Illegal Cheetah Trade 2010-2019 Analysis: Have Recent Regulatory Efforts Made a Difference?

Project Team: George Diabes, Christopher Grimes, Megan Martin
GitHub Repository Name: Project2_Diabes_Grimes_Martin

Introduction & Background

Cheetahs are a "keystone predator" native to large regions of Africa and the Middle East (mainly Iran). They are a social species and generally live a nomadic lifestyle in order to hunt enough prey to survive. Throughout the 20th century, cheetah populations have dramatically declined, primarily due to the illegal trade of live cheetah cubs and cheetah body parts (e.g. skin). This illegal trade is driven by the high demand for cheetahs as exotic pets in places like the Middle East and Asia[1]. Habitat loss and conflicts with humans as agriculture expands into their native hunting territories is also a significant factor contributing to the decline in cheetah populations. These factors have led to the reduction of the wild cheetah population from 100,000 in 1900 to less than 7,000 today.

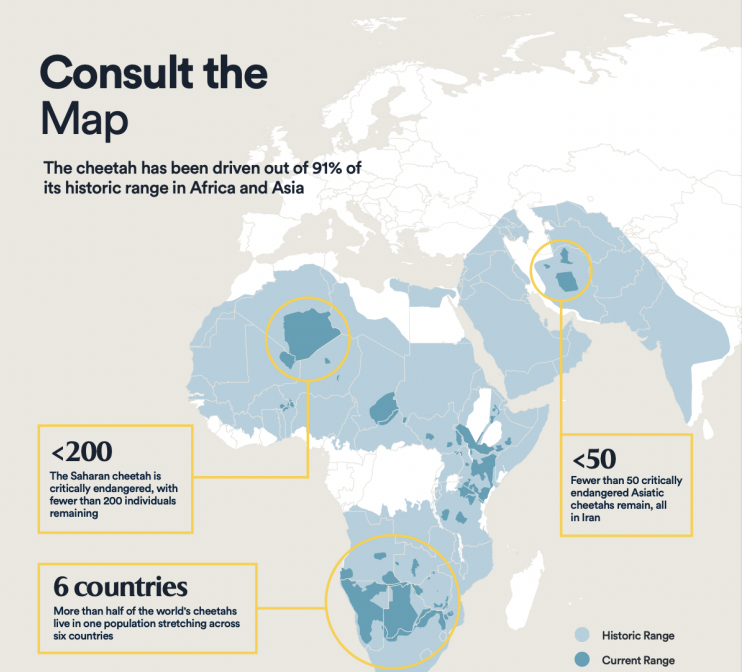


Image source:
https://www.panthera.org/cms/sites/default/files/Cheetah%20Infographic_Final_NewMaps_Panthera.pdf

Cooperation between countries is critical for success in conservation efforts, as trans-international protected areas are required due to the nomadic lifestyle of cheetahs (in particular, impacting females). As early as 1900, countries have begun to work together to try to prevent the illegal trade of cheetahs. Agreements such as the *African Convention on the Conservation of Nature and Natural Resources* (enacted in 2003 and revised in 2017) have various articles enacted to sustain threatened and endangered populations. Additionally, in 2016, the United Arab Emirates (UAE) enacted Federal Law No. 22/2016, which regulates the trade and private possession of exotic animals and enacts stiff penalties[2].

Despite these attempts to curtail the illegal cheetah trade via trade and conservation agreements from 1972 to the present day, the efficacy of such agreements remains unclear. It has proven exceedingly difficult to gain the support from enough nations for such treaties to be effective. For instance, only seven nations have ratified the most recent revision to the *African Convention*, which greatly limits the impact of such legislation when illegal activity can transpire in neighboring regions.

In 2021, the following comprehensive dataset was published in cooperation with the *Cheetah Conservation Fund* and several illegal wildlife trade experts: *Global dataset for seized and non-intercepted illegal cheetah trade (Acinonyx jubatus) 2010–2019*[3]*.* The dataset spans over 300 sources and across a ten-year time period; it is considered the most extensive dataset available with recent illegal cheetah trade activity. We used this dataset along with additional

supplemental information such as the cost of cheetahs to analyze the current state, assess how the problem has changed over time, and make recommendations for the future.

About the Data Source

The *global dataset for seized and non-intercepted illegal cheetah trade* represents 1,884 illegal trade incidents, involving more than 4,000 cheetahs or cheetah parts from over 56 countries from 2010-2019. The dataset consists of 34 variables, with the following being utilized in this analysis:

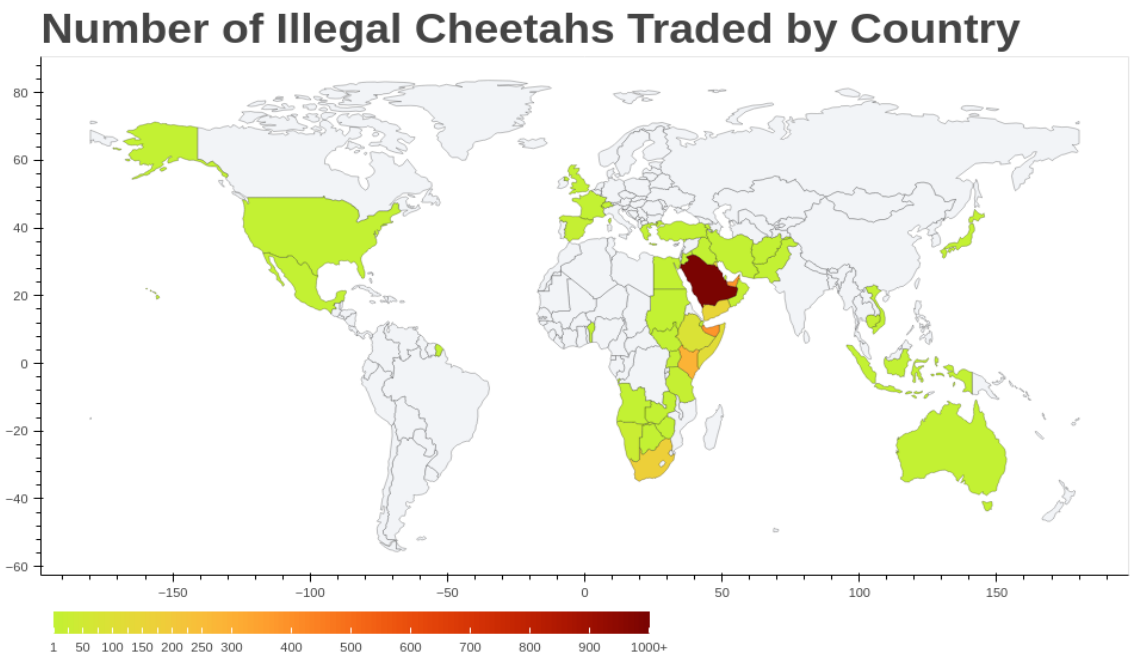
- Incident date: parsed to extract incident year
- Region incident occurred
- Country where incident occurred
- Incident grade (report grade): we filtered this dataset to only represent incident grades of highest credibility (A-D rating).
- Ultimate source type: A = official, B = Database, C= primary, D = Secondary, E = Seller
- Ultimate source reliability grade: rated by factors such as known or unknown source, direct experience with a source, timeliness of a report, and level details/evidence provided. We filtered this dataset to only represent incident grades of highest reliability (A-D rating).
- Incident description: a free-text semi-structured field with description of the incident, including price
- Number of cheetahs: quantity of cheetahs involved in each incident described

After filtering based on incident credibility and report reliability, a total of 1,165 incidents were utilized in this analysis. Several steps were taken to standardize the data entries including formatting of incident dates, converting any string entries in “# cheetahs” and “Price” columns into integers, and verifying range of dates included in the dataset.

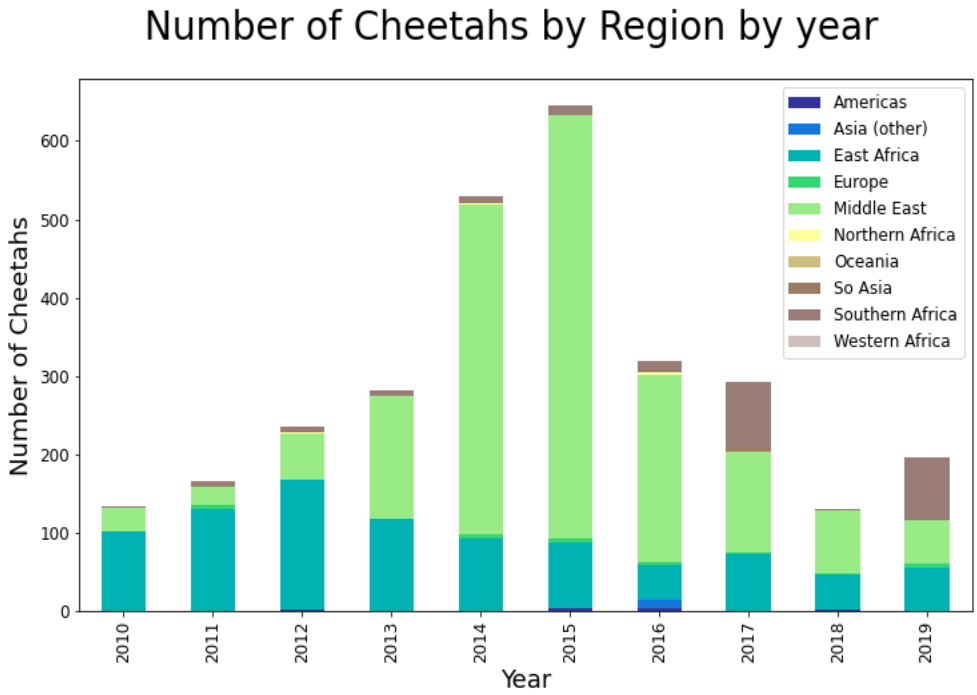
Current State & Initial Findings

Based on current knowledge from the field, cheetah trafficking is reported to occur most frequently in the Horn of Africa (Somali Peninsula). We created a geographic heatmap of the number of cheetahs involved in incidents from 2010-2019, which provides supporting evidence for concentration of illegal trade in the Horn of Africa and Middle east. The table below shows the top 5 countries involved in the reported incidents. Saudi Arabia represents the highest proportion of cheetahs and incidents in this dataset.

Country	Number of Cheetahs involved in Incidents
Saudi Arabia	1006
Somaliland	386
United Arab Emirates	386
Kenya	285
South Africa	175

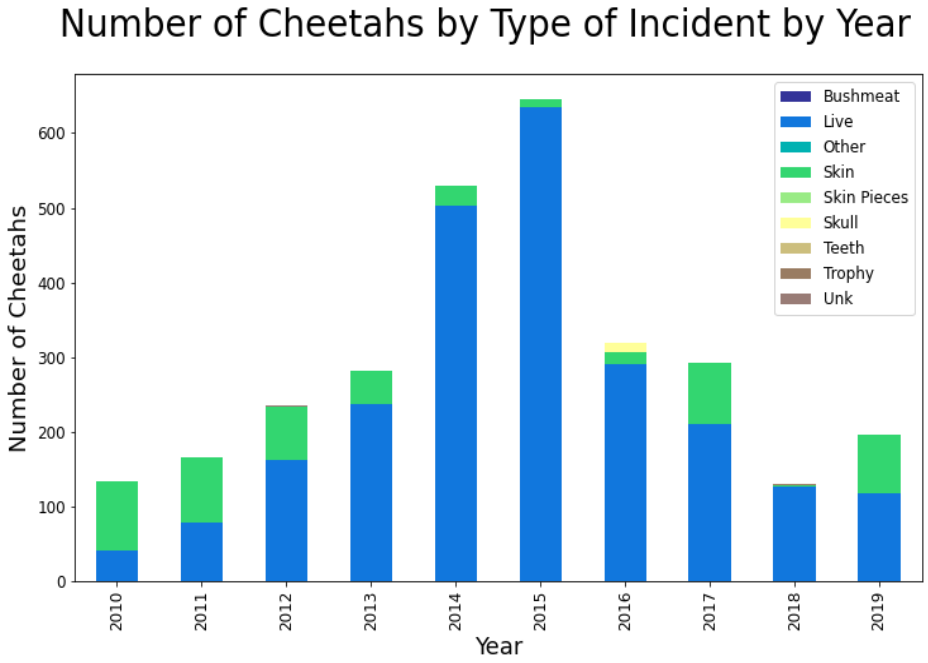


When looking at the data by year, we can see a clear trend in increasing illegal trade driven by increasing activity in the Middle East starting in 2013 with a substantial decrease in 2016 onwards.



Previous research into the type of incidents (cheetah parts vs. live animals) has indicated that trafficking of live animals is the primary type of illegal trade. This is also confirmed in our analysis with live cheetahs making up 90% of the incidents over the 9 years represented in the dataset. This aligns with the assumption that as demand in Middle East markets go up, we

should expect to see an increase in live cheetah incidents due to the high popularity of cheetahs as status symbol pets in this region.



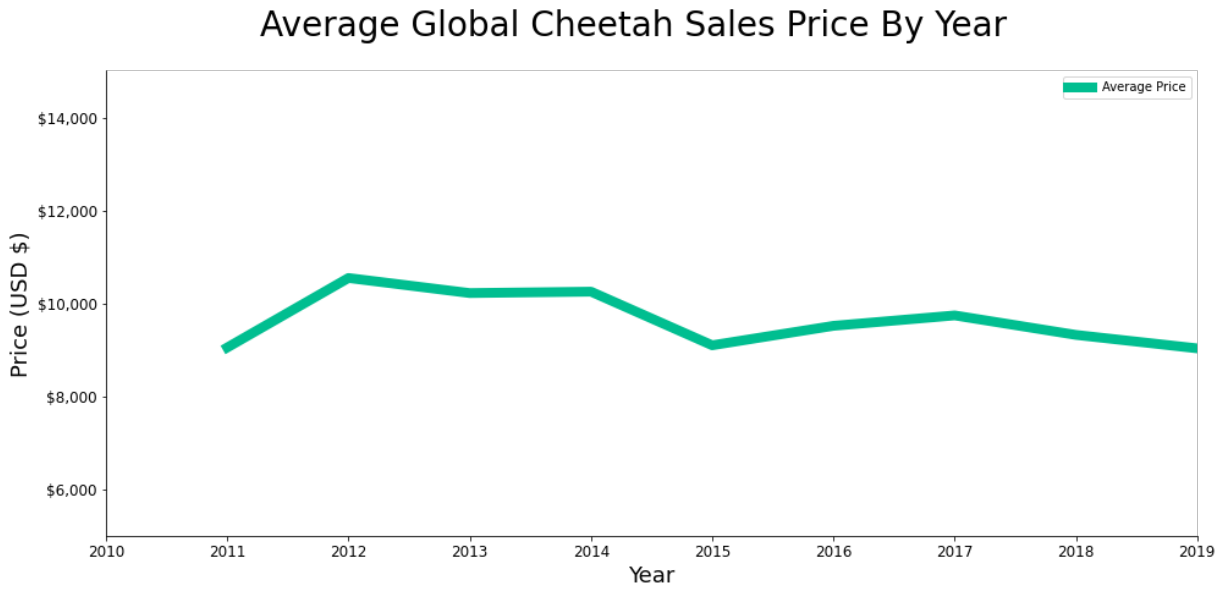
As discussed in the introduction, several conservation agreements and regulations went into effect in 2016/2017. At first glance of the dataset, it appears that these regulations were particularly effective in reducing the illegal trade activity in the middle east. While this suggests remarkable improvement, African nations containing the majority of wild cheetah populations claim that illegal cheetah trade is still a problem. So, were these conservation agreements and regulations effective? In order to answer this question, we analyzed this dataset for underlying signs of trade activity.

An Analysis of Supply & Demand's Impact on Cheetah Pricing

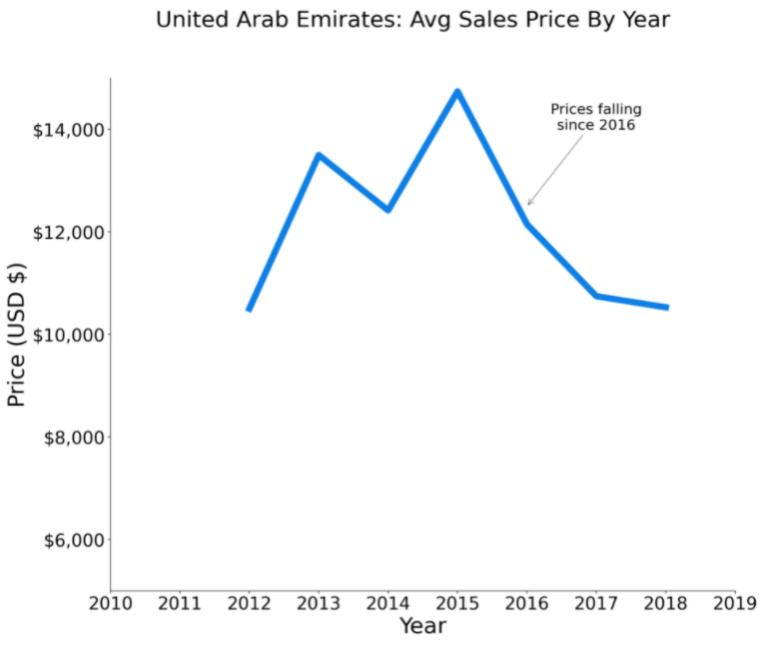
To understand whether cheetah trafficking had fundamentally changed between 2010 and 2019, we wanted to analyze how cheetah prices had changed during this period. If supply had been as substantially disrupted as our initial findings suggested, we would expect to see an increase in prices as cheetah became harder to get.

To answer this question, we needed a more sophisticated analysis of the data. Each trafficking incident contains an 'Incident Description' column that contains free-text supporting information like the age and sex of the cheetah as well as the price (in local currency). While every incident didn't contain price, we did observe it in over 30% of the data set and believe it to be enough incidents to draw some further insights from. Using regular expressions, we extracted the selling price and the currency.

While this produced some initial impressions, it was difficult to summarize the picture at a global level and it did not account for currency valuation changes that may have occurred over the 10 year period. To address this we incorporated an additional data set with historic exchange rates for each year and wrote a function to convert all prices to US dollars. The result changed the story about cheetah trafficking entirely.



Despite regulatory efforts and initial data that appeared to show a success in reducing cheetah trafficking, prices have remained stable over the past 10 years. This suggests that the trafficking problem hasn't fundamentally changed. This conclusion and our analysis of pricing is supported by experts who state that prices online typically range between $5,000 and $15,000 USD[1] and that data from their other sources indicates a high-level illegal trade has continued during this period despite implementation of regulatory actions[2].

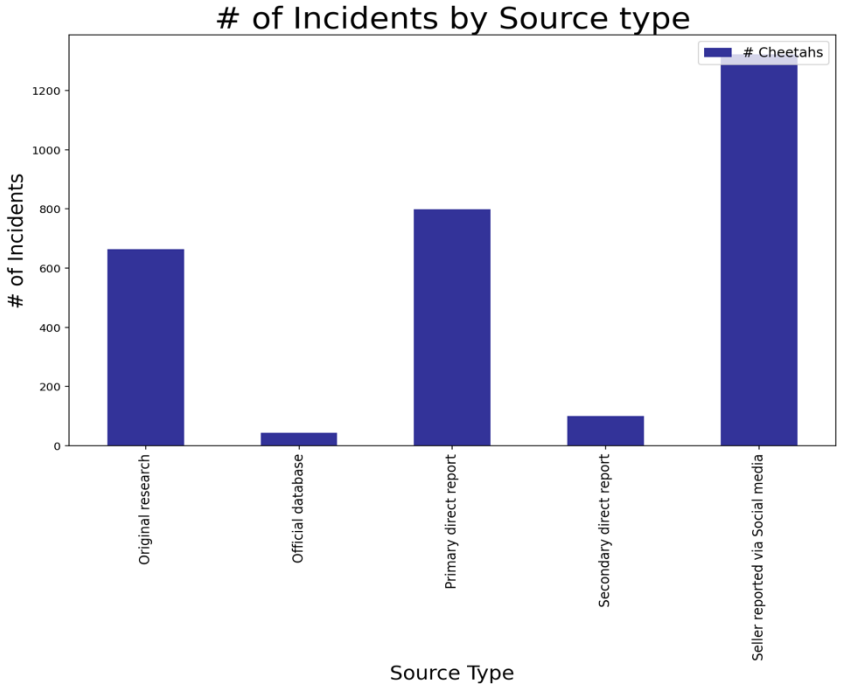


One exception is the United Arab Emirates (UAE) where we saw a notable change in prices beginning in 2016. This is the same year that new laws were introduced which include penalties of up to six months in prison and fines of $136,000[1]. While we can only speculate, we believe pricing for cheetahs has fallen since then because these laws have suppressed local demand within the country, without changing the availability of cheetahs from outside the country (resulting in a reduction in local cheetah prices).

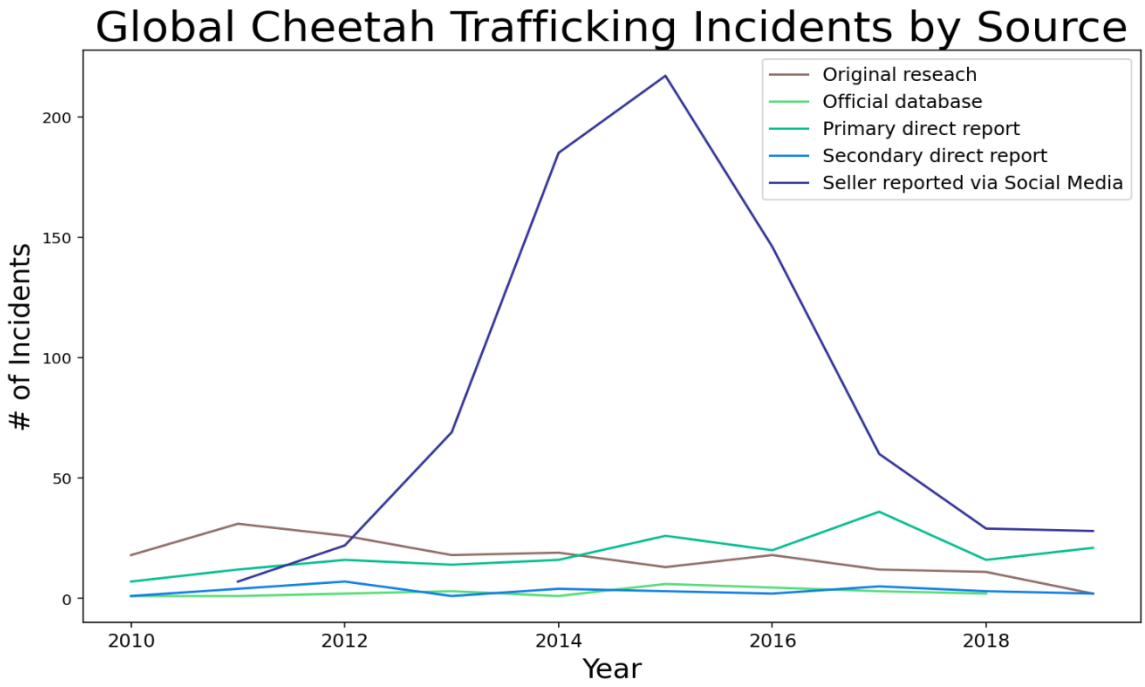
So, what explains our initial findings? Why did it appear that the trafficking problem increased between 2010-2015 and improved in recent years?

Analysis of Incident Sources and the Role of Social Media

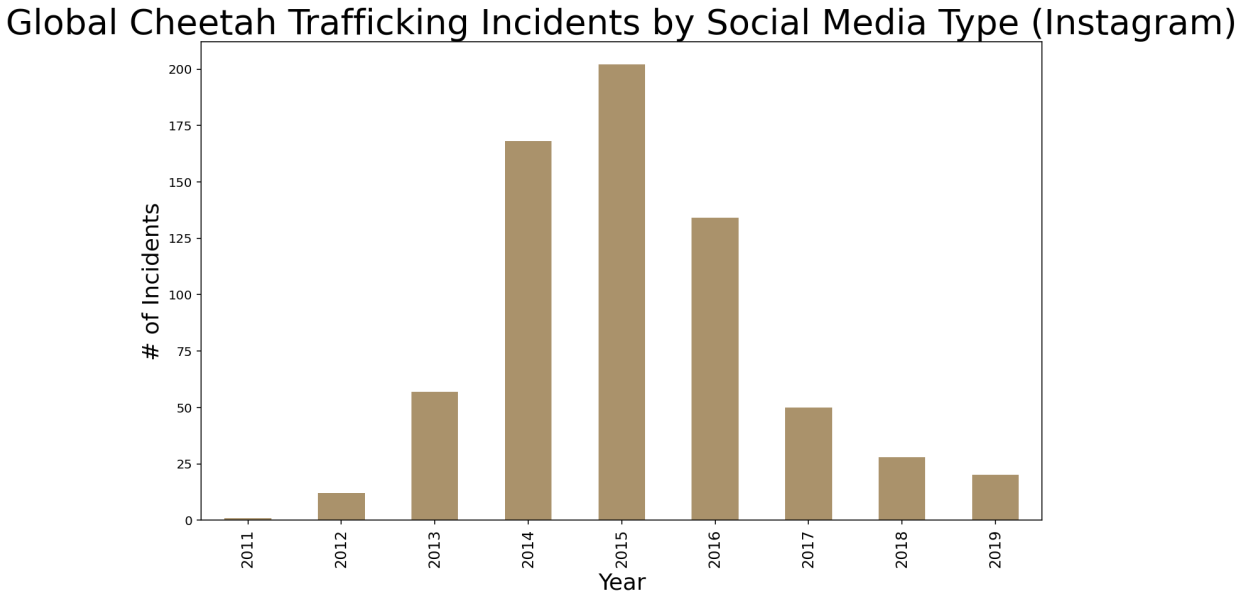
To understand the major trend changes observed in the initial dataset, an analysis was performed across the 5 incident source types, which include: (1) Original research, (2) Official databases, (3) Primary direct reports/sources, (4) Secondary direct reports/sources, and (5) Seller reports via Social Media. These 5 incident types all exhibited high levels of source reliability, which is defined as a known source or direct experience with a source. In addition, timeliness of a report and details/evidence must be provided about the event. The aim of this analysis was to better understand any underlying biases in the data which could help to better understand what is really happening and if the story presented that there is indeed a decline in illegal cheetah trade after 2015 is valid and likely to be true. The bar chart *# of Incidents by Source Type* demonstrates that the vast majority of the data is sourced from primary accounts such as original research and primary direct reports; however secondary sources such as social media (i.e. Instagram, Facebook, WhatsApp), were also a substantial contributor.



In addition to the frequency of each source type, a time-frequency analysis could uncover greater insights. The graph *Global Cheetah Trafficking Incidents by Source* demonstrates how these 5 sources have changed over time. The frequency of most sources remained very stable from 2010-19; however, the secondary source of social media experienced a steep increase from 2012-15 and a very swift decline from 2015-17. This insight indicates that the growth and decline in social media reports is the greatest factor impacting the rise and fall in incidents that is observed in the aggregate dataset.



Due to the impact social media reports play in this dataset, this variable was further probed to understand which social media sources were key in this rise and fall. Of the main sources analyzed, Instagram was the biggest and greatly drove the increase and decrease in frequency, as observed in the graph below *Global Cheetah Trafficking Incidents by Social Media Type (Instagram).*



We theorize that as social media use grew, it became a popular place for traffickers to advertise cheetahs and for owners to show off their pets on sites such as Instagram. However, due to widespread use of these platforms and increased regulations and public scrutiny, such posts

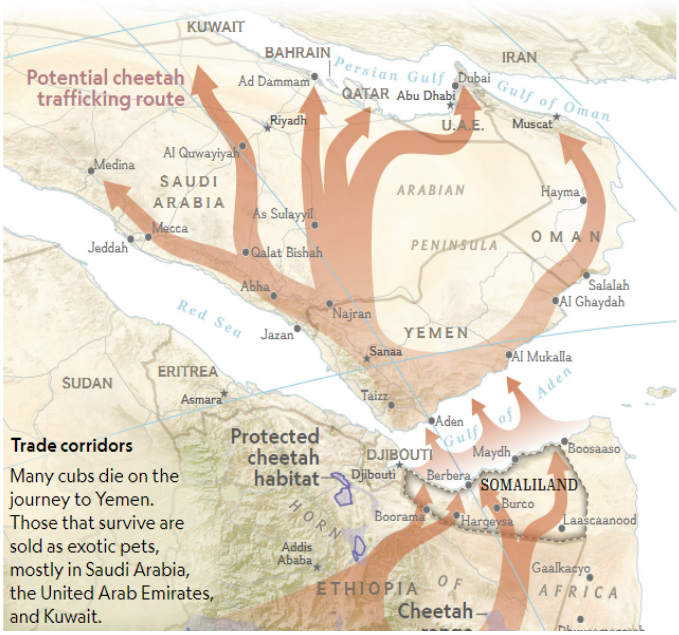
could have been reported to local authorities. We suspect that over time, both parties became savvier, which drove this type of behavior underground and off of public social media platforms. This may be why the dataset suggests that cheetah trafficking has declined from 2015-19. In reality, the decline may simply be a result of trafficking that is now under-reported.

Although most social media companies explicitly ban the illegal trade of cheetahs online via their platforms, this data suggests that these rules were rarely followed and traffickers exploited the loose or nonexistent enforcement. The main reason for the substantial use of Instagram for illegal activity may be that these policies rely on users to report such illegal activity, as the platforms themselves do not self-police. For instance, Facebook joined a group of peer companies in 2018 under the *Coalition to End Wildlife Trafficking Online* which sought to curtail the illegal trade of cheetah cubs by 80% by 2020[4]. Facebook also introduced its own more stringent site regulations in 2019. However, the efficacy of such policies is hotly debated.

Conclusions and Recommendations for the Future

At first glance, the analysis of this dataset would lead one to believe that there have been major successes in the battle to reduce cheetah trafficking. However, by leveraging additional data analysis tools, we uncovered signs that point to a very different story. Analysis of pricing trends contradict standard supply and demand patterns that would be expected. Additionally, the trend of social media advertisements dropping substantially after 2015 suggests that illegal traffickers may now be utilizing platforms that are not public thus resulting in underreporting of illegal trade incidents. This hypothesis is bolstered by African Nations stating that Illegal cheetah trade is still a challenging problem despite the regulations and conservation agreements put in place in recent years. The trends uncovered in this dataset are not all pessimistic, however. Pricing trends in the UAE may be an indication that their penalty-based regulations may have an impact in reducing local demand.

While this dataset presents the most comprehensive illegal trade incident reports to date, we recommend further research be conducted in countries like Saudi Arabia to determine if illegal cheetah trade advertisement has moved to non-public platforms and further study of whether there are learnings from the UAE's regulations. With dwindling populations, we are reaching a critical point in preventing the wild cheetah from going extinct. Additionally, as depicted in the trafficking route chart to the right, the flow of illegal trade into the middle east flows primarily through Somaliland and Yemen[5]. This represents an opportunity to disrupt the supply chain if regulatory actions could be focused in these locations. With ongoing efforts to track illegal trade, reduce demand, and implement effective regulations, there is hope that we can save the cheetah from this fate.



Limitations of This Analysis

While this is the most comprehensive dataset describing illegal cheetah trade incidents to date, there are limitations to our analysis. First, part of our analysis relied on a free-text incident description for which only 30% of incidents contained pricing information. Thus, any conclusions based on the price trend analysis should be used with caution. While these findings are supported by the claims of subject matter experts in this area, we recommend additional confirmation from alternative sources. Additionally, we elected to filter the dataset in this analysis to only reports of incidents with reasonable credibility and reliability. Additional analysis could be done on the less reliable to reports to identify any trends or insights.

Sources:

1. Tricorache, Patricia, et al. Pets and Pelts: Understanding and Combating Poaching and Trafficking in Cheetahs. 2018. Semantic Scholar, https://doi.org/10.1016/B978-0-12-804088-1.00014-9.
2. Illegal Trade In Cheetahs: Supplemental Information And Recommendations. 2019. https://cites.org/sites/default/files/eng/cop/18/inf/E-CoP18-Inf-073.pdf
3. Stringham O.C., Moncayo S., Thomas E., Heinrich S., Toomes A., Maher J., Hill K.G.W., Mitchell L., Ross J.V., Shepherd C.R., Cassey P. *Global dataset for seized and non-intercepted illegal cheetah trade (Acinonyx jubatus) 2010–2019.* Dataset of seized wildlife and their intended uses Data in Brief, Volume 39, 2021.
    a. Dataset available at: https://data.mendeley.com/datasets/84k92j4n3y/2
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5. "How Trafficked Cheetah Cubs Move from the Wild and into Your Instagram Feed." *Animals*, 17 Aug. 2021, https://www.nationalgeographic.com/animals/article/how-trafficked-cheetah-cubs-move-from-the-wild-and-into-your-instagram-feed.