

# RESEARCHING THE ILLEGAL TRADE OF TURTLES, FOCUSING ON BOX TURTLES, BETWEEN THE UNITED STATES AND HONG KONG



Jim Lynch, National Park Service (CC BY-SA 2.0).

## **An Interactive Qualifying Project**

Submitted to the faculty of  
Worcester Polytechnic Institute  
in partial fulfillment of the Bachelor of Science degree

### **Submitted to**

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and  
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### **Date submitted**

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# ABSTRACT

EASTERN BOX TURTLE FROM L. ASHLINE, N.D. CC BY-NC-ND 2.0.

Turtles are endangered and becoming extinct around the world. Our project focused on the legal and illegal turtle trade between the United States and Hong Kong, in particular the Eastern Box Turtle. Endangered turtle species are being removed from their natural habitats, sent overseas to be sold as pets or food. We interviewed government and non-government employees to learn about the legal and illegal turtle trade and reviewed relevant laws and legislation focusing on United States. We created social media posts, a story map video, and this report to help educate the public in an effort to mitigate the illegal turtle trade. We provided our recommendations to the World Wide Fund for Nature Hong Kong.



# ACKNOWLEDGEMENTS

Photo By: Kerry Wixted(Wixted, n.d.) (CC BY 2.0)

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PROJECT LIAISON

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PHOTO BY: KERRY WIXTED(WIXTED, N.D.) (CC BY 2.0)

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# EXECUTIVE SUMMARY

Around the world, turtle populations are dwindling (Kimbrough, 2020). According to a study conducted by Lovich, Ennen, Agha, and Gibbons (2018), approximately 61% of all turtle species are either endangered or already extinct. One of the major causes for this global population decline is international wildlife trade (Kimbrough, 2020). Though there are laws and guidelines in place to limit the trade of certain turtle species, there are ways of circumventing these restrictions through legal loopholes or smuggling (Wildlife Justice Commission, 2018). Much of the problem stems from the difficulty of tracking the volume and species of turtles being traded, as well as not knowing who is involved in buying and selling the turtles. To combat this trade, law enforcement agencies and activist groups are often involved in investigating and prosecuting known traffickers and buyers. Unfortunately, the turtle trade shows no sign of slowing down, as wildlife smuggling proves to be a lucrative venture (Hou, 2019).

One of the key locations involved in the global turtle trade is Hong Kong, which acts as a transit point between exporting nations and mainland China. A significant trade location for its substantial importing and exporting activities, Hong Kong handles millions of live animal imports every year, including some that may be endangered, as indicated by CITES (ADMCF, 2018). There is a large turtle market in Hong Kong as turtles are used for food, companionship, or a status symbol. Turtles are also significant in Chinese culture as a symbol of longevity and sexual prowess (Cahalan, 2018).

The purpose of this project was to provide the Hong Kong branch of the World Wide Fund for Nature (WWF) with a report that identifies all aspects of the legal and illegal trade of Box Turtles between the United States and Hong Kong. Using our findings, we have provided recommendations to the Hong Kong branch of the WWF. We have determined the various species of turtles being transported legally and illegally from the US to Hong Kong and China. We have identified international, national, and state laws regarding the sale and transport of these turtles to Asia. We have determined how the legal and illegal trade and transportation of Box Turtles between the United States and Hong Kong is carried out.

KADOORIE FARM AND BOTANIC GARDEN (SL, 2006) CC-BY-SA-2.5



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# EXECUTIVE SUMMARY

## CONTINUED

Our interviews brought awareness to six major problems. Lack of funding and resources was mentioned the most by our interviewees. We recommended that more funding be provided for the USFWS and other wildlife agencies working towards conservation. We were made aware of the light sentencing that wildlife traffickers who are caught often experience as a result of a lack of education. We recommended that maximum sentencing be encouraged. We also believe that educating judges and district attorneys on the severity of wildlife trafficking will contribute to the push for maximum sentencing.

It is very challenging to understand the origins of a turtle sold in a pet shop. We recommended that more inspectors visit Hong Kong pet shops regularly to check for illegal stock. Because it is difficult to distinguish wild-caught turtles from captive-bred turtles, having a guide for identifying turtles origins and species would be significantly helpful in catching traffickers. Additionally, identifying tags for turtles would further help with distinguishing wild-caught turtles from captive-bred. With social media being the most significant contributor to the illegal trade, we recommended more monitoring of social media and mentions online of endangered turtle species.

The governments of the United States and Hong Kong can be doing more to prevent turtle trafficking. We recommended having a Lacey Act equivalent in Hong Kong to criminalize trade of endangered species. We also believe that the United States should have a federally-associated turtle farm or breeding program to help repopulate endangered turtles.

Using the information gathered through these semi-structured interviews and our archival research, we have come up with recommendations that fall under four headings: legislation, education, sustainable trade, and enforcement. These recommendations, which serve to better manage the turtle trade, will hopefully be shared to the United States government, Hong Kong government, law enforcement officers, customs agents, pet store owners, turtle farmers, and other parties involved in the trade.

KADOORIE FARM AND BOTANIC GARDEN (SL, 2006) CC-BY-SA-2.5

# THE STORY OF TURTLES

## GLOBAL WILDLIFE TRADE

Profits from the global illegal wildlife trade are estimated to be around USD 23 billion per year (TRAFFIC, 2016). It is the fourth most lucrative trade in the world, behind only drugs, counterfeiting, and human trafficking (UNOCD, 2020). The illegal wildlife trade is highly unsustainable and is driving many species to the brink of extinction (USFWS, n.d.-a). Specifically, the trade of exotic pets is a major contributor to the global wildlife trade (Hall, 2019). Another contributor to the wildlife trade is social media, which more easily allows sellers to advertise their animals and connect with potential buyers.

A study by Scheffers, Oliveira, Lamb, and Edwards (2019) shows that out of around 31,500 vertebrate species, approximately 24% are part of the global

trade. Scheffers et al. predict that hundreds if not thousands more species will become part of future trade. The demand for animals and their products has already caused extinction in some species, such as the Javan rhino in 2010. If no action is taken to mitigate the trade, more species are likely to follow.

Turtles are one of the most-threatened animals on Earth (Kimbrough, 2020). Sixty-one percent of all turtle species are currently threatened or are already extinct (Lovich et al., 2018). One of the most direct causes of the decline in turtle populations is the global turtle trade. Turtle farming has become an extremely large industry with farms being established all over the world (Kimbrough, 2020). The growing turtle trade has proven to be a significant threat to the survival of Earth's turtle species.

## HONG KONG WILDLIFE AND TURTLE TRADE

Hong Kong serves as a major hub for the illegal wildlife trade (ADMCF, 2018). Hong Kong contains both the world's largest container port and largest cargo airport, making it a frequent destination for shipments of exotic wildlife. There is an ever-expanding turtle trade in China that is harming global turtle populations (Maron, 2019).

The people of Hong Kong and China have nearly destroyed their own native turtle populations already, and now need other sources to sustain their consumption (Mecir, 2006). A significant cause of this increased trade can be traced to Chinese currency becoming convertible in 1989. Economic prosperity gave rise to the middle class, who wanted to experience the status and supposed health benefits of turtle ownership and consumption.

Dubbed the "Asian Turtle Crisis" by conservationists, consumption of turtles soared in the 1990's, which led to the increased capture of native Asian species. This, along with the growing exotic pet trade, eventually led the Chinese turtle market to exhaust their own wild supply. Hong Kong's desire for turtles as food and pets continued to grow, which led citizens of the region to become very interested in turtles and tortoises native to other parts of the world. Such interest fueled a surge in turtle poaching in foreign nations (Goldberg, 2018). The United States naturally became a target for poaching, as it is home to 57 native species, roughly 18% of the world's turtles (Lovich, 2010). Attractive shells and vibrant color patterns make some species of turtle highly desirable. Turtles are also seen as symbols of longevity, wealth, and good luck, making them a popular pet of choice (Kao, 2018).



# THE STORY OF TURTLES

## WHAT IS BEING DONE?

Currently, law enforcement agencies and activist groups are responsible for taking action to protect turtle species (Wildlife Justice Commission, 2018). Agencies such as the US Fish & Wildlife Service (USFWS) regularly uncover turtle trafficking cases, often involving hundreds or even thousands of turtles (Maron, 2019). Unfortunately, their enforcement capacity is very limited. The USFWS (2013) has between 250-300 special agents for the entire country. Many are based in ports of entry and are not patrolling, looking for poachers directly. That responsibility is given to state wildlife agencies whose funding and manpower are not sufficient in many cases (B. Weissgold, personal communication, January 27, 2021). Traffickers who are caught typically face charges such as conspiracy to smuggle wildlife or violation of the Lacey Act, a law that bans trafficking of illegal wildlife (USFWS, n.d.-b). These charges often result in hefty fines, imprisonment, or both. Despite efforts to manage it, the turtle trade continues, threatening the long-term survival of commonly traded species such as the Box Turtle.

Although CITES (2019) aims to reduce and regulate the amount of wildlife trade among countries, CITES is not law. But even with laws in place, traffickers have not been deterred, meaning that not enough is being done.

There are still many turtles native to the United States that are taken to Hong Kong. Exact numbers are not known due to the volume of turtles traded illegally and the inconsistent reporting of numbers by exporting and importing countries (ADMCF, 2018). There are loopholes in the existing laws and regulations that traffickers often exploit. There is also a lack of enforcement of these laws for various reasons (Malone & Watson, 2018). The WWF is committed to preventing species of turtles from going extinct, but they require a greater understanding of how this trade takes place and its extent. WWF Hong Kong, in particular, would like to receive and communicate recommendations about how to better control the trade of Box Turtles between the United States and East Asia.

## THE APPEAL OF TURTLES

In China, turtles are highly valued for several reasons. In Chinese culture, turtles symbolize longevity and sexual prowess (Cahalan, 2018). They were worshipped in ancient China and regarded as prophets, pets, and symbols of emperors. Turtles also commonly appear in Chinese artwork and stories (Kun, 2018). Many consumers of turtles believe that they serve medicinal purposes. (Crandall, 2014). Turtles are a treatment for various ailments as well as a key to staying youthful and beautiful. There is an overall belief that turtles are very rich in nutrients (Kun, 2018). Eating rare turtles serves as a demonstration of wealth and status.

Turtles that are targeted for the pet trade usually have some trait that is desired. This will include shell shape, shell color, shell patterns and overall rarity. Turtles that are albino or possess any gold are often targets because they are thought to be lucky (B. Horne, personal communication, January 28, 2021). The Eastern Box Turtle has red and yellow patterns making it a desired turtle species in the pet trade.



EASTERN BOX TURTLE (BILLTACULAR, 2015) (CC BY-NC-ND 2.0)

# THE STORY OF TURTLES

## BOX TURTLE LIFE CYCLE

Turtles and tortoises are known for their longevity, but their lifespan varies from species to species. Smaller species of turtles, like the Box Turtle, live between thirty and forty years (Bauhaus, n.d.). Other sources list the Box Turtle's life expectancy as 25-35 years, with some Box Turtles living to be over 100 years old (Smithsonian, 2018). The age at which turtles reach sexual maturity also varies depending on species. Generally, it can take between five to eight years for turtles to reach sexual maturity, while some species of tortoises don't reach full maturity until the age of 20 (Kramer, 2016).

Figure 1 shows the life cycle of the Eastern Box Turtle. It is important to understand the life cycle of turtles because of the role it plays in conservation efforts. For common turtle species, only around 1 in 100 hatchlings survive to adulthood (Wildlife Epidemiology Laboratory, n.d.). Common threats to Eastern Box Turtle survival are predators, roads, collection, and habitat destruction (Wurst, n.d.). Predators such as raccoons and skunks dig up Eastern Box Turtle eggs for consumption (Burge & Jones, n.d.) When a clutch of Eastern Box Turtle eggs is laid, only a fraction of those eggs will hatch after incubation. Very few, if any, hatchlings will survive for the 5-10 years it takes to reach adulthood (Groton Herald, 2014).

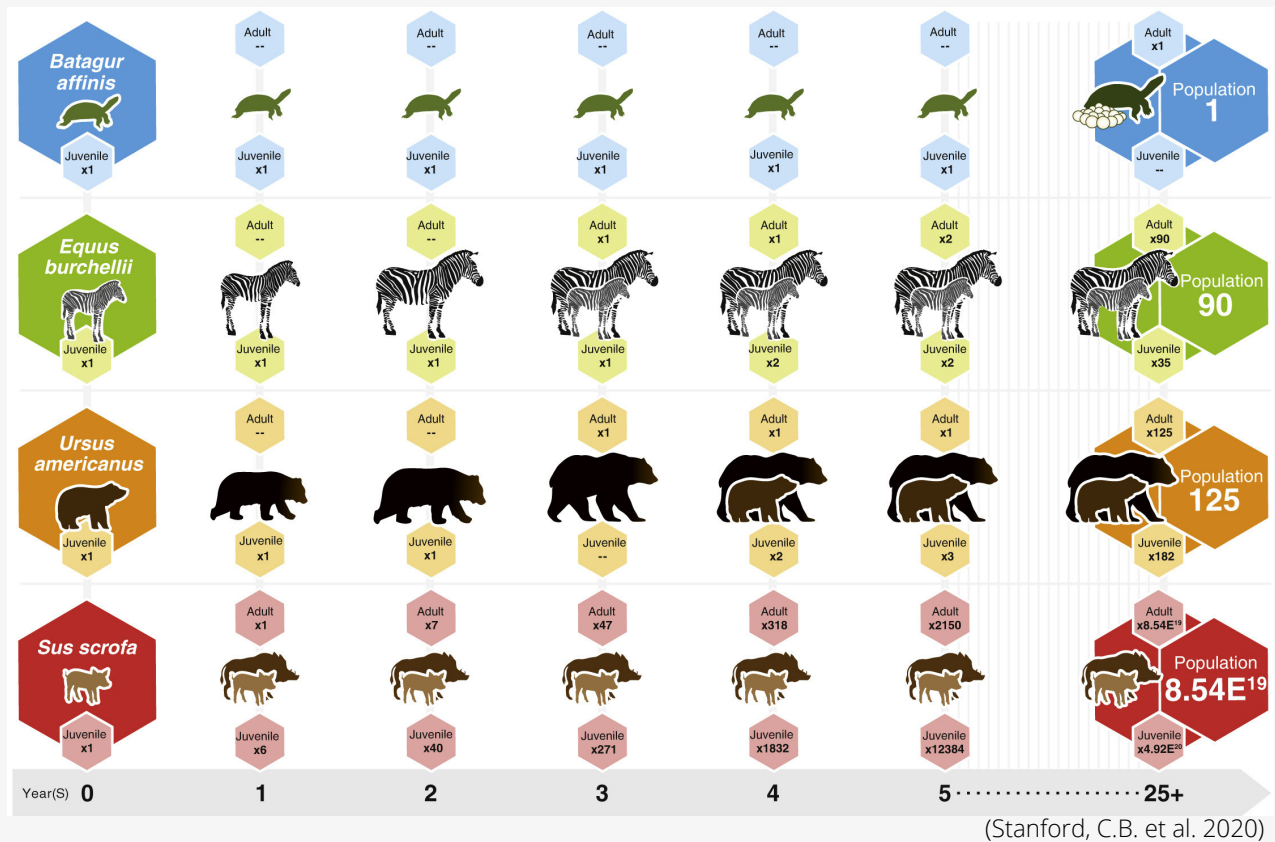
Figure 1  
*The Life Cycle of an Eastern Box Turtle*



# THE STORY OF TURTLES

Figure 2

Population Count Produced by One Individual Over 25 Years



Generally, turtles have a very slow reproduction rate. In Figure 2, we see that even after 25 years there is only a turtle population of one turtle, which was the original juvenile turtle seen in Year 0. This individual turtle probably reached maturity between the ages of 5 and 10. This turtle even laid one clutch of eggs every year. But due the factors talked about in the previous section, these eggs never hatched, or hatchlings never made it to adulthood. On the other hand we see a population of  $8.54 \times 10^{19}$  wild boars descended from one boar in 25 years. Their slow reproduction rate makes turtle populations extremely vulnerable to collapsing if there is any removal of adult turtles from the wild (Reptiles Alive, n.d.).



# THE DIFFICULTIES OF OUR RESEARCH

Now that we have introduced the worldwide turtle trade and sustainability issues, we will specifically discuss the turtle trade between the United States and Hong Kong. Our liaison, Jovy Chan, works for the Hong Kong branch of the World Wide Fund for Nature, and her work mainly focuses on animal conservation. She had asked us to focus, in particular, on the threats to the Eastern Box Turtle for this project. In order to reach our goal, we had a number of specific objectives. We took a closer look at the various species of turtles that are being traded between the United States and Hong Kong, both legally and illegally. We identified international, national, and state laws applicable in the United States.

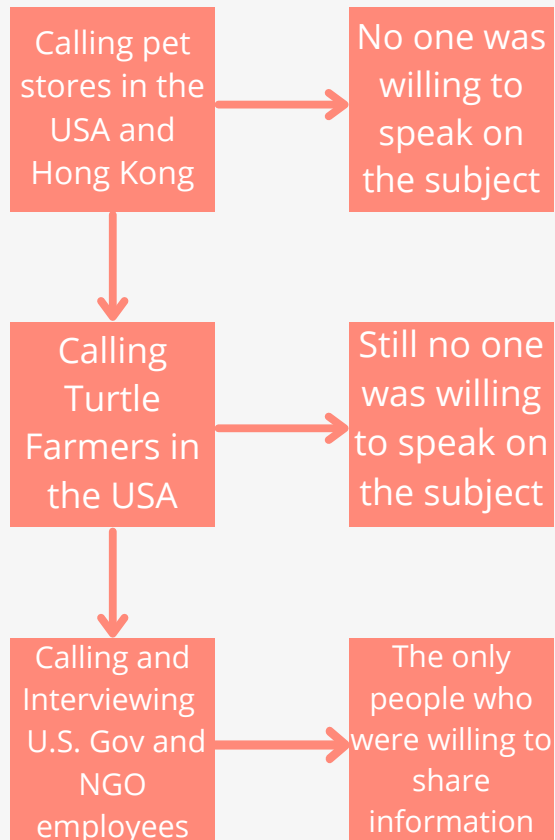
Due to the COVID-19 pandemic, our team was unable to travel to Hong Kong and we faced many challenges. We were isolated in the United States, specifically in Worcester, Massachusetts and all interactions and meetings were carried out via Zoom. As a team, we intended to make phone calls to pet store owners in Hong Kong. The remote nature of our project meant that making calls from the United States to Hong Kong ended up being unsuccessful. This is for a number of reasons. First, there is a 13-hour time difference between the east coast of the United States and Hong Kong during the months of January and February, which made calling stores that opened after 1:00pm HKT very difficult. We also struggled with connecting to Hong Kong stores. Many stores in Hong Kong and mainland China use WhatsApp to communicate with customers. WhatsApp is a free voice-calling and messaging service that provides secure, unmonitored communication. WhatsApp is an easily-accessible platform for making international calls. Unfortunately, many pet stores in Hong Kong did not have WhatsApp numbers or the WhatsApp numbers posted on their sites did not lead to an account. We also found that many pet stores in Hong Kong did not have a website as they are small, street-side vendors. Some of these vendors were closed to the public due to health concerns related to the COVID-19 pandemic. Additionally, the sensitivity of our research topic greatly impacted our research efforts. Many pet stores do not feel comfortable talking about the turtle trade because there is a large portion of this trade that is illegal.

We also had trouble when contacting pet stores and turtle farms in the United States. Just like in Hong Kong, nobody wanted to speak with us about the turtle trade and risk exposing potentially-illegal behavior. We were also legally unable to go to pet stores in person, due to WPI's current rules regarding in-person research. One of our advisors visited a local Petco but did not find Box Turtles. He only found Hermann's tortoises, the origins of which were unknown by the Petco staff.

# OUR RESEARCH PROCESS

## INVESTIGATIVE PROCESS

Figure 3  
*Our Process to Investigate the Turtle Trade*



We had very little luck in talking to anyone involved in selling turtles, as seen in Figure 3. Those who were willing to speak with us said that they either could not or were not allowed to disclose any useful information. Occasionally, we were told that someone would call us back to discuss an interview, or that we should send an email and await a response. Despite our persistence in contacting and interviewing those people, none of these calls ever resulted in a returned call, barring one.

The phone call that we received was from a reptile wholesaler in Florida. We described the nature of our project and, due to the large number of turtles available on the website, asked about where their turtles came from. The man on the phone said that all of the turtles were captive-bred, and that most of their operations were purely domestic. When asked for clarification on what he meant by "most" operations being domestic, he refused to answer and dismissed us, saying he couldn't provide any helpful information.

# OUR RESEARCH PROCESS

## WE CONTACTED...

Figure 4  
*Groups Contacted via  
Telephone and Email*



In total, we contacted 53 different parties, 33 of which were turtle farms or pet stores. The breakdown of the numbers can be seen in Figure 4. For a more in-depth breakdown, refer to Appendix F. Due to the lack of communication with pet stores and turtle farmers, we have come to the conclusion that there is a reason for the secrecy. While making no accusations towards any places we contacted, we believe that the illegal turtle trade is a complex network, with roots deep within the "legal" turtle trade.

## INTERVIEWS WE CONDUCTED

Out of the 15 government and non-government organization employees we contacted, we were able to interview seven:

- Mike Jones
- Susan Lieberman
- Peter Paul Van Dijk
- Bruce Weissgold
- Brian Horne
- Anonymous interviewee
- Anonymous interviewee

The following section talks about the main points that we took from each interview.



# OUR RESEARCH PROCESS

## MIKE JONES

### STATE HERPETOLOGIST, MA

When asked about ways to distinguish wild-caught turtles from those bred on a farm, Mike brought up a method that conservationists are trying to refine, which is conservation genetics. This method would allow scientists to determine whether or not an animal conclusively came from a specific water shed or region. This might be helpful over time in distinguishing wild-caught from captive-bred turtles because wild-caught might have a clearer signature. In captive-bred turtles, that clear signature is lost, since they have a higher probability of being crossed between regions. This method is fairly new for freshwater turtles, but it does show great potential.

Another method that the northeast region is trying to scale up is the use of Passive Integrated Transponders (PIT) tags on priority populations of turtles. The northeast region is trying to plant microchips in turtles of all species encountered in the wild. This would aid in reassigning turtles if they are ever collected and confiscated.

Mike also provided us with common loopholes that poachers use, such as turtle laundering (see Figure 12). Since there is no completely reliable way of distinguishing wild-caught turtles from captive-bred, one cannot prove that laundered turtles were caught illegally.

## SUSAN LIEBERMAN

### INTERNATIONAL POLICY VP (WCS) AND FORMER CHIEF OF CITES SCIENTIFIC AUTHORITY (USFWS)

Susan explained to us that states handle the management of Box Turtle harvest and sale. The states often report wildlife trafficking within their borders to the federal government. This kind of relationship is extremely important in wildlife conservation efforts.

She also explained that any export (or import) of wildlife (including live animals) must be declared to the USFWS upon import, even if these animals are not listed on CITES.

We asked about common loopholes that traffickers use and Susan explained to us that one of the most exploitable aspects of the United States' government is the capacity of inspectors and agents of the US Fish and Wildlife Service. The government does not have sufficient funds to be able to hire enough inspectors and agents to investigate every suspected instance of turtle trafficking (or other wildlife trafficking).

Susan also explained that there is federal legislation in place protecting migratory birds and marine animals, so proposing federal laws like these for reptiles including turtles would not be impossible..

# OUR RESEARCH PROCESS

## PETER PAUL VAN DIJK

SENIOR DIRECTOR OF WILDLIFE  
TRADE (GWC)

When asked about trends in turtle populations, Peter Paul brought to our attention that turtle species' whose habitats experience human interference often struggle to survive. Habitat degradation is directly linked to population decline.

Peter Paul stressed that the penalties smugglers face are not enough to turn them away from the trade. There needs to be more awareness regarding the laws that deal with wildlife trafficking, and of the ecological significance of wildlife crime among the judiciary.

The background picture behind the Box Turtle crisis is climate change. If we cannot address pollution, global warming, and the decline in ecological integrity, we cannot fully protect turtles from being wiped out. Peter Paul added that targeted exploitation is a massively significant problem.

Peter Paul recommended strengthening the contact and collaboration between the United States and Hong Kong. However, it is important that both governments have the resources to do so.

## BRUCE WEISSGOLD

RETIRED SENIOR CITES SPECIALIST  
(USFWS)

Mr. Weissgold finds that freshwater turtle populations around the globe are largely dwindling, with some exceptions. In addition to trafficking, major causes for this decline include habitat destruction, pollution, climate change, and subsidized predators.

Due to their extreme generational length, it can be difficult to determine the severity of impact on a chelonian population soon enough to take sufficient action. Therefore, actions taken to prevent population loss need to be proactive rather than reactive, as is common.

In recent years, states have been strengthening wildlife protection laws. The only federal regulation protecting turtles is the Endangered Species Act of 1973, which does so only species by species. Outside of this act, regulation and conservation is the responsibility of individual states. Though it is unlikely that further federal laws will be enacted on this matter, there are likely more native species that need to be protected under the Endangered Species Act than are currently protected.

## BRIAN HORNE

COORDINATOR OF FRESHWATER TURTLE AND  
TORTOISE CONSERVATION (WCS)

Brian Horne traces the modern Asian interest in turtle collection to Chinese turtle farms that initially provided Chinese softshell turtles as a food source. There became a great interest in the patterns and colors that resulted from selective breeding on these farms. Species like the Golden Coin Turtle, revered for its lucky golden color, became popular pets. These days, there are few Golden Coin Turtles left in the wild due to the immense collecting pressure from high-paying farmers and independent buyers.

Some turtles are desired for luck or medicinal purposes, others for their rarity. Mr. Horne described how a newly-found Mexican turtle species began appearing in Asian markets just a few months after being discovered. Farmers with a monopoly on rare species can corner the market, giving them greater spending power and the ability to control production.

There are many factors that contribute to the final destination for turtle traffickers. They are primarily concerned with being able to ship many turtles quickly, cheaply, and without getting caught. Hub locations like Hong Kong, Jakarta, and Kuala Lumpur are chosen for the difficulty that comes with checking incoming shipments. It is nearly impossible to control the sheer volume of cargo that enters these regions. There are simply not enough enforcement officials to conduct inspections.

Even in cases where one of these traffickers is caught, the penalties are not nearly as high for wildlife trafficking as they are for similar crimes like drug trafficking. The amount of money that can be made from the wildlife trade easily offsets the fines that result from being caught smuggling. It is just another cost of doing business.



## ANONYMOUS INTERVIEWEE

### RESOURCE INVESTIGATOR

When asked about enforcement methods that are commonly used within wildlife agencies, this interviewee told us that generally the low-level poachers are caught by field officers doing routine patrols in management areas, state parks, and state lands. If the field officers have reasons to believe that these poachers are part of a bigger organization, they turn the case over to investigators, leading to bigger covert operations.

Sometimes, these investigators will receive tips from disgruntled employees. For example, a collector that feels they are not being paid enough might tip off investigators on the identity of their employer.

The biggest obstacle that is present in this line of work is the limitations involving manpower. The state agents are tasked with many different jobs and are spread thin. Limitations with

manpower are largely impacted by the lack of funding that these agencies receive.

Existence of states that allow the collection of turtles opens up the possibility of collectors taking advantage of loopholes. In Florida, for example, someone is allowed to collect one box turtle a day with a maximum possession of two box turtles. If someone collecting one turtle a day were to be stopped and checked by law enforcement, they would not be found violating any laws. When that person stockpiles the collected turtles in their home, that action would be breaking the law, but the chances of law enforcement checking their home is very low.

They can transport these cached turtles to a turtle farm, where they would be passed off as captive-bred. This is an example of how turtles are laundered.

## ANONYMOUS INTERVIEWEE

### CONSERVANCY TEAM MEMBER

We asked the conservancy team member about turtle population trends. We learned that turtle species populations are becoming concentrated as smaller strongholds form. With this lack of spread, it is much easier for poachers to wipe out populations and much harder for the turtles to recolonize.

There is a lot of uncertainty in numbers. Conservationists are unsure of how many turtles are being taken by poachers, how many are being killed on roads, and what percentage of turtle shipments are being confiscated. Estimates made are often very rough.

Because of America's turtle diversity, the country has become a hot spot for harvest and trafficking. To avoid the expenses of legally shipping turtles, collectors have no complaints with resorting to illegal turtle smuggling if it means jumping on the fad of owning exotic turtle species.

The interviewee shared that judges, DAs, and prosecutors are not well educated on the existence and the value of the trade.

Very often, a judge going from a human trafficking or drug smuggling case to a turtle smuggling case does not view these cases as equally severe. Thusly, judges rarely give out maximum penalties. Poachers and smugglers that continue to profit from this trade demonstrate the need for strict adherence to maximum penalties. All branches of law enforcement need to be educated about the enormous negative impacts of the turtle trade.

The most significant contributor to the growth of the turtle trade is social media. When pictures or videos of turtle species are posted to social media, poachers take notice and go to great lengths to locate the turtles. It is also easy to contact turtle owners across the globe via social media and purchase an exotic turtle species.

We asked about how to potentially close common loopholes. The team member suggested providing more resources to officers and inspectors. They also suggested heavier policing on social media.

# WHAT WE LEARNED

One of the clear points that we learned from our interviews was the common belief that there is a lack of funding for enforcement within wildlife agencies.

In Figure 5, one can see that in 2020, Conservation and Enforcement only received 148.3 million dollars (Crafton, 2021). In 2021, their budget is 157.8 million dollars. We believe, based on the interviews we conducted, that this sum of money is not enough to combat the illegal wildlife trade. There needs to be more funding for Conservation and Enforcement. This will help with:

- Hiring more USFWS special agents
- Increasing wages for officers to prevent bribery and corruption
- Implementing more methods of detecting illegal wildlife
  - Sniffer dogs in airports and shipping facilities (an example of one such dog can be seen in Figure 6)
  - Increasing the use of Passive Integrated Transponders or PIT tags

Figure 5  
*Resource Management Discretionary Funding by Activity, FY2020 and FY2021 Enacted (nominal \$ in millions)*

Activity	FY2020 Enacted	FY2021 Enacted
Ecological Services	\$266.0	\$269.7
Habitat Conservation	70.3	70.2
National Wildlife Refuge System	502.4	503.9
Conservation and Enforcement	148.3	157.8
Fish and Aquatic Conservation	205.5	206.6
Cooperative Landscape Conservation	12.5	12.5
Science Support	17.3	17.3
General Operation	142.0	141.9
<b>Total<sup>a</sup></b>	<b>1,364.3</b>	<b>1,379.8</b>

**Sources:** CRS; data from explanatory statements accompanying H.R. 1865 (P.L. 116-94) and H.R. 133 (P.L. 116-260).

a. Total may differ from column sum due to rounding.

(Crafton, 2021)

Figure 6  
*Lancer with three boxes he found containing turtles*



(USFWS, 2020).

# WHAT WE LEARNED

Another problem that we found is the lack of adherence to the maximum penalties that comes with the illegal wildlife trade. Each state has its own rules and regulations regarding collecting turtles (refer to Appendix C) and penalties for violating those laws. We believe that, while the laws themselves are sufficient, the states need harsher penalties for low-level collectors. From our interview with the resource investigator, we learned that being caught by law enforcement usually does not stop low-level poachers from repeating their offenses. The fines given to people taking advantage of loopholes is not a big enough deterrent. The resource investigator also believes that there should be a separate penalty for commercialization of wildlife. This would not include a one-time offender of the daily bag limit, rather it would include anyone who is making a living exploiting wildlife.

We believe that the reason that the fines do not deter poachers from becoming repeat offenders has to do with the lack of knowledge or

understanding about this trade from judges, district attorneys, and prosecutors. Even if the maximum penalties are sufficient in deterring poachers, it won't work unless they are actually used in court.

The lack of understanding may have something to do with the way people see animals, specifically reptiles and turtles. We believe the people who are a part of the trade only see the turtles as an item, something to add to the collection. They only see the colors, the shape, the rarity, and how much money they can make from it. The people who are in charge of prosecuting and judging these traffickers only see the turtles as a tiny animal. They do not see the important role that these creatures play within their native ecosystems. This is why the people in charge of these cases must be educated on the level of seriousness that this trade has. The potential monetary value that these turtles have (see Figure 11) makes light sentencing an exploitable loophole. Paying a fine that isn't the maximum value is perceived as just another cost of doing business.



# WHAT WE LEARNED

Another key point we learned from our interviews is the problem of distinguishing wild-caught turtles from captive-bred turtles. We were informed that there is no method of distinguishing between the two that is beyond a reasonable doubt and that would stand up in a court of law. We did learn of some techniques that are used to estimate the origin of a turtle, however (see Figure 7).

We also learned about the use of Passive Integrated Transponders, or commonly known as PIT tags, on turtle populations (refer to Appendix B). Although officials could require PIT tags be implanted in all captive-bred turtles to prevent the laundering of wild-caught turtles, we came to the conclusion that this would not be the best way to use these tags. First, the tags and tag readers are expensive (refer to Appendix B). Requiring PIT tags on farm-raised turtles could drive the cost of captive-bred turtles up, making a wild-caught turtle even more of a target for collectors. Second, if PIT tags were to be used in all captive-bred turtles, there would be nothing stopping farmers from catching wild turtles and tagging them, passing them off as captive-bred.

Figure 7  
*Potential methods of distinguishing wild-caught and captive-bred turtles*

## WILD CAUGHT VS. CAPTIVE BRED TURTLES

WAYS THAT INSPECTORS AND CONSUMERS CAN TELL THE DIFFERENCE



### MARKINGS FROM PREDATORS

Turtles from the wild might have scratches and marks on their shells from predators, stains on their skin and shells from water, or lightly tanned skin from sun exposure. This is the easiest way to tell if a turtle came from the wild.

### PARASITES

Turtles from the wild have certain parasites in or on their bodies that come from their natural habitats. Checking turtles for these parasites allows biologists and prosecutors to argue that a turtle is wild-caught.



### CROSS-BREEDING

Wild-caught turtles may have genetic signatures specific to the region or watershed they are from. Captive-bred turtles may lose these signatures due to breeding between turtles of different regions.

### FLAWLESS LOOK-ALIKES

Captive-bred turtles are generally flawless. They often look extremely similar to one another. This is because of the conditions they are kept in as well as the breeding habits of farmers.



### PYRAMIDING

A captive-bred tortoise may show morphological differences from those found in the wild. Tortoises suffering from malnutrition may have pyramid-like shells, contrasting with the smooth, dome-like shell of a wild-caught tortoise. This trait is only present in tortoise species.

Understanding the differences between wild-caught and captive-bred turtles can aid in turtle conservation and mitigating the illegal trade. When visiting a pet store, one should look for these traits to understand if a turtle has been taken from the wild. A buyer could be educated to avoid buying any turtle that might have been wild-caught.

Sources From Top to Bottom: (DeMers, 2012), (Wolf, 2014) (Ramirez, 2017), (Marco, 2015). (Goebel, 2010).

# WHAT WE LEARNED

Mike Jones referred us to Northeast Partners in Amphibian and Reptile Conservation (NEPARC). This organization is a collaboration among organizations in the Northeast region of the United States, comprised of Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia (NEPARC, n.d.). According to Mike Jones, NEPARC is pushing for increased use of PIT tags in any wild turtles encountered. This includes the Wood turtle, Blanding's turtle, Diamondback Terrapin, Redbelly Cooter, and various other species (NEPARC, 2020). Tagging would help conservationists reassign these turtles back to their original habitats if they are ever caught and then confiscated by law enforcement.

We considered the possibilities of PIT tags and how they could be used to combat the illegal turtle trade. One possibility includes tagging as many wild turtles as possible. If tagging becomes a widespread, cost-efficient method, scanners can be placed in airports around the world to detect any wild turtle that is being smuggled. However, the technology has to be developed more in order for the tagging method to be feasible. (For current capabilities, refer to Appendix B).

In order to install scanners into airports and have widespread use of tagging of wild turtles, there would need to be funding and extensive research into the development of this technology. The range of the tags would need to be extended to at least two feet, while keeping the hardware small. Figure 8 shows the small pit tags that are commonly used in sturgeon.

NEPARC (2020) surveyed veterinarians on the subject of PIT tagging. There is no consensus as to whether tagging hatchling turtles is harmful. More research would need to be done to determine if tagging hatchlings is safe. If it is safe, it would be possible to have breeding programs that tag the new hatchlings and release them into their natural habitat.

Figure 8  
*PIT tags before they are injected in the backs of yearling sturgeon*



(Stukel, 2016).

# WHAT WE LEARNED

From Peter Paul Van Dijk and our archival research (Burge & Jones, n.d.; NFW, n.d.), we learned about the reproductive rate of freshwater turtles. We know that it takes 5-10 years or more for turtles to reach maturity. If a female turtle lives for another 30-50 years, consistently producing a clutch of eggs every year, most of her eggs will be dug up and consumed by predators. Even after successfully hatching, young turtles often fall prey to a number of other predators. According to Peter Paul Van Dijk, an adult turtle only needs to produce two hatchlings that survive into adulthood. All other eggs and hatchlings are essentially ecologically disposable; they are "food for others". However, a large number of eggs are required to be entered into the "lottery for survival" before one hits the circumstances that allow it to grow and reach maturity.

If humans' turtle eggs collection can stay within the range of eggs that are naturally lost, populations would not be damaged. Once humans start removing wild adult turtles, they aren't taking out just one turtle, but 20-30 years' worth of potential adults from the population. This is when turtle populations begin to collapse. To have a sustainable trade in turtles, it cannot involve wild-caught adult turtles.

There are other possibilities such as sustainable egg harvest or turtle ranching (Sigouin et al., 2016). Turtle ranching is a method of collecting wild turtle eggs or newly-hatched wild turtles and raising them in a controlled environment. Harvesting turtle eggs or newly-hatched turtles is a feasible solution because it has less of an impact on wild populations.

## ZHENG'S FINDINGS

Zheng, a citizen of Hangzhou, China, volunteered to help us with our research. She visited three pet stores in Hangzhou. The pet store owners did not want to disclose much information to her.

However, Zheng found three turtle species sold at these shops. These stores reported selling about 200 of each species a year.

- **Chinese Softshell Turtle:** Caught in the wild by Hainan fishermen and sold in stores. These turtles are also farmed as a food source.
- **Flat Chested Turtle / Big Head Turtle:** an endangered, rare species in China.
- **Red-Eared Slider:** Originally from Brazil, this species is invasive in China.

From this information, we concluded that Chinese pet markets are selling endangered species, likely without being properly monitored.

# WHAT WE LEARNED

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An example of successful egg harvesting can be seen in the Cofan people located in the Amazon (Caputo et al. 2005). In this case, consumption needs are less of a threat to turtle populations than the flooding that occurs in the area. This community only harvests eggs in nests that are threatened by flooding. There are also relocation programs for threatened nests that they aren't harvesting.

Turtle farming is another possible solution to the growing demand for rare turtles (Sigouin et al., 2016). Farms support recolonization of a turtle species population. Unfortunately, turtle farming is not a sustainable solution. There are many problems with turtle farms that need to be addressed.

There is an inconsistency in the ease at which turtles are farmed. Some turtle species take more time to mature than others and many farmers do not want to wait several years to restock their populations (Sigouin et al., 2016). Thus, turtle farmers are more inclined to take turtles from the wild or purchase wild-caught turtles from poachers to supply their farms (van Dijk, Stuart & Rhodin, 2000). For this reason, turtle farms are one of the largest buyers of adult wild-caught turtles. This leads us to believe that turtle farms actually increase the collecting pressure on wild turtle populations.

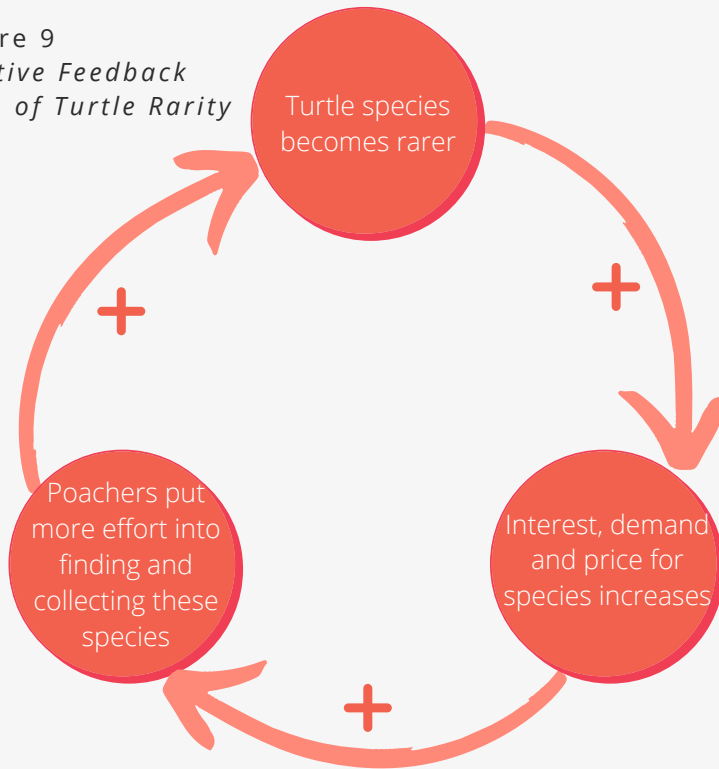
Another problem present within turtle farms is the consumers' desire for wild-caught turtles (Sigouin et al., 2016). In China, consumers are willing to pay greater prices for wild-caught turtles. To Chinese consumers, wild-caught turtles are believed to have more nutritional value than their captive-bred counterparts (Zhou & Jiang, 2008). We believe that setting up legal turtle farms for the Eastern Box Turtle might have an adverse effect instead of a positive one.

Another trend we gleaned from our interviews is how the presence of social media and the internet has been a driving force for not only the turtle trade, but for all wildlife trade. Social media has made fast communication extremely accessible for people around the world. Social media platforms make advertising turtles very easy. Collectors and sellers can post pictures of rare and exotic turtles from around the world. Someone from Hong Kong can see a post about a new rare turtle/tortoise species from Madagascar and send the original poster a private message asking if they have extra turtles and are willing to sell them. Social media can create a demand for turtles that sometimes have yet to be a target for the pet trade.



# WHAT WE LEARNED

Figure 9  
*Positive Feedback  
Loop of Turtle Rarity*



One of the main attributes that makes a turtle desired is its rarity. The anthropogenic Allee effect is a phenomenon that characterizes the wildlife trade (Sigouin et al., 2016). As a species' rarity grows, so does its price on the market. This creates a positive feedback loop, as seen in Figure 9.

Social media poses another risk. With the added feature of tagging one's location when one posts, it has become a known strategy for poachers to search social media for posts about turtles someone found in the wild with their location tagged. The poachers will then travel to that location and search for that type of turtle.

This strategy has also been used with scientific publications. According to the resource investigator, a collector informed them that they scoured reports and research papers for locations of turtle populations. Often times their location information was down to the exact latitude and longitude.

When conducting archival research, we found a study that focused on consumer trends and illegal wildlife by monitoring wildlife forums in Hong Kong (Sung & Fong, 2018). In order to prevent counting cross-platform posts, the researchers studied just one popular forum specializing in turtles. Over the span of three years, the researchers collected data on 9,058 posts advertising 14,360 individual live turtles of 136 different species. This is over one third of all turtle species (136 of 356). To make assumptions about the legality of these turtles, they used two methods. First, they cross-referenced the post data to the CITES trade database. Under the Protection of Endangered Species of Animals and Plants Ordinance (CAP.586) of Hong Kong, a possession license is required for the possession and sale of all live turtles included in CITES Appendix I, and wild-caught individuals in Appendix II. They obtained a species list of the permits given out by the Agriculture, Fisheries and Conservation Department, Hong Kong Government (AFCD). All turtles that appear on Appendix I, and wild-caught Appendix II species that were not listed on either the

# WHAT WE LEARNED

CITES trade database or the possession permit list were assumed to being traded illegally.

The researchers found that 36% (28 of 77) of the CITES listed species were not found on import data or on the possession permit list, which means they were traded illegally (Sung & Fong, 2018). We believe that this is an indicator of the scale of the illegal trade present in Hong Kong. In just one online forum, it was estimated that 36% of the species were traded illegally. Based on this study, we believe it is important to continue to closely monitor the online wildlife trading groups and forums.

Social media has also been used by leaders in turtle smuggling rings. Kung Juntao, of Hangzhou, China, was recently extradited from Malaysia to the United States on the charges of financing a nationwide turtle-smuggling ring (Department of Justice, 2020). As the leader of the turtle-smuggling ring, he was responsible for smuggling at least 1,500 individual turtles valued at \$2,250,000 USD. Juntao recruited at least six middlemen using Facebook Messenger. These middlemen were typically Chinese college students studying in the United States (Fieseler, 2020). A USFWS special undercover agent worked on this case and

is referred to as Person One. Over the course of 18 months, Juntao sent Person One 40 payments through PayPal, totaling approximately \$78,000. Person One was directed by Juntao to use these funds to pay turtle suppliers and smuggle the turtles out of the United States, into Hong Kong (United States of America v. Kung Juntao, 2019).

There have been multiple cases similar to this one in the past 5 years. Xiao Dong Qin, a Chinese national, plead guilty to conspiring to smuggle goods out of the United States (Department of Justice, 2019a). The contraband included 136 Florida Box Turtles, 76 Eastern Box Turtles, 57 North American Wood Turtles, 20 Spotted Turtles, 18 Diamondback Terrapins, 7 Yellow-blotched Map Turtles, and one Blanding's Turtle. Keri Zhang Wang was charged with smuggling wildlife out of the United States and false labeling under the Lacey Act (Department of Justice, 2019c). In addition, a New Jersey man pled guilty for conspiring with others to buy, sell, and transport approximately 1000 Box Turtles collected in the state of Oklahoma (Department of Justice, 2019b).

A common occurrence within all of the cases is the false labeling of the turtles. Smugglers mislabel the turtles as material goods such as snacks or toys (Department of Justice, 2018, 2019c).



# WHAT WE LEARNED



TURTLES CONFISCATED BY FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION (PHOTO BY FWC) (MILLER, 2020)

## EXAMPLE PRICES OF TURTLES IN HONG KONG

Figure 11

*Potential Cost of Buying a Turtle in Hong Kong*

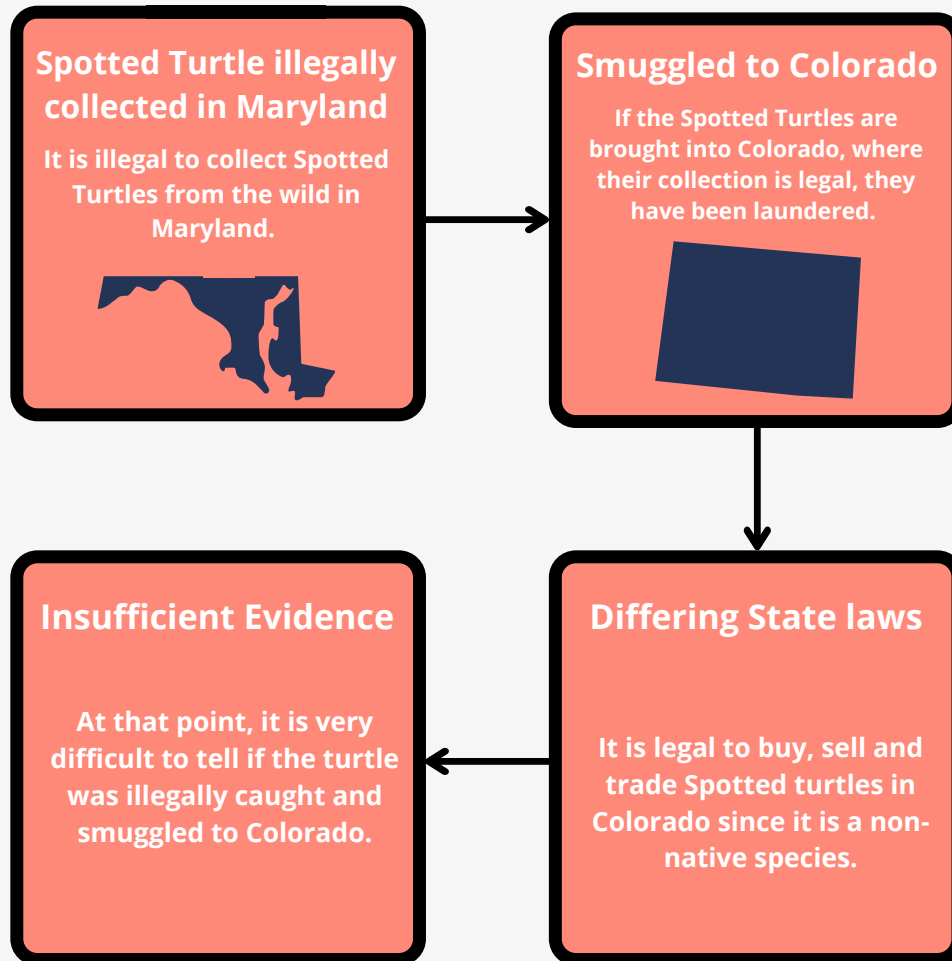
SPECIES	COST OF TURTLES (USD)
<b>RED-EARED SLIDERS</b>	\$2 - \$3 (SPCA, 2017)
<b>MUD TURTLE</b>	\$150 - \$400 (RESOURCE INVESTIGATOR, PERSONAL COMMUNICATION, FEBRUARY 3, 2021)
<b>DIAMONDBACK TERRAPIN</b>	\$1000 - \$5000 (Resource Investigator, personal communication, February 3, 2021)
<b>EASTERN BOX TURTLE</b>	\$1000 - \$5000 (Turtle Sheng Reptile Company, n.d.)
<b>GOLDEN COIN TURTLE</b>	\$10,000 - \$25,000 (Turtle Conservancy, n.d.)
<b>ALBINO SNAPPING TURTLE</b>	\$50,800 (Sung, Fong, 2018).



# WHAT WE LEARNED

## COMMON LOOPHOLES

Figure 12  
*Turtle Laundering Between States*



Turtle laundering is a common occurrence within the United States. Each state has its own rules and regulations concerning turtles not listed on the Endangered Species Act and may not protect a species to the same capacity as another state. Figure 12 is an example of turtle laundering given to us by Mike Jones.

"There is an intrinsic weakness in a patchwork of state regulations that leaves open the possibility of laundering animals out of that region" - Mike Jones.

# WHAT WE LEARNED

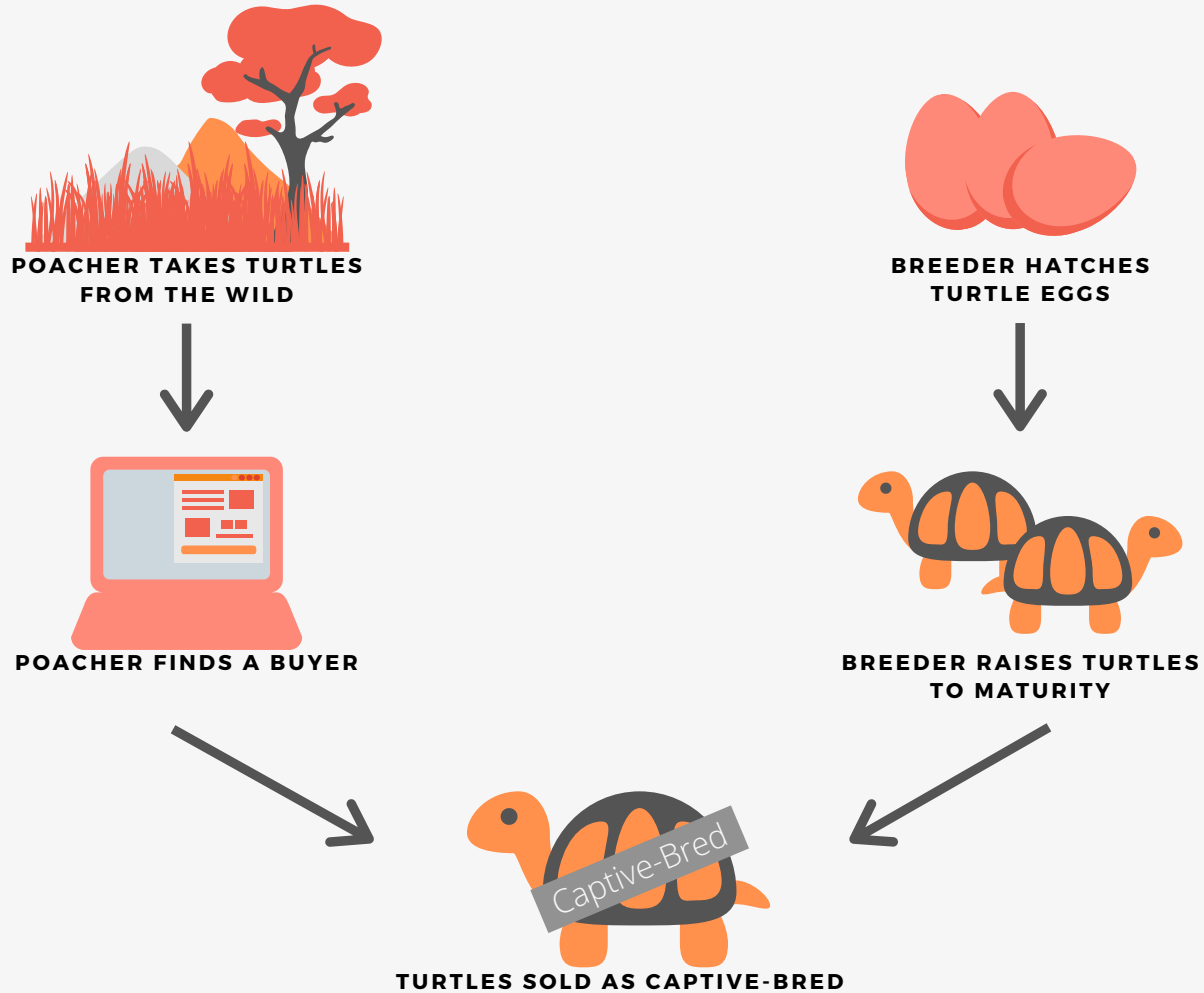
Figure 13  
*Abusing Collection Restrictions*



States that allow the collection of wild turtles will likely have specific limits on the number of turtles that a collector can take each day or possess. Commonly, investigators may check a vehicle to see how many turtles a collector has. If they have fewer turtles than the limit allows, then the collector is not violating the law. However, collectors will often store the turtles at their homes or loan them to another individual (thereby no longer being in violation of the possession limit). The collector returns the next day, again only transporting a legal number of turtles. It is unlikely that an officer would check an unsuspecting collector's home. Such a scenario is represented in Figure 13.

# WHAT WE LEARNED

Figure 14  
*Selling Wild-Caught Turtles as Captive-Bred*



State laws differ on the sale of wild-caught turtles (See Appendix C). Some states, such as Maine, do not allow wild-caught turtles to be sold at all. Other states, like Oregon, may require a permit or only allow the sale of certain wild-caught species. However, the laws are much more lax when it comes to captive-bred turtles. Often times, as is shown in Figure 14, wild-caught turtles are passed off and sold as captive-bred (Beaudry, 2020). Buyers may include individuals, breeders, or turtle farms. It is difficult to tell with certainty if a turtle was actually captive-bred, so this is a common method of circumventing the law.

# CONCLUSIONS FROM OUR RESULTS

Our conclusions from the results we gathered are presented in Figure 15. We identified areas of the trade that need to be addressed. The problems we discovered include lack of funding, light sentences and fines, distinguishing between a wild-caught and captive bred turtle, adult turtle collection, and social media. Based on the interviews and archival research we conducted, we have made conclusions on these problems. These conclusions include more funds and resources, more education, developing methods of distinguishing wild-caught from captive bred turtles, turtle farms are not sustainable and finally social media needs more monitoring.



Kerry Wixted (CC BY 2.0)



# CONCLUSIONS FROM OUR RESULTS

Figure 15

Key Points Gathered from Interviews and Research, and Our Resulting Conclusions

## WHAT WE LEARNED



### RESOURCES & FUNDING

Within wildlife agencies, there is a lack of funding and resources, limiting enforcement efforts.



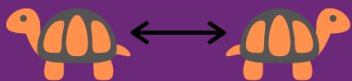
### LIGHT SENTENCES

Lack of adherence to maximum wildlife trafficking penalties encourages traffickers to continue breaking the law. Traffickers see wildlife smuggling fines as the cost of doing business.



### DOWN-PLAYING

Judges, district attorneys, and prosecutors lack understanding of the severity of wildlife trafficking. In the eyes of the law, wildlife trafficking is not as detrimental as other forms of trafficking.



### WILD-CAUGHT OR CAPTIVE BRED

There currently is no full proof method of distinguishing wild-caught turtles from captive bred ones. While there are some methods to get an idea, no current method will hold in a court of law.



### POPULATION INTERFERENCE

When an adult turtle is taken from the wild, its potential to recolonize a population in the wild is gone.



### SOCIAL MEDIA

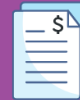
Wildlife traffickers scour social media posts about wild turtles and turtle collecting in order to find rare species. Social media provides easy connections for overseas buyers.

## WHAT WE CONCLUDED



### INCREASE IN FUNDING

We concluded that there needs to be an increase of funding to conservation efforts and wildlife enforcement agencies.



### INCREASE IN PENALTIES

We came to the conclusion that there needs to be an increase in the amount of fines paid and time served.



### EDUCATION FOR RELEVANT PARTIES

Judges, district attorneys, and prosecutors need more education on the severity of these wildlife crimes. We hope this leads to more maximum penalties given.



### WILD-CAUGHT OR CAPTIVE BRED

We concluded that there needs to be more development and wide spread use of conservation genetics and PIT tags on wild turtles. This will help with identifying wild-caught turtles from captive bred ones.



### TURTLE FARMS

Turtle Farms are one of the largest buyers of wild-caught turtles. They also provide a front to laundering illegally caught wild turtles. We concluded that turtle farms are not sustainable.



### MONITORING SOCIAL MEDIA

We believe that social media is a major part of the turtle trade. We conclude there needs to be an increase of monitoring social media platforms and forums.

# OUR DELIVERABLES

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When brainstorming what deliverables we wanted, we considered the message we wanted to offer the world. Considering that we are living through a climate crisis and the sixth extinction, otherwise known as the Holocene Extinction, we felt that not enough people are aware or even care about what is going on. Turtle trafficking is part of this greater extinction, tied to climate change, pollution, and greed.

The first deliverable we decided on was this report, submitted to WPI and WWF - Hong Kong, detailing the information we've gathered from our interviews and the resulting recommendations for mitigating the effects of the turtle trade.

We then decided to create an Instagram account to spread awareness to the general public. We created the account, @turtleswpi, and created several posts with photos and descriptions for various issues in the turtle trade.

For our last deliverable, we created a story map video. The video shows the journey of a turtle taken from the wild to be traded to Hong Kong from the United States. We believe that these three deliverables will help show diverse audiences the importance of environmental consciousness.

## OUR INSTAGRAM ACCOUNT

We created an account on Instagram, a popular photo and video-sharing app, to spread awareness about the crisis of the Eastern Box Turtle and educate the public on how they can help. The account contains various posts focusing on the Eastern Box Turtle and conservation. Some of the posts, seen in Figures 16 through 19, discuss topics such as the nature of our project, what to do when encountering an Eastern Box Turtle in the wild, how smugglers transport turtles, and the dangers of posting turtles on social media.

# OUR DELIVERABLES

Figure 16  
@turtleswpi post from February 8th, 2021

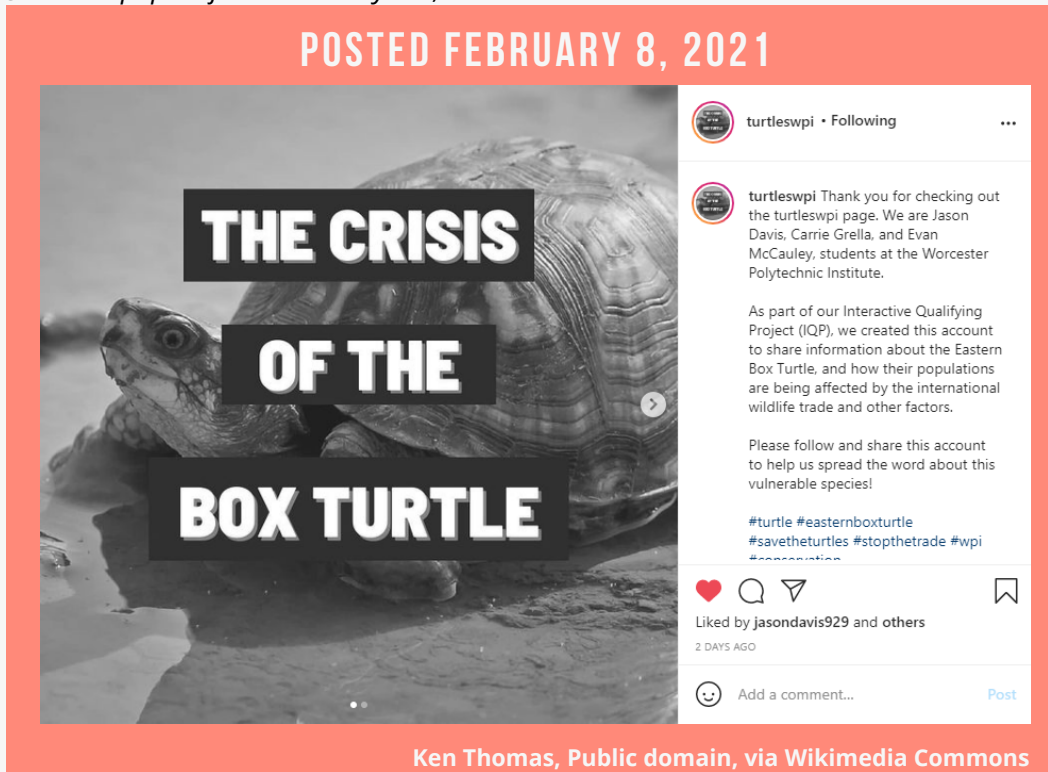
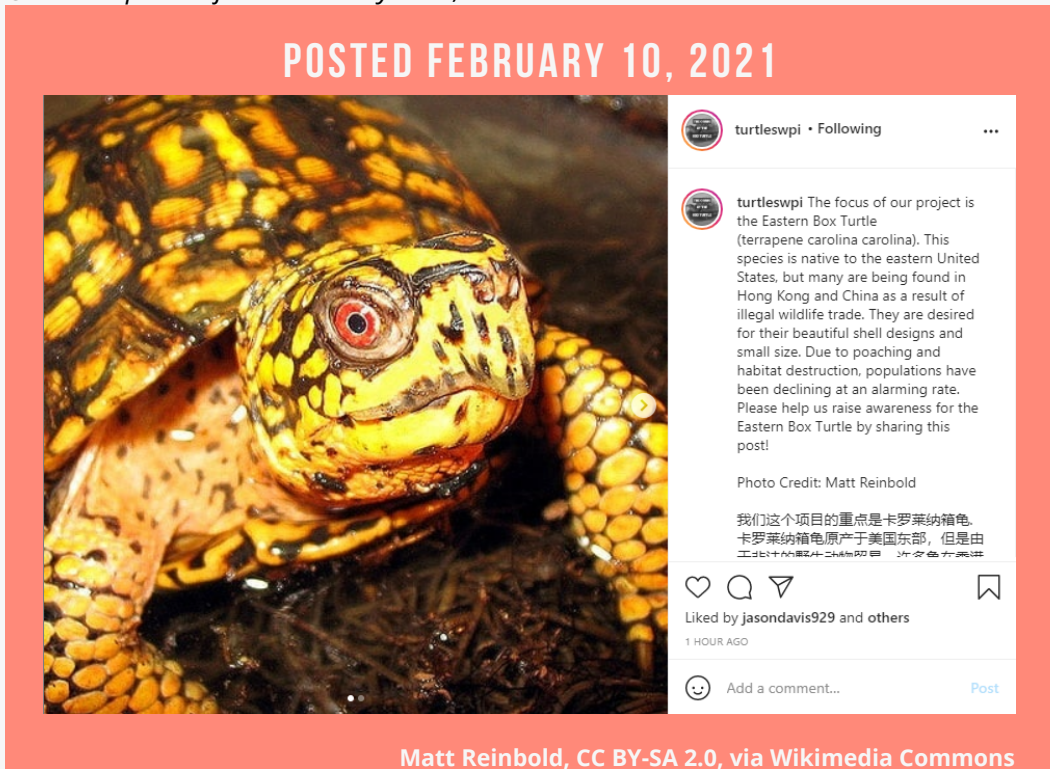


Figure 17  
@turtleswpi Post from February 10th, 2021



# OUR DELIVERABLES

Figure 18

@turtleswpi Post from February 15th, 2021

POSTED FEBRUARY 15, 2021



turtleswpi • Following

turtleswpi One of the most common methods of transporting turtles internationally is to smuggle them onto a plane. Oftentimes, traffickers will cruelly pack as many turtles into a suitcase as they can fit. The turtles' limbs are duct taped to make more room, and to prevent the turtles from moving around. They are given little if any food, and many turtles often die during transportation.

Photo Credit: Bureau of Customs, NAIA

在国际上运输乌龟最常见的方法之一是将乌龟走私到飞机上。贩运者常常会残酷地将尽可能多的乌龟装进手提箱，为防止乌龟四处移动和有更多的空间，他们用胶带固定乌龟的四肢。它们几乎没有食物，许多乌龟在运输过程中死亡。

Liked by jasondavis929 and others  
1 HOUR AGO

Add a comment... Post

NCBioTeacher, CC0, via Wikimedia Commons

Figure 19

@turtleswpi Post from February 17th, 2021

POSTED FEBRUARY 17, 2021



turtleswpi • Following

turtleswpi When you come across a turtle in the wild (especially one with a beautiful shell), it can be tempting to tell all of your friends on social media by posting a picture of it. But often times, poachers will look online for these posts and attempt to find the turtle based on the poster's location. You can take a picture, but don't post it online. Do not attempt to move the turtle either, unless it is in a truly dangerous area like the middle of the road. Lastly, if the turtle is injured, contact your local wildlife center for help.

Photo Credit: Joe Myers

当您在野外看到一只乌龟时（尤其是一只壳很漂亮的时候），您可能很想告诉您的朋友。但是，有时偷猎者会在线寻找这些帖子，并尝试根据发帖者的位置找到乌龟。您可以拍照，但不要在网上发布。除非是在真正危险的地方（如马路中间），否则不要尝试移动乌龟。最后，如果乌龟受伤，请联系当地的野生动物中心寻求帮助。

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## THE TURTLE'S JOURNEY: A STORY MAP VIDEO

For our second deliverable, we created a video detailing the journey of a turtle targeted by the illegal wildlife trade. The visuals are a compilation of various photos and videos gathered from the internet. For the audio, we used royalty-free music and a narration by Jason Davis. The video script can be found in Appendix A.

Not enough people are aware of the severity of the wildlife trade. We wanted to be able to send a message of the importance of protecting our turtle species and what is going to happen if no one takes action. We spoke with Prof. Dodson about how to tell our story in a unique way. After discussing different methods of transmedia storytelling, we decided that making a story map video was our desired way of introducing our audience to the exotic wildlife trade and the painful journey of a trafficked turtle.

The video can be accessed through our Instagram page, @turtleswpi. The exact video link is <https://www.instagram.com/p/CL7eE46jmdM/>.



Kerry Wixted (CC BY 2.0)

# RECOMMENDATIONS

We provided the following recommendations to our liaison, Ms. Jovy Chan, in order to better manage the international turtle trade. These recommendations were formulated as a direct result of our interviews with government and non-government organization employees. We identified four key categories to build our recommendations under: education; enforcement; legislation; and sustainability.

## EDUCATION RECOMMENDATIONS

### 1. Educate judges and prosecutors on the severity of turtle trafficking crimes.

*(Judicial Branch of Both The United States and Hong Kong Governments)*

- A well-informed judicial body is imperative to ensuring that traffickers face sufficient penalties
- Helps to deter repeat offenses

### 2. Provide educational programs on sustainability and conservation in Hong Kong.

*(Primary Schools within Hong Kong)*

- Turtles' popularity in Hong Kong and China is due to their cultural significance
  - Admired but treated like objects rather than living creatures.
- Teaching the value of a turtle's life would decrease interest in practices that would threaten it

## ENFORCEMENT RECOMMENDATIONS

### 3. Increase funding to federal wildlife agencies in the United States and Hong Kong.

*(USFWS and AFCD)*

- The most recurring point heard in our interviews was that there is a lack of resources and funding for wildlife agencies.
- Greater funding would increase the capacity to investigate trafficking and save more turtle populations.

### 4. Conduct routine inspections of turtle shops in Hong Kong for wild-caught and endangered turtles. *(Hong Kong Police Force, Customs and Excise Department)*

- Inspections should be common but not regular, so as to prevent shop owners from hiding any illegal stock.
- Genetic tracing can be used to determine if a turtle may have been illegally transported from another country.
- The WWF could create a species identification packet or online tool to help officers determine what species are in the shop, where the species are from, and if the species are endangered.
- Discourages shop owners from interacting with smugglers

# RECOMMENDATIONS

## 5. **Greater scrutiny of social media.** *(Customs and Excise Department)*

- Traffickers employ social media to find wild turtles and potential buyers.
  - Understanding how traffickers leverage social media and taking measures to prevent the capture or sale of turtles could save populations and lead to further arrests.

## LEGISLATION RECOMMENDATIONS

### 6. **Stronger international enforcement of CITES.** *(Governing Bodies of CITES)*

- More consistent penalties would eliminate weak spots that traffickers exploit between destinations.

### 7. **A Lacey Act equivalent in Hong Kong and China.** *(Legislative Council and The National People's Congress)*

- There are some wildlife protection laws in Hong Kong and China.
  - We believe that the severity of the wildlife trade is strong proof that these laws are not as effective as they could be.
- Something like the Lacey Act involving international protections for illegally taken and illegally transported wildlife would help to prosecute not only turtle traffickers, but anyone else that is knowingly involved in the illegal wildlife trade.

### 8. **Stronger unity on non-federally protected species in the United States.** *(State Wildlife Agencies)*

- States differ on which species are protected based on native populations.
  - This difference has led to the turtle laundering loophole.
- Implementing similar protections for these species across state lines would help to maintain wild turtle populations and eliminate laundering.

## SUSTAINABILITY RECOMMENDATIONS

### 9. **State or federally associated breeder program in the United States.** *(USFWS, NGOs)*

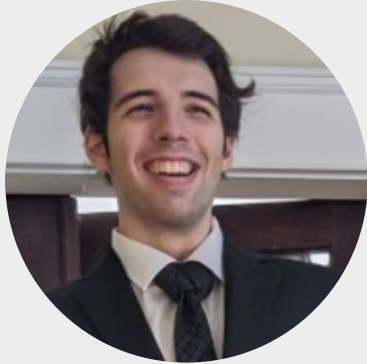
- Mirroring Kadoorie Farm & Botanical Garden in Hong Kong
- Staffed by trusted officials such as current or former USFWS agents and conservation specialists
- On the state level, programs can be particular about local endangered turtle species

### 10. **Further development of PIT tag technology.** *(USFWS, State wildlife agencies)*

- PIT tags are a useful tool for identifying turtles and their origins, and we would like to see the technology improve in the near future
  - Current problems include cost inefficiency and maintaining the balance of a long sensory range while keeping the tags small
- It would be beneficial to have scanners at customs agencies for turtle imports/exports



# PERSONAL DEVELOPMENT



**JASON DAVIS**

COMPUTER SCIENCE MAJOR

This last semester has certainly been quite a ride. The only class that I've had that's felt similar to IQP was my Software Engineering class. However, this project created a completely new area for me to explore. Making phone calls and conducting interviews as part of the investigative process was a surprisingly enjoyable experience.

Being unable to travel to Hong Kong was certainly a downer. But I know that I will be able to travel in the future, and I hope to one day personally see the land that I researched so much over the last few months. Exiting IQP, I will always think a little more about how my actions may be impacting the world around me.

This project was difficult. It's very mentally taxing to be sitting in front of a computer in a cold room, isolated from my teammates and advisors, for many hours a day. But, I chose not to let this take away all of my motivation. It's amazing that, even though we were stuck inside our homes because of the COVID-19 pandemic, we could still complete a big project like the IQP and still make an impact.

Working on this project has allowed me to find a passion in wildlife conservation. The conservationists we interviewed exhibited contagious passion and determination in the future of our planet. Speaking with them and learning about their involvement in protecting America's turtles was a very inspiring and motivating experience.

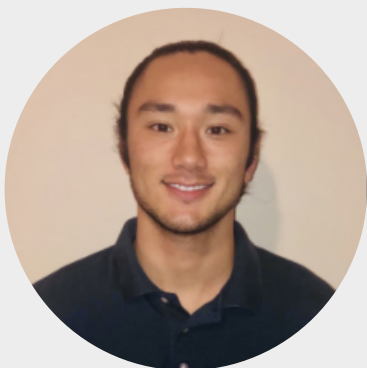


**CARRIE GRELLA**

INTERACTIVE MEDIA & GAME  
DEVELOPMENT MAJOR

From the moment I got accepted into the Hong Kong project center, I had doubts about actually being able to go. At first, it had nothing to do with Covid-19 and everything to do with the Hong Kong protests. After lock down eventually came and projects were being canceled, it was not difficult to see that we were not going to be able to travel. I had accepted it, but it was still disappointing.

Being locked up in a room all day for the past few months has been very difficult. But this experience was still valuable, and I am glad to have been apart of this great team and great project center. This project has opened my eyes to the greater problems that this world is facing. I hope that through this project and my future career, I can help make the world a better place.



**EVAN MCCAULEY**

MCHANICAL ENGINEERING  
MAJOR



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## VIDEO SCRIPT

Currently, we are faced with the Sixth Mass Extinction. As a result of climate change, habitat destruction, and pollution, it is estimated at least 200 - 2,000 species go extinct every year. An effect that has been accelerated by humanity.

A significant contributor to this problem is the exotic pet trade. The region of Hong Kong serves as a hub for wildlife trade in general. Animals from across the world are brought to Hong Kong, and turtles are among the biggest targets. We are seeing turtle populations around the globe declining at an alarming rate. The desire for turtles is driving Asian turtle populations to the brink of extinction. Of the 35 turtle species that are native to China, 15 are endangered, and 11 more are critically endangered. As it becomes more difficult to locate these native turtles due to their dwindling populations, the demand for foreign turtles increases. These days, turtles are shipped off to Hong Kong from anywhere they can be found, including Africa, Mexico, South America, and the United States.

We will be following an all-too-common story for Eastern Box Turtles, between the days as a hatchling to arriving in Hong Kong. Eastern Box Turtles are endemic to the United States, found from southern Maine, down to northern Florida, and as far west as Illinois. And as one of one of the many victims of the pet trade, they can also be found in captivity in Hong Kong.

Our turtle's journey begins in North Carolina, a common spot for his kind. He may live in the woodlands, on the edges of a field, or by the bank of a stream. He is one of just eight eggs laid by his mother.

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Here, we see our hatchling exploring the world for the first time. Though his brothers and sisters are few, it is almost a miracle that they have hatched at all. Between predators, poaching, and habitat destruction, their chances of surviving to adulthood are slim. The Eastern Box Turtle won't be able to reproduce for five to eight years. On average, an Eastern Box Turtle will live 25 - 35 years, though some are even able to live for over 100 years with the right conditions. Unfortunately, the pet trade has made the beautiful Eastern Box Turtle a popular target for poachers looking to make money.

All too often, these poachers know their way around the law. They may capture a box turtle in one state, say North Carolina, where doing so is illegal, and bring it to a state where collecting box turtles is not illegal, like Florida. This unfortunately common process is known as laundering, and it can be difficult if not impossible to tell if a turtle has been laundered.

There are many possible paths these turtles might follow to get to Hong Kong. If the turtles were laundered onto a turtle farming business, they may be passed off as captive bred and sold directly to a customer. Sometimes these customers buy turtles with the intent to illegally transport them to Hong Kong. Other turtles might skip the turtle farm stage entirely and be sold directly to people with connections to Hong Kong pet markets.

Before shipping out the turtles, traffickers often use duct tape to secure the turtle's limbs inside of its shell. This is done to ensure that they do not move, are more difficult to detect, and so that the trafficker can fit more turtles inside of a box.

From Florida, the turtles are shipped by plane to Hong Kong, enduring the grueling conditions of their captivity for nearly 24 hours. They will most likely arrive at Hong Kong International.



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The Hong Kong International Airport handles hundreds of flights every day. In 2019 there were 420,000 air traffic movements which included passenger, cargo, and non-revenue flights. From just the sheer amount of luggage and cargo being processed every day, it isn't difficult to see how a large number of illegal wildlife shipments can make it into the region unchecked.

Once our turtle arrives in Hong Kong, he and the others may be sold directly to a high-paying buyer or brought to one of Hong Kong's many street side pet markets to be sold off later. Goldfish Market, located on Tung Choi street, is lined with various pet stores. They sell everything from fish to frogs and of course, many turtles and tortoises. After being bought at a pet market, likely for aesthetic purposes, our turtle will just serve as another object of beauty, much like a vase or a painting.

If the turtle trade continues without any effort of mitigation, turtle populations like that of the Eastern Box Turtle will continue to drop, eventually reaching extinction. These turtles are traded like art pieces, and this natural beauty that humans hunger for may become lost forever. But there is still time to control the trade. With sustainable practices and the right protective measures, we can live in harmony with these turtles for years to come. We must consider these turtles for what they are: creatures that worthy of a peaceful life. Worthy of a wild life. Worthy of a good life. Worthy of a life on this Earth.

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## PASSIVE INTEGRATED TRANSPONDERS (PIT TAGS)

These tags do not have a battery and only activate when read by a scanner (Biomark Frequently Asked Questions, n.d.). The scanner sends the PIT tag a low frequency signal, providing the tag enough power to send out the unique code identifying the tagged animal. Currently, the range is quite small. Most handheld readers have a range of 3 to 9 inches depending on the reader and other factors such as tag frequency, electromagnetic noise, presence of ferrous metals, orientation of the tag, and antenna power. It is possible to scan the tags through plastics, water, wood products, animal tissue, bone, fabrics, fiberglass, rock, and most nonferrous metals.

### PRICE OF TAGS (BIOMARK 2020 PRODUCT CATALOG)

- GPT12 Pre-loaded Sterile LL (12.5mm 134.2 kHz)  
Qty 1-499: \$7.65 each, Qty 500-1000: \$7.15 each
- MiniHPT8 Pre-loaded Sterile Syringe (8.4 mm x 1.4mm 134.2kHz)  
Qty 1-499: \$7.65 each, Qty 500-1000: \$7.15 each
- MiniHPT10 Pre-loaded Sterile Syringe (10.3 mm x 1.4mm 134.2kHz)  
Qty 1-499: \$7.65 each, Qty 500-1000: \$7.15 each

### PRICE OF READERS (BIOMARK 2020 PRODUCT CATALOG)

- BIOMARK HPR PLUS: \$3,055
- BIOMARK HPR LITE: \$815
- GPR PLUS: \$556

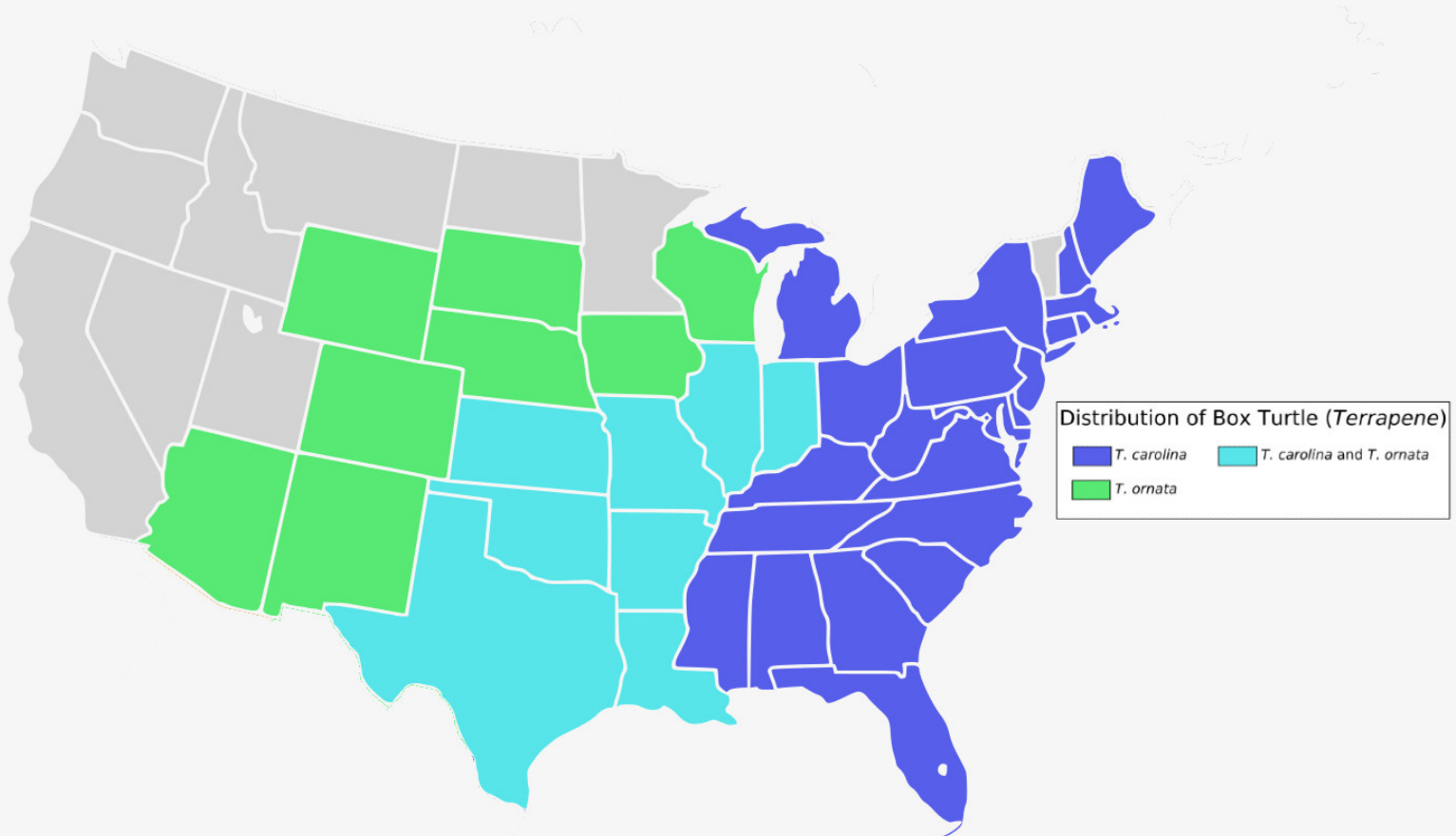
## STATE LAW RESEARCH

In order to better understand the efficacy of protective regulations, it was important to get an idea of how the United States government handles various laws concerning turtle welfare. Due to the prioritization of a state's independent rights, each state is allowed to make its own regulations rather than follow unified federal regulations.

### RANGE OF THE BOX TURTLE

Figure 20

*Range of T. Carolina and T. Ornata Box Turtle Species in the United States*



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*Note:* This figure does not include data for Alaska or Hawaii, which are not home to any freshwater turtle species. Adapted from Box Turtle Distribution Map, by Makeemlighter, 2011 ([https://commons.wikimedia.org/wiki/File:Box\\_turtle\\_distribution\\_map.svg](https://commons.wikimedia.org/wiki/File:Box_turtle_distribution_map.svg)).

CC BY-SA 3.0.

An important piece of contextual information is the range of the Common Box Turtle (*Terrapene carolina*), of which the Eastern Box Turtles (*T. carolina carolina*) is a subspecies. Some states may have few if any protections for box turtles. This makes sense if this state is not part of the species' range. Concern arises when a state that is within the range does not have enough protective measures. As can be seen in Figure X, the states highlighted in indigo and cyan are part of the Common Box Turtle's range. The range is comprised of 31 states, each with varying regulations.

## POSSESSION

Of the 31 states within the Common Box Turtle's range, only 12 prohibit box turtle possession entirely. There are only two states that do not allow any turtles to be taken from the wild: Vermont and Washington. Unfortunately, this does not help box turtle populations as there are none in Vermont and Washington (Nauti-lass Ponds & Critters Inc., n.d.). States that do allow the collection and subsequent possession of box turtles will often impose restrictions. For example, Indiana does not allow the take of wild Eastern Box Turtles, but allows the possession of one turtle so long as the owner has a permit (Indiana Department of Natural Resources, n.d.).



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## COMMERCIAL SALE

Eighteen of the states within the Common Box Turtle's range prohibit the commercial sale of wild-caught turtles, or will otherwise require a permit to do so. Even then, these states have regulations forbidding the commercial sale of protected species, which often include the subspecies of the Common Box Turtle relevant to the region.

## FEDERAL INVOLVEMENT

For the most part, states regulate their wildlife trade independently. However, there are two key federal laws superseding state wildlife laws: the Lacey Act and the Endangered Species Act.

The Lacey Act, established in 1900, makes it illegal to import, export, buy, sell, or otherwise acquire fish, wildlife, or plants that were acquired or transported in violation of state, federal, or foreign law (USFWS, n.d.-b). This includes all fish, wildlife, plants, and their parts that are protected by CITES. Violations of the Lacey Act, including the falsification of trade documents, can result in a prison sentence of up to five years, and a maximum fine of \$250,000 for an individual or \$500,000 for an organization (USFWS, 2014).

The Endangered Species Act (ESA) of 1973 requires federal agencies to ensure that their actions do not threaten the existence of any endangered species (Environmental Protection Agency, 2020). Actions that involve taking or transporting any such species is also prohibited. Violators of the Endangered Species Act may be subject to up to one year in prison, a maximum fine of \$100,000 for an individual or \$200,000 for an organization (USFWS, 2014).

## INFORMED CONSENT AGREEMENT FOR PARTICIPATION IN A RESEARCH STUDY

### Non-Videotaping-Semi-Structured Interviews

**Investigators:** Jason Davis (jrdavis@wpi.edu), Carrie Grella (cigrella@wpi.edu), & Evan McCauley (emccauley@wpi.edu)

**Primary Contact Information:** gr-hkturtle-c21@wpi.edu

**Project Title:** The Study of International Trade of Turtles

**Sponsor:** Jovy Chan (jovychan@wwf.org.hk)

#### *Script*

#### **Introductions**

- Greet those being interviewed or those involved with a focus group.
- Thank those involved for their time.
- Ask how they would like to be addressed?
- Introduce the team by first and last name and indicate that we would like to be referred to by first name.

**Introduction to format of this meeting:** You are being asked to participate in a research project. Before you agree, however, we wish to inform you about the purpose of the project and the procedures and protocols we follow. Our goal here is to ensure that you are making a fully informed decision regarding your participation and feel comfortable in participating.

**Purpose of our project:** The purpose of our project is to provide the World Wide Fund for Nature Hong Kong with a report that identifies all aspects of the legal and illegal trade of Box Turtles between the United States and Hong Kong.

**Procedures and Protocols:** It is important that we take a moment to explain our responsibilities and your rights regarding this one hour in duration semi-structured interview. Eventually our final IQP document, which includes the results of our interaction with you (your answers), will be stored on the WPI library website or may appear in a published paper.

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**Record keeping and confidentiality:** We would like to receive your verbal permission to publish your responses as well as the names, titles, and any affiliations that you may have with individuals or groups that we may discuss during this interview. Anonymity is guaranteed unless your permission is received. You have the option to remain anonymous and continue to participate in the interview/study. If we wish to use a quote that identifies you, we are required to ask for your permission and you have the right to review any quotes or information before publication. The answers to our questions, today, will be maintained in our pass-coded computer to be reviewed only by this team. No one else will have access to the answers. Raw data not published will be deleted upon completion of the project. We will be recording this interview through Zoom and the recording will also be stored in our pass-coded computer. "Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you."

**Risks to participants:** There are no anticipated, perceived or known risks to you that we are aware of as a result of your participation in this semi-structured interview.

**Benefits to research participants and others:** There are no monetary or other benefits to you or others who participate in this semi-structured interview.

**For more information about this research or about the rights of research participants, or in case of research-related injury, contact:**

**Jason Davis**, Tel: 978 973 7268, Email: [jrdavis@wpi.edu](mailto:jrdavis@wpi.edu)

**Carrie Grella**, Tel: 508 446 7946, Email: [cigrella@wpi.edu](mailto:cigrella@wpi.edu)

**Evan McCauley**, Tel: 401 300 1032, Email: [emccauley@wpi.edu](mailto:emccauley@wpi.edu)

**Ruth McKeogh** (IRB Manager), Tel. 508 831 6699, Email: [irb@wpi.edu](mailto:irb@wpi.edu)

**Gabriel Johnson** (Human Protection Administrator), Tel. 508 831 4989, Email: [gjohnson@wpi.edu](mailto:gjohnson@wpi.edu)

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**Your participation in this research is voluntary:** Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

**Final Comments before undertaking Interview:**

1. Do you have any questions about our project or any of our responsibilities or your rights?
2. If not, then may I have your permission to record this session or conversation? (If they agree, ask their permission once recording, so that their consent is recorded.)

**Begin the interview:**

1. Ask your questions remembering to paraphrase, summarize and question to the void. Remember to watch your time as you must receive answers to key questions.
2. End the interview, asking the interviewee if they have any follow-up statements that they were not able to make, any questions about the project, how their answers will be used, or any other relevant questions?
3. Thank the participant for their time. Ask if you may follow up for more questions later, if necessary or relevant, either through the same medium as this interview, or through another format.

## INTERVIEW QUESTIONS

### QUESTIONS FOR PET STORE OWNERS & TURTLE FARMERS

1. TELL US MORE ABOUT WHAT TURTLE SPECIES ARE POPULAR, AND WHAT MAKES THEM POPULAR.
2. HOW DO YOU DISTINGUISH WILD-CAUGHT TURTLES FROM FARM-RAISED TURTLES?
3. WHAT KIND OF DOCUMENTATION IS REQUIRED TO BUY AND/OR SELL TURTLES?
4. HOW MANY [BOX] TURTLES ARE YOU ALLOWED TO SELL PER PERSON?
  - A. IF THERE ARE REPEAT CUSTOMERS, WHY DO YOU THINK THEY ARE BUYING TURTLES REPEATEDLY?
5. FROM WHERE DO YOU OBTAIN THE TURTLES YOU ARE SELLING?
6. PLEASE EXPLAIN THE PROCESS OF BREEDING TURTLES. (FARMERS)
7. HOW OFTEN DO YOU SUPPLEMENT WITH WILD TURTLES? (FARMERS)
8. EXPLAIN THE REASONING AND PROCESS.
9. WHO ARE YOUR MAIN BUYERS?
  - A. EXPLAIN THE PROCESS OF SHIPPING TURTLES.
  - B. HOW HAS THE TURTLE BREEDING COMMUNITY RESPONDED TO THE INCREASE IN VALUE OVERSEAS?



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## QUESTIONS FOR USFWS AND NON-GOVERNMENT ORGANIZATION EMPLOYEES WITH SUMMARY OF RESPONSES

### 1. WHAT KIND OF DOCUMENTATION IS REQUIRED TO BUY AND/OR SELL TURTLES (LOCALLY, THEN OVERSEAS)?

The general consensus is that it varies depending on the state. If the species is not federally listed on the Endangered Species Act, then protections are controlled by state law. There is also the Lacey act, which is a federal law that makes it unlawful to import, export, sell, or purchase any wildlife that is obtained illegally. It also regulates transport of illegally acquired wildlife between state lines. As far as exporting overseas, any export of live animals needs to be declared to the USFWS. If the wildlife is listed on CITES, then the exporter needs to apply for an export permit.

### 2. WHAT IS THE PROCESS FOR ISSUING PERMITS FOR THE INTERNATIONAL TRADE OF BOX TURTLES?

Whether the species is listed on the ESA or just on the CITES appendices can change the process. Applicants need pay a fee to the USFWS. Species that are listed on the ESA can be exported only if they fall under an exception or they are being exported for scientific purposes. In the case of the latter, exporters would need to apply for a permit while following the requirements of other regulations such as CITES. If the species is just listed on CITES, the USFWS is required to make a finding showing that the plants or animals were legally obtained and not detrimental to the species in the wild. According to Susan Lieberman, this means that the USFWS asks the states if there are any concerns. If the species is coming from a wild habitat in the states, the USFWS would have to check the local legislation.

### 3. WHAT TRENDS HAVE YOU NOTICED IN TURTLE POPULATIONS IN RECENT YEARS? ARE ALL POPULATIONS DECREASING, OR ARE THERE SOME POPULATIONS THAT ARE STABLE OR EVEN THRIVING?

In general, our interviewees indicated that turtle populations around the globe are decreasing. Bruce Weissgold added that common species like the Red-Eared Slider or species that are undisturbed may be stable or increasing. Brian Horne also noted that recent years have seen an increase in the number of high-end turtle traders.

#### 4. IN YOUR OPINION, ARE THE CURRENT LAWS, THE PENALTIES FOR BREAKING THEM, AND THE POLICING, ADEQUATELY PROTECTING TURTLE POPULATIONS. (IF NOT, WHAT NEEDS TO BE CHANGED?)

Most of our interview subjects agreed that the current system does not do enough to protect turtle populations. A recurring statement was that judges and prosecutors do not always fully grasp the severity of the trade. When a judge sentences a trafficker to pay a \$20,000 fine, this is seen as another cost of doing business in an industry that pays hundreds of thousands of dollars. Traffickers continue because they know that they can either get away with their crimes or suffer a minor profit loss.

#### 5. TELL US MORE ABOUT HOW TRAFFICKERS AND SMUGGLERS ARE CAUGHT.

There are many ways in which traffickers and smugglers are caught. The most successful method seems to be undercover investigations, but these require a large amount of time and resources, so they are not commonly conducted. More common methods include luggage inspection, the use of dogs that can detect the scent of turtles, or from informants.

#### 6. WHAT LEGAL LOOPHOLES DO TURTLE TRAFFICKERS EXPLOIT?

Our interviewees made us aware of several loopholes:

- Laundering: Turtles caught in the wild will be sold to turtle farmers. In other cases, turtles are laundered from states where there are no laws protecting them.
- Dishonesty: Traffickers lie about whether a turtle is captive-bred or not. This is one of the most common loopholes, passing wild-caught turtles off as captive-bred. Traffickers commonly lie about what species a turtle is, attempting to convince authorities that a protected turtle actually belongs to an unprotected species.
- Daily bag limit: Most states have laws limiting how many turtles can be harvested from the wild. Traffickers commonly take the maximum amount of turtles they can legally harvest and bring them to a turtle farm or other location where the turtles are cached. Then, the process repeats. Inspectors may check vehicles to verify adherence to the daily bag limit, but it is very uncommon for inspectors to check people's homes.

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## 7. BASED ON YOUR EXPERIENCE, WHAT METHODS ARE USED TO DISTINGUISH WILD-CAUGHT TURTLES FROM THOSE RAISED ON A FARM?

There are many ways to distinguish wild-caught turtles from farm-raised turtles:

- **Markings:** While captive-bred turtles are often in pristine condition with little indication of wear or damage, wild-caught turtles' shells display markings from predators. Wild-caught turtles may have tanned skin from being in the sun and stains on their skin and shells from being in water.
- **Parasites:** Wild-caught turtles have parasites in their stomachs and on their bodies that they contract from being in the wild. Captive-bred turtles do not commonly have these parasites. Biologists will check potential wild-caught turtles for these parasites and use the results as evidence. However, this often fails to hold up in the court of law as captive-bred turtles that are kept penned outside could potentially have these parasites as well.
- **Signature markings:** Wild turtles have signatures that allow one to quickly identify the turtles' species. Captive-bred turtles lose these signatures when they are bred across regions.
- **Health issues:** Turtles (specifically tortoises) can show evidence of malnutrition on their shells. A malnourished tortoise's shell will exhibit "pyramiding", when the scutes of the shell become pointy and pyramid-like. A healthy tortoise will have a smoother, rounder shell. It is rare for wild-caught tortoises to suffer from malnutrition.

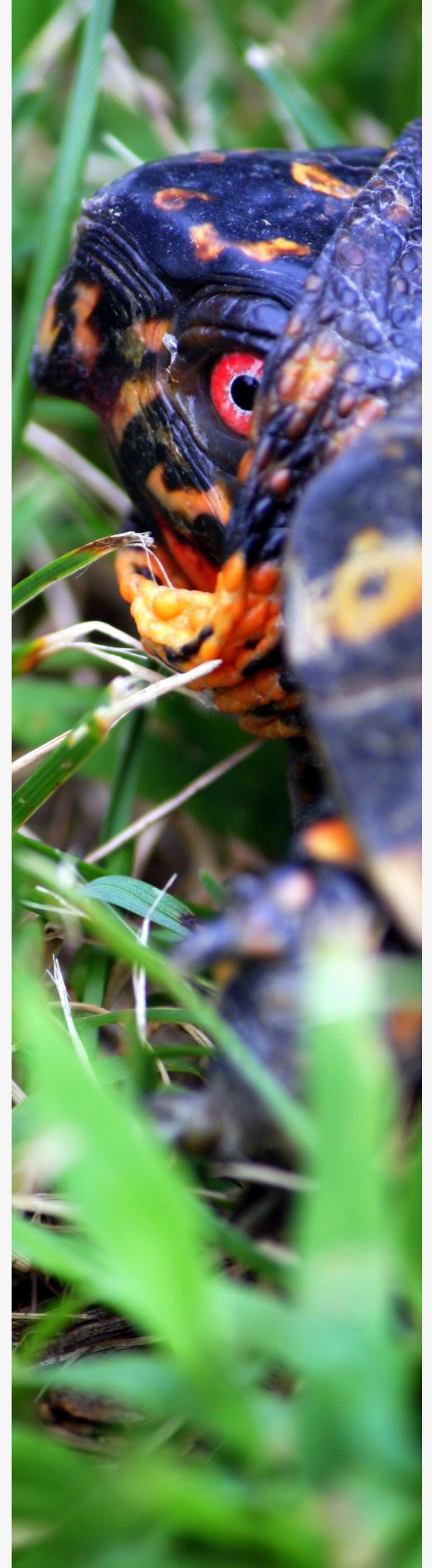
# APPENDIX F

## CONTACTS

This is a list of pet stores, turtle farms, NGO and USFWS employees we have contacted throughout this project. Bolded names are organizations and individuals we successfully interviewed. Underlined names are organizations and individuals that we spoke briefly with.

### UNITED STATES PET STORES AND FARMS

1. Turtle Towns (PA)
2. Tortoise Town (NJ)
3. Alabama Turtle Farmer (AL)
4. Jabberwock Reptiles (MA)
5. Reptile Industries (FL)
6. PetCo (RI, MA)
7. PetCo Corporate (CA)
8. United States Association of Reptiles (USA)
9. Reptile Rapture (WI)
10. New England Reptile & Raptor (MA)
11. Underground Reptile (FL)
12. Bluewater Zoo (FL)
13. Turtle Source (FL)
14. Tangi Turtle Farm (LA)
15. Dark Hammock Turtles (FL)
16. Boudreaux's Turtle Farm (LA)
17. PB&J Turtle Farm (AR)
18. Concordia Turtle Farm (LA)
19. Backwater Reptiles
20. CajunGrocer (LA)
21. LA Crawfish (LA)
22. New Orleans Fish House (LA)
23. LLLReptile (CA)
24. CB Reptiles (NJ)
25. Millington Seafood (MD)
26. XYZ Reptiles (FL)



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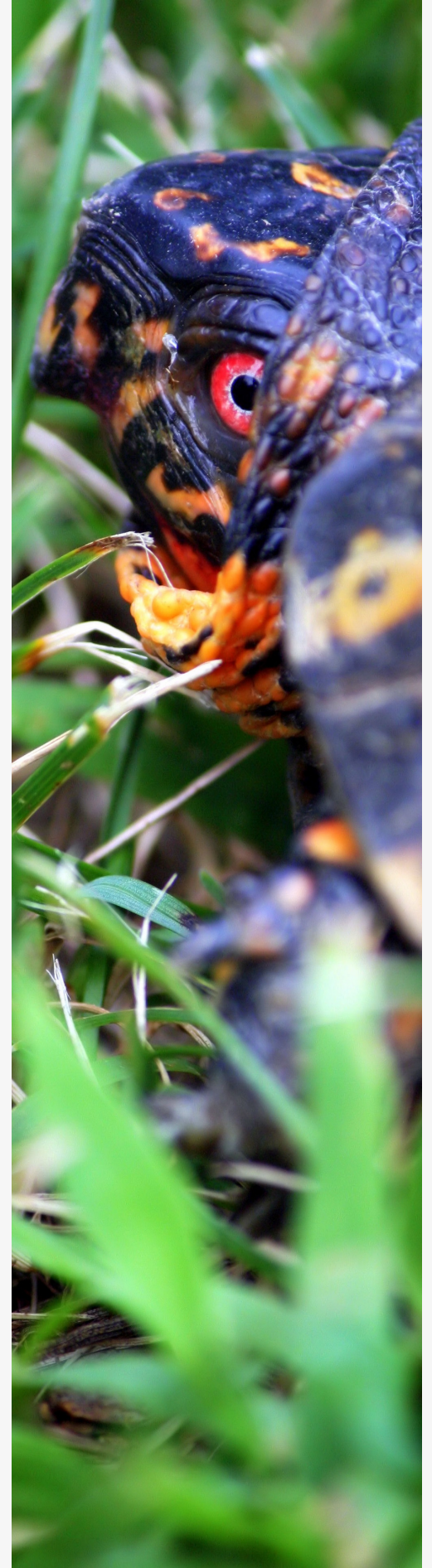


## HONG KONG PET STORES

1. Avery's Reptiles (HK)
2. Goldfish Market (HK)
3. Urban Jungle (HK)
4. FishManShop (HK)
5. Art of God Exotic Services (HK)
6. Thin. Fin (Mong Kok Store) (HK)
7. BTReptile (HK)
8. Pet City (China)
9. New Equator Reptiles & Amphibians (HK)
10. 爬爬 Wild House Reptile (HK)
11. MAD Unit Reptiles (HK)
12. Rare. Fin Reptile Aquarium Specialty Store (HK)

## USFWS / NGO EMPLOYEES

1. **Susan Lieberman (Wildlife Conservation Society / USFWS)**
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3. Thomas Leuteritz (Division of Scientific Authority)
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5. Christina Meister (Office of Public Affairs)
6. Allen Salzberg (New York Turtle and Tortoise Society)
7. Theresa Telecky (Humane Society of the United States)
8. Robin Sawyer (TRAFFIC)
9. **Peter Paul van Dijk (Global Wildlife Conservation)**
10. **Brian Horne (Wildlife Conservation Society)**
11. Col. Curtis Brown (FWC Law Enforcement Director)
12. Captain Barrow (FWC Law Enforcement Captain)
13. **Bruce Weissgold (USFWS Senior CITES Specialist (Former))**
14. Division of Management Authority
15. Division of Scientific Authority



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