between 89% to 98% of the migrant population. Minors peaked at 11% in January 2016, and dropped to a low of 2% in July-August of 2016. For 2018 and 2019, the data records only an adult percentage, which stayed between 90%-93%, rather than providing a separate minor breakdown, but this is consistent with the non-adult share remaining in a similar low range.

Niger, Egypt, Chad, Sudan, and Nigeria were among the most frequently recorded nationalities from 2016-2019; however, the individual shares of each nationality varied from month to month of the studied period. Niger's share ranged from 16% to a high of 33%, Egypt from 14% to 21%, Chad from 9% to 16%, Sudan from 8% to 12%, and Nigeria from 6% to 10%. Combined, these five nationalities accounted for between 61% and 71% of all migrants recorded in a given month. In some reporting rounds, regional origin was also tracked. Regional origin was only tracked consistently starting in 2018, with Sub-Saharan Africans making up 62%-66% of total migrant stock and North Africans making up 28%-30%, with a small remaining share from Asia and the Middle East.

For the months that motivation for migration was recorded, economic opportunity was the most frequently cited motivation. This was most prevalent in 2017. Security and violence-related motivations

appeared intermittently as early as 2016, recorded alongside economic factors in several months, and became more prominent starting in early 2018. Security Deterioration appeared as a main motivation in November-December of 2018 as well.

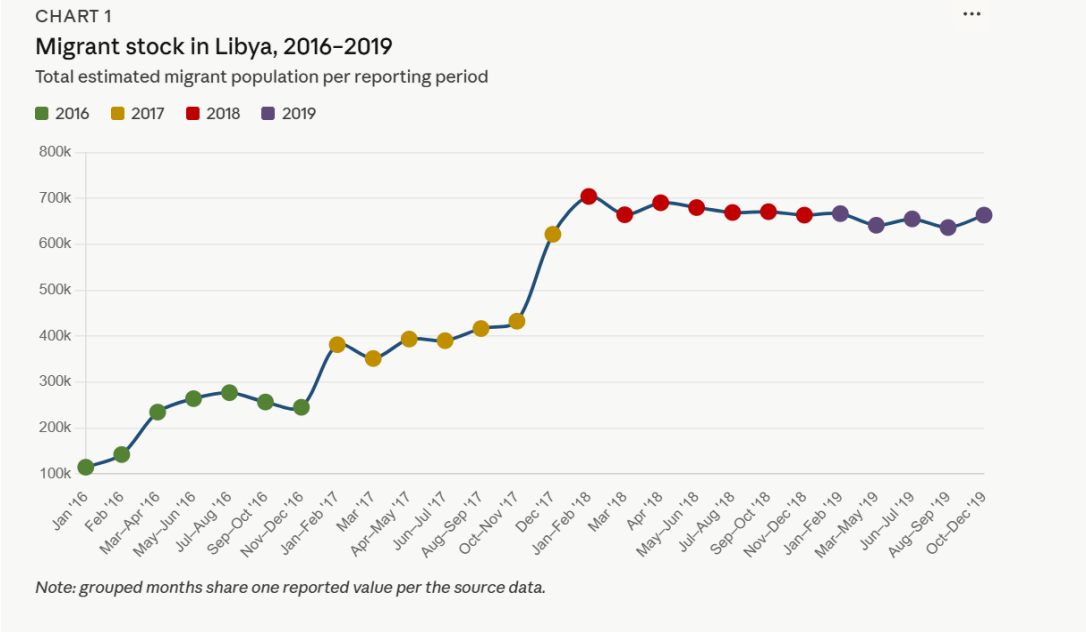
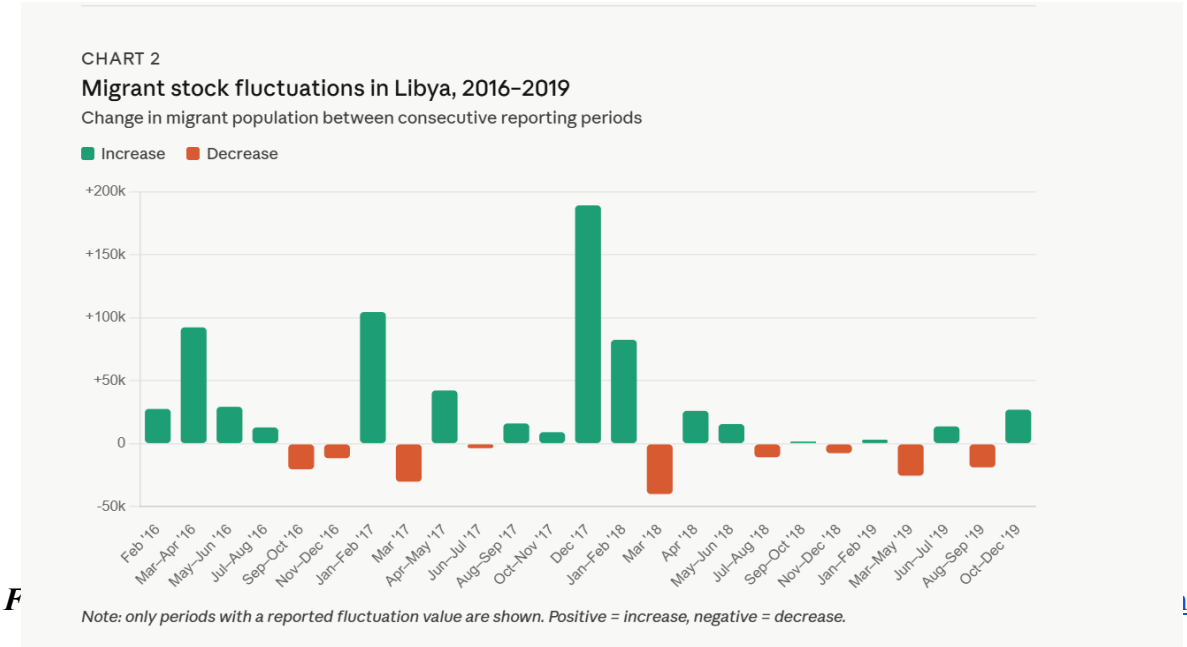


Figure 2: Migrant Stock Data 2016-2019 (Libya Migrant Stock and Fluctuation Charts)



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V. Identified Key Routes & Locations

Land was the dominant entry mode into Libya throughout the studied period, while sea was recorded primarily for onward movement to Europe via the Central Mediterranean route. April through November were the main months for migration into Europe.

The most frequently mentioned route shifted from year to year in the period studied. In 2015, the primary documented route ran from Niger through Agadez toward Oubari and Ghat, alongside the Central Mediterranean route used for onward movement to Europe. In 2016, routes documented from July onward included Egypt to Libya via Al Jaghbub in eastern Libya, and Niger to Libya via Sebha. In 2017, the main routes were Niger through Sebha to Tripoli, and Egypt through Tobruk to Tripoli. In 2018, the main routes were Nigeria through Niger to Libya, and Mali through Algeria to Libya. In 2019, routes centered on Niger and Nigeria to Libya, and Egypt to Libya. The level of specificity also changed over the study period. The IOM's 2016-2017 reports generally named specific cities along migration routes, while its 2018-2019 routes shifted to reporting transit countries only in certain months, with percentages of migrants using each route, rather than naming specific cities within Libya.

Several regions and cities stood out as key locations throughout the period. Tripoli was the primary destination on both the Niger-Sebha-Tripoli and Egypt-Tobruk-Tripoli routes, and consistently hosted the largest migrant population in Libya, reaching 23% of all migrants by May of 2018. Misrata was regularly one of the top three cities for migrant populations starting in April 2017, and was joined by Ajdabiya in that top group during 2018. By the end of 2019, Misrata was replaced by Murzuq in the top three. By December 2019, Tripoli, Murzuq and Ajdabiya hosted the largest concentrations of migrants. Sebha also came up as a major transit hub nearly every year in the data. Bani Walid appeared as an important stop on the route between Sebha and Tripoli, and the number of people grew sharply as

fighting escalated near Tripoli, reaching about 4,450 displaced people by June 2019. It is worth noting that Bani Walid appeared less frequently on the IOM DTM reports, datasets, and baseline assessments than the lab expected, which may reflect a high proportion of "Mobile & Invisible" migrants in the area who are undercounted by the DTM's methodology. Al Kufra was documented as an entry point for the eastern desert route in 2017, 2018, and 2019, with recorded arrivals from Sudan, Chad, and Somalia; it did not appear in the 2016 data at all. Kassala was identified as a key migration hub where people crossing from Eritrea or Ethiopia initially arrive en route to Libya (UNHCR, 2021).

VI. Event Timeline

Alongside the demographic database, the lab constructed two parallel event timeline databases tracking political, security, humanitarian, and logistical events that may have influenced migrant flows into and within Libya from 2015 to 2019. One is an Annual Event Timeline, broken down by year. The other is an Aggregate Event Timeline, combining all years into a single timeline and sorting each event into a specific category. Events were drawn from institutional resources such as the United Nations High Commissioner for Refugees and Frontex, as well as news coverage and press sources including Reuters, Al Jazeera and local news outlets. The lab also utilized the IOM's event-tracking monthly reports where they were available as well.

For each event, the lab recorded the year and month, a description of the event, a source link, whether the event was internal or external to Libya, and the event type. Events were coded into nine categories: Civil War/Armed Clashes, Security Deterioration, Political/Governance, Migration Enforcement, Opportunity/Labor Opportunity, Transit/Route Movement, Environmental/Weather Shock, Humanitarian/Basic Needs, and Human Trafficking/Smuggling.

VII. Correlation: Event Timeline & Migrant Stock Fluctuations

The lab produced an interactive graph plotting the IOM's migrant stock data from 2016-2019 alongside major timeline events, demonstrating which notable peaks and troughs aligned with different events occurring in the region during that time. Artificial intelligence was used to produce the visual, but the information was manually inputted by researchers in the lab, and all information is recorded in the lab's demographic and timeline event databases in Excel.

Several notable increases appear in the migrant stock data. From February to April of 2016, stock rose sharply. This increase coincided with the IOM's first expansion in Mobility Tracking geographic coverage in that round of data collection, meaning the increase may reflect improved counting rather than a genuine rise in arrivals. In October 2017, an IOM event-tracking report also recorded an increase of about 6,000 migrants at Alhamra Detention Center in Gharyn. The largest single jump in the dataset was from the October-November 2017 estimate to December 2017 estimate, which coincided with the aforementioned major IOM methodology revision, in which the IOM expanded to a larger key informant network, double-verification of data, and broader geographic coverage. A more modest increase appeared in September and October 2019, which coincided with when arrivals through Emsaed near the Egyptian border were recorded at 60 to 85 migrants per day, motivated by migrants seeking work opportunities or using the crossing point for onward travel according to the IOM's field notes for Rounds 27 and 28.

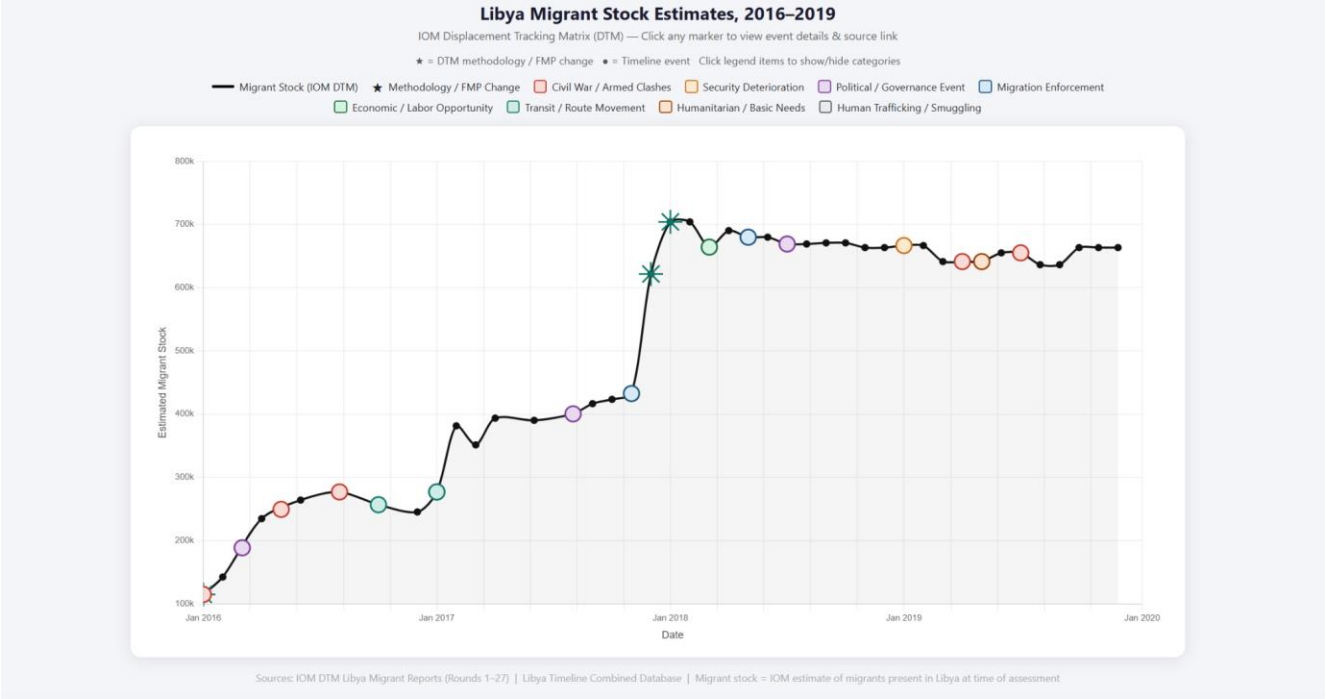


Figure 4: Migrant stock data from 2016-2019 alongside major timeline events (interactive graph)

Notable decreases also appear in the migrant stock data. Between August and October of 2016, stock fell by over 20,000 overall. This could be impacted by this being the peak season of departures from Libya across the Mediterranean toward Europe, which reduces the in-country total the DTM would record, as reflected in the IOM's Round 2 report. In March of 2018, stock data fell drastically, coinciding with armed clashes near Sebha that displaced over 700 households according to the IOM's Round 18 report. This same report notes that harsh dust storms in late March affected migrant travel more broadly as well. In March of 2019, stock also fell sharply. The IOM's Round 25 report ties this to security force operations in Algatroun and Murzuq, and to the closure of gold mines along the Niger and Chad border, which had been a driver of labor migration into this area.

VIII. Major Findings

Sustained patterns of abuse in human trafficking and detention center conditions

A. The conditions of detention centers and human trafficking only worsened as the reporting period went on, showing a sustained and escalating pattern of abuse. In October 2017, detention centers reported being over capacity by 10,500. The following month, it was discovered that 5,500 migrants were held in a farm and warehouse west of Tripoli. Mass escape attempts were noted and confirmed by the IOM, with the earliest included in the reports being the May 2018 incident in Bani Walid. As violence worsened in Southern Tripoli throughout 2019, facilities near conflict zones tracked the rising number of detainees, going from 3,300 in May, 5,545 in June, and then decreasing to 4,475 by November. Together, these events display continuity of a worsening detention system from at least late 2017 through the end of 2019.

2019 Tripoli conflict and large-scale migrant displacement

A. The 2019 conflict in Tripoli was a defining event in this period. The DTM recorded between 18,250-24,350 displaced people in the first two weeks of conflict in April alone. Displacement continued at a rapid pace, reaching 50,500 by May, 93,925 by June, and 140,133 by November. As a result, primary migrant routes redirected away from Tripoli toward Misrata and coastal areas.

Civil war and armed clashes as a recurring event type

A. Civil war and armed clashes recur throughout the dataset as the most frequent event type. Individual instances of violence are well documented such as the 2018 clashes in Tarhuna, Sebha, and Southern Tripoli and correspond to movements in the stock data.

Documentation of casualties during smuggling operations

A. On February 14th 2018, a truck carrying 180 migrants crashed along the As Saddadah-Bani Walid-Tarhuna corridor, killing 19 and injuring 49 more. During the same month, 375 migrants were rescued near Tripoli with 34 bodies recovered.

Dramatic growth in migrant stock figures amid poor data quality

A. Reported migrant stock increased substantially across rounds, but the figures are not fully comparable. DTM reports from January through June 2016 (Rounds 1-4) relied on Mobility Tracking. Flow Monitoring through FMPs began in July 2016. After that, the DTM used both components. Reporting intervals varied across the study period; some reports were monthly, others covered two months, and some months had no reports in the series. The difference in method and timing makes direct comparison across rounds difficult. Large increases in migrant stock could reflect the IOM's own methodology changes, in which they broadened geographic coverage, added double verification of data, and expanded its Key Informant network in 2017.

The retaking of Sirte from ISIS and changes in migrant stock

A. The retaking of Sirte from ISIS in December 2016 coincided with a dramatic increase in stock data. Migrant stock rose from 245,242 in December 2016 to 381,463 in February 2017. Between February and March 2017, the IOM's Round 9 IDP report notes that the number of returnees to Sirte rose from 2,550 to 37,850.

External migration enforcement and decline in February-March 2018 stock data

A. External migration enforcement is only partly attributed as a driver of the February-March 2018 stock decline. Clashes in the Sebha region are noted as a contributing factor in Round 18. Migration enforcement outside Libyan borders may have had effects on stock data as well, with

Niger criminalizing smuggling in 2015, the EU's Operation Sophia (2015 onward), Algeria's expulsion of migrants into the Sahara, and tightened control around Agadez in early 2018 are all events that coincide with reduced migrant inflow. Particularly, the February-March 2018 stock decrease coincided very closely with the Agadez crackdown and Sebha clashes.

Consistent migrant demographic patterns from 2016 onward

A. Adults made up at least 89% of the recorded migrant population across the reporting period. The male share ranged from 75% to 95% across the reporting period, and stabilized at 87%-91% in 2018-2019. Niger, Egypt, Chad, Sudan, and Nigeria were the five most frequently recorded nationalities, together accounting for 61%-71% of migrants in a given month. From 2018 onward, Sub-Saharan Africans made up 62%-66% of recorded migrant stock, while North Africans made up 28%-30%.

April through November as peak migration months

A. Specifically for onward movement from Libya into Europe via the Mediterranean Sea, April through November are the peak migration months. This seasonal pattern is noted explicitly in the DTM Round 2 report and refers to maritime departures. Stock fluctuations inside Libya follow a less predictable trend, shaped more by conflict and enforcement actions than by season alone. However, aggregate migrant stock data from 2017 onwards displays a decline that begins near the end of March and into early April.

2015 cannot be compared to the 2016-2019 series

A. IOM reporting began January 2016, but this reflects Mobility Tracking, not Flow Monitoring. The IOM's FMPs did not become operational until July 2016. Figures from 2015 had to be

sourced from Frontex and UNHCR on Mediterranean departures rather than Libyan migrant stock. No reputable source could be found that included monthly stock data prior to 2016.

IX. Limitations of the Data

Coverage and consistency

A. While the IOM's DTM Mobility Tracking began in January 2016, the IOM FMPs were not operational until July 2016. 2015 data stems from open-source research, mainly from Frontex and the United Nations High Commissioner for Refugees. Migrant departures from Libya were the only data recorded rather than total estimated migrant stock. 2015 should be treated as contextual evidence and not part of the 2016-2019 series.

B. The IOM's DTM reports varied throughout the study period in information provided, the formats used, the periods covered, and the frequency of observation and publication. The lab compiled the most comparable information available, using the Mobility Tracking for migrant-stock estimates and Flow Monitoring data when available.

Methodology changes impact comparability across reporting rounds

A. During 2017, the IOM expanded Flow Monitoring Coverage and updated its Mobility Tracking methodology, including procedures for verifying area-level estimates. Migrant-stock estimates increased between Rounds 16 and 17, coinciding with these methodological changes. The reports do not establish whether the increase reflected improved counting, population, movement, or both, but the increase in migrant stock between Rounds 16 and 17 may reflect better counting methods rather than a spike in arrivals.

Undercounting of detained and other hidden populations

A. FMPs largely lie within urban gathering points rather than borders and detention sites; migrants held on private properties or smuggler-controlled facilities are undercounted. This is crucial in relation to abuse findings as major data points relating to migrant detentions surfaced from separate reporting rather than routine monitoring. In the first week of October 2017, detention facilities south of Tripoli reported being over capacity by 4,500, with an additional 6,000 detainee increase at the same facility within the same week. On November 19, 2017, over 5,500 detained migrants were found within a farm and warehouse in Western Tripoli. With both events occurring 6 weeks apart, it suggests a large undocumented pattern of detentions during this period and that the true scale of informal detention is likely higher than the DTM data suggests.

Border entry vs. internal transit

A. Method of entry data shows most migrants entered through unofficial crossing points. FMPs are not positioned at borders so the data shows internal transit better than actual points of entry or volume data. IOM demographic data does not add any further information beyond land/water/air entry-mode and country of origin.

Regional conflict creating gaps in reportable data

A. During periods of active conflict, field reporters were unable to safely access assigned monitoring locations, leading to gaps in the data that coincide with the periods and regions that hold the highest threat to life against migrant populations.

Social media/OSINT limitations

A. Vehicle and smuggling network data drawn from X and Facebook hold standard open-source limitations. There is no complete way to confirm a post's date matches when the footage was actually taken.

Section 2: Social Media Research & Vehicle Identification

I. Research Methodology & Data Collection

A. Research Focus

The goal of this project was to identify common types of vehicles used in the transportation and smuggling of migrants into and out of Libya. There was an emphasis on evidence of large vehicle transports such as trucks and lorries, known to smuggle many migrants across borders and to the coast. The lab consolidated this information into a Social Media Database.

B. Data Collection

Data was collected using open source methods such as social media (primarily X and Facebook). Key words related to the issue at hand were used in X and Facebook to collect images and videos of vehicles used in smuggling migrants, all of which can be found in the Social Media Findings Database. On Facebook, the lab began by inputting key words pertaining to Libyan migrant smuggling and large transport trucks. Searches included, in English, and occasionally Arabic, key phrases such as: *"Libyan migrants," "Migrant smuggling Libya," "Libyan migrant Trucks," "Libyan Migrant Route," "Libya truck route," "Libya to Europe safe travel," "Libya to Europe transport"* as well as important locations, noted above, followed by key words such as *Migrant, Truck,* or *Smuggling.* Searches were then filtered by date, specifically the dates in question, using the filter search feature. Resulting information was individually considered for relevancy. If a post was both relevant to the aforementioned research question and provided new information, the post would be submitted via a Google form, where the post's link, location, type of vehicle, date, and a screenshot of visual elements were cataloged into an associated Google Sheet. The same process was followed when conducting research on X. X's filter search feature differs slightly in that it allows searches to be filtered by a range of years, as opposed to a

single year, thus the lab utilized this feature, setting search parameters to posts between 2015-2019 to sort through relevant posts.

The lab also conducted brief searches on Libya used car sites to gather information about commonly used models of cargo trucks, semi trucks, pickup trucks, and sedans, in order to cross-reference vehicles identified in social media posts against vehicles known to be in circulation in Libya.

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<td>
Twitter - Dec 13, 2018; Toyota Land cruisers 70; armored</td>
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Twitter - Dec 7, 2019; White sedan (Toyota corolla)</td>
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<td>
Twitter - Dec 15, 2019; Right - Toyota Land Cruiser; Left - sedan (Toyota Corolla, Hyundai Elantra)</td>
<td>
Twitter and Facebook - Feb 14 & 15, 2018; Multiple posts about the same truck crash; Large cargo truck, possibly from the brand Iveco</td>
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Twitter - July 16 and 17, 2018; 8 migrants including 6 children found dead. 90 others found; Refrigerated box truck (likely Iveco or Mercedes-Benz)



Facebook - April 3, 2017; 89 illegal immigrants of Ethiopian nationality; Renault long bed pickup truck.



Twitter - Sept 23, 2018; Migrant smuggling from Sudan and Chad to Libya; Heavy duty cargo trucks (Iveco Magirus, Mercedes-Benz SK series).



Twitter - October 23, 2019; 9 migrants apprehended in Kufra; Toyota Hilux Double cab.



Twitter and Facebook - October 29/30 2019; Different days, same content of post; 14 migrants from Egypt hidden under vegetables in heavy duty semi-truck (likely Iveco Stralis).



Facebook - March 1, 2016; Video warning migrants of the dangers of going to EU; Mercedes-Benz Actros.

II. Major Findings

Large flatbed trucks and refrigerated boxes on trucks were the most common large vehicles used in the smuggling of migrants. The use of refrigerated box trucks was especially relevant, as they can be locked on the outside and cannot be opened from the inside. Common makes of these trucks included Iveco, Mercedes Benz, and Renault. Mid-sized cars were used in the transport of smaller numbers of migrants, including primarily Toyota Land Cruisers or Hilux.

The lab identified certain incidents involving vehicles to gauge which types of vehicles were used in each region. In Misrata, long flatbed trucks (possibly Iveco or Kia), armoured Toyota Land Cruiser 70s, and sedans (Toyota Corolla, Hyundai Elantra) were identified in social media posts on X and Facebook from 2015, and 2018-2019. In Bani Walid, a large cargo truck, possibly an Iveco, was

identified in connection with a truck crash reported across multiple X and Facebook posts from February 2018. In Tripoli, a Mercedes-Benz Actros was identified in a 2016 video warning migrants of the dangers of traveling to the EU, a Renault long-bed pickup truck was identified in a 2017 post regarding 89 Ethiopian migrants, and an unidentified refrigerated box truck was identified in a 2017 post in which seven migrants were found dead. In Kufra, heavy-duty cargo trucks (Iveco Magirus, Mercedes-Benz SK series) were identified in a 2018 post describing migrant smuggling from Sudan and Chad, and a Toyota Hilux double cab was identified in a 2019 post about migrants apprehended in the area. In Sirte, a heavy duty semi-truck, likely an Iveco Stralis, was identified in a 2019 post describing 14 migrants from Egypt found hidden under vegetables in a truck. In Zuwara, a refrigerated box truck (likely Iveco or Mercedes-Benz) was identified in a 2018 post in which 8 migrants, including 6 children, were found dead, with 90 others found alive.

III. Limitations of the Data

As most of the data was collected through social media, there is always the possibility of the unreliability of these platforms and there is uncertainty regarding the credibility of those posting images and videos. Dates and times of the posts were recorded, yet there is no way to verify if the post date correlates closely with when the actual image was taken as footage can be re-shared or re-uploaded well after it was originally filmed. Some videos or images found were low resolution and thus made identifying makes and models of vehicles difficult. In several entries, the vehicle type could not be identified at all, or could only be narrowed to a general category (e.g. “large truck” or “various types of trucks”) rather than a specific make or model. Vehicle identification also relied on visual judgement by lab members, introducing the possibility that vehicles could have been misidentified. Location and

vehicle details were also inconsistently reported by original posters, and several posts collected by the lab did not include a specified location.

Section 3: Route Identification & Visualization: ArcGIS Story Map

I. Research Methodology & Data Collection

A. Research Focus

The objective of this project was to identify potential roads and tracks of migrant movement within Libya and from surrounding countries, as well as major smuggling hubs and cities, creating a visual representation of migrant movement and traffic in the region. The lab consolidated this information into an ArcGIS StoryMap.

B. Data Collection

Data was collected using open source methods to identify major smuggling hubs and known high-traffic areas where migrants were known to be traveling to or through, using the IOM Displacement Tracking Matrix (DTM) introduced in Section 1, Parts II and III to first gain an understanding of the possible major transit hubs and cities migrants might be traveling through. From there, Google Earth Pro and ArcGIS were utilized in the tracking of road networks to find tire tracks and map roads connecting these potential migrant routes.

II. Major Findings

Bani Walid, Tripoli, Misrata, Sebha, Benghazi, Al Kufra were all noted as major smuggling hubs/cities in Libya, with connecting road networks throughout the country and from surrounding countries. Major roads/tracks into Libya came from Sudan, Chad and Niger. The lab also mapped road

networks extending from major Libyan cities to the Sudanese border, and onward to cities such as Khartoum and El Fasher. Road network and tire tracks crossing the Niger border were connected to Libyan cities of Murzuq and Sebha, as well as the Salvador Pass in Northern Niger, a natural corridor at the border between Niger and Libya that has been historically used by smugglers. Several structures of interest were noted, such as airports or potential compounds, that were located along potential routes and could be used as potential staging areas/rest stops for migrant trafficking. An ArcGIS StoryMap was created that visualizes complete road findings throughout Libya and surrounding nations. ArcGIS was also used to note Flow Monitoring Points in the region from the IOM across several years, which did line up with the major hubs found and some of the networks between Libya and Sudan.

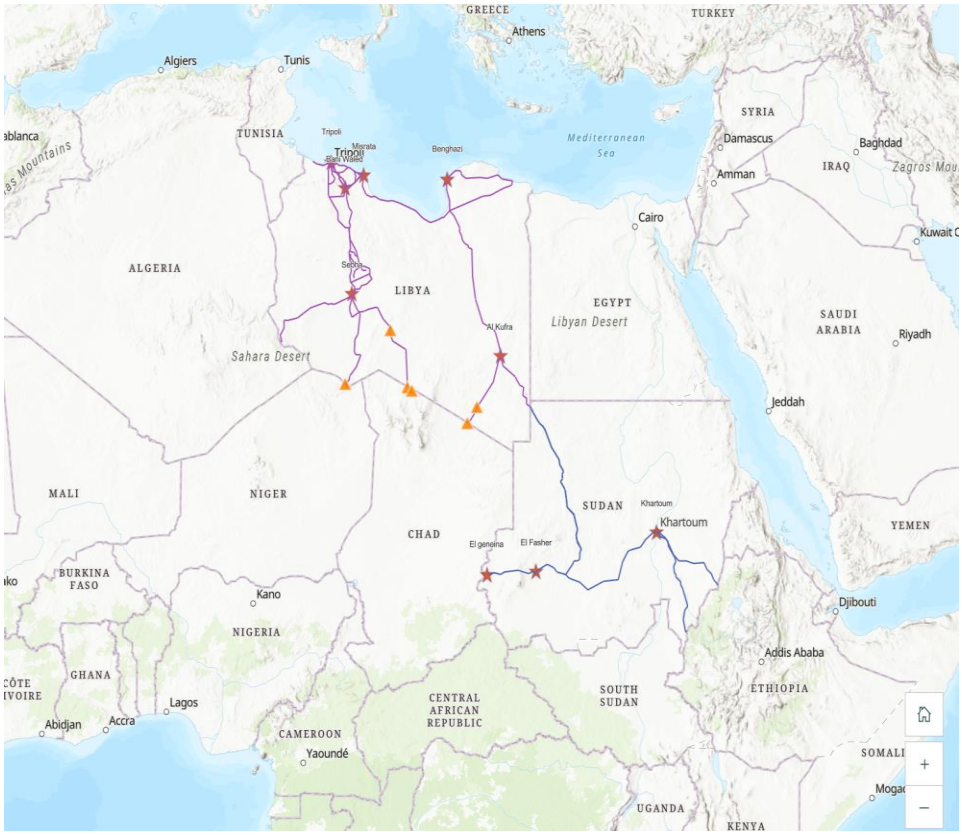


Figure 5: Route Mapping & Locations of Interest (ArcGIS StoryMap)

III. Limitations of the Data

Google Earth Pro coverage across large desert regions in Libya and Sudan was often very poor, thus working with a specific timeline created difficulties in tracking continuous networks. Tracking the networks was extremely time consuming and deeper routes into Niger and Chad could often not be established due to restricted lab time. Low resolution imaging also made it difficult to determine the nature of tracks in the desert, such as whether it was actually caused by trucks or cars transporting migrants, mining vehicles or just existing natural desert features.

Section 4: Room for Future Expansion: This Semester's Work

This semester, the lab is expanding on its previous work in four distinct areas: reconstructing the route from Eritrea to Bani Walid, identifying the source and purpose of Renault long-bed trucks, examining the impact of ISIS's control of eastern Libya on migration, and investigating the use of refrigerated and enclosed freight vehicles. For the routing, the lab is tracing the journey in three legs, from Eritrea to Sudan, Sudan to Southeastern Libya, and Southeastern Libya to Bani Walid, using Kassala as a starting point and identifying key intermediaries, transport modes, and transit locations along the way. To identify the long-bed trucks, the lab is tracing how specific Renault models move from the commercial vehicle economy into the illicit migration economy and identifying key individuals or companies involved in that trade. To examine the impact of ISIS's activity, the lab is comparing migration routes, volume, and conditions before, during, and after ISIS held control of regions of eastern Libya from 2015 to 2016. And to investigate the use of refrigerator trucks, the lab is looking at how often and where smugglers use refrigerated or enclosed trucks instead of pickups, or ordinary trucks to transport migrants.

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