

Ethical Management of Invasive Species

The Burmese Python

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Abstract: Burmese pythons and other invasive species wreak havoc on local environments and threaten biodiversity globally. Beginning with an overview of the unique challenges posed by the Burmese python in Florida, this article addresses invasive species laws and management that currently exist both in the United States as well as across the globe. The current method for addressing the complications created by the pythons is to capture and destroy them. This process is not the most effective means of addressing biodiversity loss as Burmese python populations are now declining in its native habitat due to overexploitation. The following discussion proposes that these pythons not be captured and killed, but rather humanely captured then released back into its native habitat. This is a logical alternative because (1) capture and release is a more ethical solution and (2) capture and release promotes biodiversity. In addition to managing the current threat of these invasive species, countries must also work to prevent the future growth of unwanted populations. In order to successfully rid South Florida of the Burmese python, while preventing the future spread of invasive species, the laws that allow these invasions to happen must change. This article will explore state and federal controls regarding the management of invasive species as well as offer solutions to strengthening these protections.

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I. Overview of the Problem with the Burmese Python Release into Florida

The Burmese python, one of the most infamous invasive species, has decimated South Florida wildlife.¹ It is theorized that the pythons were intentionally released by irresponsible pet owners.² Another introduction included accidental release from a breeding facility that was affected by Hurricane Andrew in 1992.³

Hurricane Andrew, one of the most powerful storms to hit the United States, was a category five hurricane that devastated the South Florida area, primarily Miami-Dade County.⁴ In addition to the destruction of homes, a nearby reptile breeding facility suffered severe structural damage, resulting in the accidental release of hundreds of Burmese pythons.⁵ With an abundance of prey in the Florida Everglades, including many small mammals and birds, that pythons prefer to eat, the python population has exploded in Florida.⁶ As noted, the intentional release of pythons by irresponsible pet owners also contributes to the problem.⁷

The current method for addressing the complications created by the pythons, is to capture and destroy them.⁸ Aside from the fact that these snakes are difficult to track to begin with, this

¹ Matt Morrison, *Burmese Python Invasion in Florida a Hidden Legacy of Hurricane Andrew*, CBSN NEWS (Oct. 26, 2018), <https://www.cbsnews.com/news/burmese-python-invasive-species-in-florida-hurricane-andrew-legacy-cbsn-originals/>.

² *Id.*

³ *Id.*

⁴ Tony Reynes, *25th Anniversary Commemoration of Hurricane Andrew*, NATIONAL WEATHER SERVICE (Aug. 24, 2017), <https://www.weather.gov/mfl/andrew>.

⁵ Matt Morrison, *Burmese Python Invasion in Florida a Hidden Legacy of Hurricane Andrew*, CBSN NEWS (Oct. 26, 2018), <https://www.cbsnews.com/news/burmese-python-invasive-species-in-florida-hurricane-andrew-legacy-cbsn-originals/>.

⁶ *Id.*

⁷ *Id.*

⁸ *Burmese Pythons in Florida*, FLA. FISH & WILDLIFE CONSERVATION COMM'N, <https://myfwc.com/wildlifehabitats/nonnatives/python/> (last visited Apr. 21, 2019).

process is not the most effective means of addressing biodiversity loss because the Burmese python is now declining in its native habitat of Southeast Asia due to overexploitation of the species.⁹ In order to effectively rid South Florida of the pythons there needs to be a more effective way to capture them. Then, after successful capture, the pythons should subsequently be released back into their native habitat or a reptile sanctuary, rather than being killed or otherwise destroyed. By capturing then releasing, the pythons will no longer be diminishing the Florida ecosystem. This approach will allow the pythons to repopulate in their own native environment where they are now considered a threatened species.¹⁰ Section II will discuss the Burmese python, their native habitat, and how they became an invasive species in South Florida. Section III will address invasive species management and applicable laws. Section IV will recommend solutions to the problem.

II. Invasive Species and the Impact of the Burmese Python in Florida

a. Invasive Species: An Overview

An invasive species is any living organism that is not native to the ecosystem that it has been introduced into and is causing harm as a result.¹¹ It is estimated that 42% of threatened or endangered native wildlife species are at risk because of invasive species.¹² Invasive species are not only harmful to the environment, they can also weigh heavily on the economy, costing billions of dollars yearly in management.¹³ Invasive species spread in many ways, mostly from

⁹ Stuart B. Nguyen, ET AL., *Python Bivittatus*, THE IUCN RED LIST: THREATENED SPECIES (Sept. 2, 2011), <http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS.T193451A2237271.en>.

¹⁰ *Id.*

¹¹ *Invasive Species*, THE NATIONAL WILDLIFE FEDERATION, <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species> (last visited Mar. 15, 2019).

¹² *Id.*

¹³ *Id.*

human activity, including the exotic pet trade as well as accidental and purposeful release.¹⁴

Species do not have to be introduced from another country to be considered invasive; if they are not native to the environment and compete with native species for resources, they are considered invasive.¹⁵

Invasive species become a threat to native wildlife when they have no natural predators, an abundance of food, and can reproduce successfully.¹⁶ Invasive species cause many problems including, “outcompeting native species for food or other resources, causing or carrying disease, and preventing native species from reproducing or killing a native species' young.”¹⁷ Invasive species often take over areas because native wildlife have no way to protect themselves from the foreign invader.¹⁸ Invasive species are therefore a major threat to biodiversity because they provide little to no value for native wildlife and tend to deplete the area of its natural resources, destroying the delicate balance of the ecosystem.¹⁹ Generally, invasive species are controlled at the federal and state level.²⁰ This is done by using relevant law, such as the Lacey Act, to stop introduction, mitigate impact, and adapt to changes caused by invasive species.²¹ In conjunction with management of current invasive species, it is also important to stop the establishment and spread of new species that have the potential to become invasive. Although there are everyday steps humans can take to limit the spread of invasive species, it would be most beneficial to put stricter regulations on the exotic pet trade as a matter of law.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Invasive Species*, THE NATIONAL WILDLIFE FEDERATION, <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species> (last visited Mar. 15, 2019).

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ Lacey Act, 16 U.S.C. §§ 3371-3378 (1900).

²¹ *Id.*

i. Climate Change and Invasive Species

As climate change continues to be a threat on natural systems, the likelihood of invasive species spreading to new regions increases.²² According to The Climate Institute, “Both climate change and invasive species pose extraordinary ecological challenges to the world today. The impact of climate change and rising average world temperatures will have a profound influence on a given species’ geographical ranges”²³ The Burmese python particularly thrives in warmer sub-tropical environments, such as Florida.²⁴ As temperatures rise so will their ability to survive in new places.²⁵ Temperature and CO₂ concentration in the atmosphere are key factors that drive the survival of a species, therefore changes in these factors will create stress and imbalance on ecosystems and their inhabitants.²⁶ Florida and Hawaii are affected by invasive species due to the states mild and warm climate.²⁷ “[C]hanges in precipitation could cause water-loving or water-resistant species to outcompete one another” and “rising temperatures would allow the spread northward of some species currently restricted in their northern ranges.”²⁸ More later on how species invasion contributes to problems associated with biodiversity loss because of the potential extinction of native species that cannot compete with nonnative predator.²⁹ U.N.’s biodiversity executive secretary, Cristiana Pasca Palmer is worried about the effects of climate change on biodiversity, stressing that:

The already high rates of biodiversity loss from habitat destruction, chemical pollution and invasive species will accelerate in the coming 30 years as a result

²² Anna Szyniszewska, *Invasive Species & Climate Change*, CLIMATE INSTITUTE: CLIMATE CHANGE, <http://climate.org/archive/topics/ecosystems/invasivespecies.html>.

²³ *Id.*

²⁴ *Id.*

²⁵ *Id.*

²⁶ *Id.*

²⁷ Anna Szyniszewska, *Invasive Species & Climate Change*, CLIMATE INSTITUTE: CLIMATE CHANGE, <http://climate.org/archive/topics/ecosystems/invasivespecies.html>.

²⁸ *Id.*

²⁹ *Id.*

of climate change and growing human populations. By 2050, Africa is expected to lose 50% of its birds and mammals, and Asian fisheries to completely collapse. The loss of plants and sea life will reduce the Earth's ability to absorb carbon, creating a vicious cycle.³⁰

Unfortunately, governments globally are not taking threats of biodiversity loss seriously enough, despite strong scientific evidence that catastrophic mass extinction is on the horizon.³¹ Unlike climate change, which is already impacting the planet in big ways, the loss of biodiversity is “often a silent killer” and by the time it is noticeable it is most likely too late to do anything about it.³²

b. Natural History of the Burmese Python

The Burmese python, scientifically known as *Python Bivittatus*, is a reptile known for its distinctly patterned skin, incredibly large size, and mild disposition.³³ Because of their docile temperament and beauty, they are a very popular breed among reptile and exotic pet owners. These non-venomous snakes are native to the jungles of Southeast Asia and are one of the largest species of snakes on earth, growing up to twenty-three feet and 200 pounds.³⁴ In the wild they have a lifespan of up to twenty-five years.³⁵ Adult Burmese pythons are mostly land-dwelling animals but are considered semi-aquatic because they can stay submerged under water up to thirty minutes, making them highly adaptable in tropical ecosystems.³⁶ When they are young they spend a majority of time in trees then slowly transition to becoming land-dwelling as

³⁰ Jonathan Watts, *Stop Biodiversity Loss Or We Could Face Our Own Extinction, Warns UN*, THE GUARDIAN: THE AGE OF EXTINCTION (Nov. 6, 2018, 8:47 AM), <https://www.theguardian.com/environment/2018/nov/03/stop-biodiversity-loss-or-we-could-face-our-own-extinction-warns-un>.

³¹ *Id.*

³² *Id.*

³³ *Burmese Python*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/b/burmese-python/> (last visited Mar. 28, 2019).

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

adults.³⁷ Because they are semi-aquatic creatures, they can be very hard to detect. These semi-aquatic tendencies have aided in their spread across South Florida and the Everglades because they are hard to detect once submerged, making them hard to capture, and therefore almost impossible to manage.

Being a carnivorous species, these nocturnal reptiles prefer to hunt small mammals and birds, killing them with their powerful constriction.³⁸ In their native habitats, they often prey on smaller animals such as rodents but will eat larger animals such as deer and pigs as well.³⁹ After suffocating their prey, the Burmese python is able to swallow the animal whole due to ligaments in their jaw that stretch and allow their body to expand.⁴⁰ They hunt by using receptors in their tongues and jaw to compensate for their very poor vision.⁴¹ They are solitary animals who mate in the spring.⁴² Upon reaching sexual maturity at roughly three to five years old, a female python can lay up to one hundred eggs in one clutch.⁴³ After laying her eggs, the female will remain with the nest while they incubate and until they hatch, two to three months later.⁴⁴ Although it is not clear exactly how many hatchlings make it to adulthood, this large number of offspring contributes to the invasive cycle in South Florida as their population has the potential to rapidly increase on a yearly basis.

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Burmese Python*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/b/burmese-python/> (last visited Mar. 28, 2019).

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

i. Biodiversity and the Burmese Python

Biodiversity is defined as the variety of life in the world, a particular habitat, or an ecosystem.⁴⁵ Biodiversity is vital to the planet. Without it, ecosystems would collapse and life on earth would cease to exist.⁴⁶ Over the years, human action (and inaction) has caused biodiversity to decrease globally.⁴⁷ With species extinction on the rise, achieving biodiversity is as important as ever. This is because:

Healthy ecosystems deliver life-sustaining services for free, and in many cases on a scale so large and complex that humanity would find it practically impossible to substitute for them. With respect to complexity, we often do not know which species are necessary for the services to work, what numbers they must be present in, and whether there are “keystone” species for ecosystem services. Disruption of these natural services can have catastrophic effects. ⁴⁸

By the time it is evident what purpose a particular species serves in an ecosystem, it may be too late.⁴⁹

The Burmese python is listed as vulnerable on the IUCN Red List of Threatened Species.⁵⁰ Their vulnerable status means they are decreasing in population and at a high risk of extinction in the wild, specifically Southeast Asia for the Burmese python.⁵¹ The IUCN Red List was created in 1964 and is now widely recognized as the most comprehensive and accurate source of information regarding the conservation status of animal and plant species. More importantly, the IUCN Red List is a “critical indicator of the health of the world’s biodiversity” making it a “powerful tool to inform and catalyze action for biodiversity conservation and policy change,

⁴⁵ Eric Chivian, M.D., *Biodiversity: Its Importance to Human Health*, HARV. MED. SCH.: THE CTR. FOR HEALTH & THE GLOB. ENV'T., 7 (2002) https://www.uttayarndham.org/sites/default/files/3_biodiversity_v2_screen_0_0.pdf.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ Stuart B. Nguyen, ET AL., *Python Bivittatus*, THE IUCN RED LIST: THREATENED SPECIES (Sept. 2, 2011), <http://dx.doi.org/10.2305/IUCN.UK.2012-1.LRLTS.T193451A2237271.en>.

⁵¹ *Id.*

critical to protecting the natural resources we need to survive.”⁵² According to the site, biodiversity around the world is rapidly declining.⁵³ There are more than 98,500 species on the IUCN Red List, of which, 27,000 are threatened with extinction.⁵⁴

ii. Loss of Biodiversity and Environmental Justice

Biodiversity impacts Environmental Justice; if an ecosystem is distressed people will be affected.⁵⁵ Environmental justice is defined as the fair treatment and meaningful involvement of all people in the creation, implementation, and enforcement of environmental laws, regulations and policies.⁵⁶ Generally, people of color and low-income individuals are most affected by environmental degradation.⁵⁷ For example, research shows that Native Americans are often left out of the political process when it comes to invasive species management.⁵⁸ Native American and indigenous peoples own or have rights to approximately twenty percent of the earth’s land despite only making up five percent of the world’s population.⁵⁹ In South Florida, the Miccosukee Tribe of Indians of Florida occupy the northern border of the Everglades National Park.⁶⁰ Big Cypress National Preserve also encompasses Big Cypress Reservation which is one of the six reservations of the Seminole Tribe of Florida.⁶¹ Due to their location within the Everglades, the Miccosukee, Seminole and other local tribes will be met with the burden of

⁵² *Background & History*, IUCN RED LIST, <https://www.iucnredlist.org/about/background-history> (last visited Mar. 21, 2019).

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ Eric Chivian, M.D., *Biodiversity: Its Importance to Human Health*, HARV. MED. SCH.: THE CTR. FOR HEALTH & THE GLOB. ENV’T., 7 (2002) https://www.uttayarndham.org/sites/default/files/3_biodiversity_v2_screen_0_0.pdf.

⁵⁶ Office of Environmental Justice, *Environmental Justice*, EPA, <https://www.epa.gov/environmentaljustice> (last visited Mar. 21, 2019).

⁵⁷ *Id.*

⁵⁸ Nicholas J. Reo, Anishnaabe Aki: An Indigenous Perspective on the Global Threat of Invasive Species, 13 L.A. SUSTAINABILITY SCI. 1, 5-8 (2018).

⁵⁹ *Id.* at 8.

⁶⁰ Miccosukee Reserved Area Act, 16 U.S.C. § 410 (1998).

⁶¹ *Seminole History*, FLA. DEP’T OF ST., <https://dos.myflorida.com/florida-facts/florida-history/seminole-history/> (last visited Mar. 21, 2019).

dealing with these pythons. Recently, the largest python on record was removed from Big Cypress National Preserve in the Florida Everglades.⁶² The pregnant female, who was seventeen-feet and 140 pounds, was found as a result of a team of researchers.⁶³ It is widely understood that indigenous knowledge is an important aspect of conserving biodiversity.⁶⁴ In fact, Article 8 of the Convention of Biological Diversity states:

(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.⁶⁵

Although many times indigenous cultural values do not align with mainstream methods of handling nonnative species, their perspectives and knowledge are both valuable and essential to environmental welfare.⁶⁶ For example, within the Anishnaabe Aki Tribe, plants and animals are regarded as persons, each serving their own purpose.⁶⁷ Many indigenous groups around the world similarly believe that “plants, animals and other beings are members of the extended family.”⁶⁸

⁶² Howard Cohen, *This is the Biggest Female Python Ever Captured in the Everglades' Big Cypress, Researchers Say*, MIAMI HERALD: ENV'T. (Apr. 7, 2019, 10:22 AM), <https://www.miamiherald.com/news/local/environment/article228925134.html>.

⁶³ *Id.*

⁶⁴ Nicholas J. Reo, Anishnaabe Aki: An Indigenous Perspective on the Global Threat of Invasive Species, 13 L.A. SUSTAINABILITY SCI. 1, 5-8 (2018).

⁶⁵ Convention on Biological Diversity, art. 8, June 5, 1992, 1760 U.N.T.S. 69.

⁶⁶ Nicholas J. Reo, Anishnaabe Aki: An Indigenous Perspective on the Global Threat of Invasive Species, 13 L.A. SUSTAINABILITY SCI. 1, 5-8 (2018).

⁶⁷ *Id.* at 5.

⁶⁸ *Id.* at 5.

c. Python Invasion and the Everglades Ecosystem

It is estimated that 49,000 homes were destroyed and 108,000 were damaged during Hurricane Andrew.⁶⁹ The pythons lost after the storm were never recaptured and are believed to have migrated from the damaged breeding facility into nearby Everglades. South Florida's natural ecosystem allowed these pythons to flourish because they are native to areas containing swamps, grasslands, and jungles-ecosystems found in the Everglades.⁷⁰

Currently, the Burmese python is one of the most concerning invasive species in South Florida because it has no natural predator.⁷¹ They're at competition with other wildlife species, such as the Florida Alligator, for food. Several pythons have attempted to eat alligators.⁷² In a recent example, a thirteen-foot python was found dead with its entire midsection split open.⁷³ After attempting to consume a six-foot alligator, the alligator burst out of the pythons stomach.⁷⁴ The fact that the pythons are now targeting alligators, is problematic because the American Alligator, an apex predator, sits at the top of the Everglades food chain.⁷⁵ The Burmese python is preying on every species it can, and is causing a decline in many native and endangered species necessary to the survival of others.⁷⁶

⁶⁹ Tony Reynes, *25th Anniversary Commemoration of Hurricane Andrew*, NATIONAL WEATHER SERVICE (Aug. 24, 2017), <https://www.weather.gov/mfl/andrew>.

⁷⁰ *Burmese Python*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/b/burmese-python/> (last visited Mar. 28, 2019).

⁷¹ Michael Tennesen, *Python Predation: Big Snakes Poised to Change U.S. Ecosystems*, SCIENTIFIC AMERICAN (Feb. 1, 2010), <https://www.scientificamerican.com/article/python-boom/>.

⁷² Victoria Gillman, *Photo in the News: Python Bursts After Eating Gator (Update)*, NAT'L GEOGRAPHIC (Sept. 5, 2006), <https://news.nationalgeographic.com/news/2005/10/photo-in-the-news-python-bursts-after-eating-gator-update/>.

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *American Alligator*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/a/american-alligator/> (last visited Apr. 10, 2019).

⁷⁶ Robert A. McCleery, ET AL., *Marsh Rabbit Mortalities Tie Pythons to the Precipitous Decline of Mammals in the Everglades*, 282 *The Royal Soc'y Pub.* 1, 1 (2015).

It is currently estimated that there are currently tens of thousands of Burmese pythons living in the Florida Everglades.⁷⁷ Studies show that the presence of the pythons are directly linked to the decline in the population of small mammals such as Marsh Rabbits.⁷⁸ For example, one study found that “pythons accounted for 77% of rabbit mortalities within 11 months of their translocation to ENP [Everglades National Park] and that python predation appeared to preclude the persistence of rabbit populations in ENP.⁷⁹ More notably, the pythons are having a destructive effect on the ecosystem by preying on threatened and endangered species like the Key Largo Woodrat and Key Largo Cotton Mouse.⁸⁰ Although the pythons are mostly breeding in the Everglades, they have been found on Key Largo as well as other nearby islands, meaning that they are geographically spreading.⁸¹ This is not surprising considering they are excellent swimmers.⁸² They are also feasting on the Great Blue Heron, American Coot and other native birds in the South Florida region.⁸³

d. The Exotic Pet Trade Industry

The exotic pet trade industry is in large part responsible for both the overexploitation and endangerment of animals in some areas as well as the invasive nature of animals in other areas.⁸⁴ Although trade in animals has existed for hundreds of year, the exotic pet trade became popular

⁷⁷ U.S. GEOLOGICAL SURVEY (USGS), https://www.usgs.gov/faqs/how-many-burmese-pythons-inhabit-southern-florida?qt-news_science_products=0#qt-news_science_products (last visited Mar. 28, 2019).

⁷⁸ Robert A. McCleery, ET AL., *Marsh Rabbit Mortalities Tie Pythons to the Precipitous Decline of Mammals in the Everglades*, 282 *The Royal Soc’y Pub.* 1, 1 (2015).

⁷⁹ *Id.* at 1.

⁸⁰ Nala Rogers, *Burmese Pythons Breeding in the Florida Keys*, THE WILDLIFE SOCIETY (Oct. 7, 2016), <http://wildlife.org/burmese-pythons-breeding-in-the-florida-keys/>.

⁸¹ *Id.*

⁸² *Id.*

⁸³ Johnny Gibbons, *Invasive Burmese Pythons are Taking a Toll on Florida’s Native Birds*, SMITHSONIAN INSIDER (Mar. 11, 2011), <https://insider.si.edu/2011/03/burmese-pythons-are-taking-a-toll-on-floridas-native-birds/>.

⁸⁴ Wynne Parry, *Exotic Pets Turn Invasive, Threatening Florida*, LIVE SCIENCE (Sept. 23, 2011), <https://www.livescience.com/16204-florida-invasive-reptiles-amphibians.html>.

during the twentieth century when tropical fish became affordable and accessible for the average family.⁸⁵ Today, millions of exotic animals are forcibly taken from their natural habitats and sold around the world every year.⁸⁶ Exotic animals are generally those that fall outside the basic dog and cat classification, such as birds and reptiles.⁸⁷ Although some of this trade business is legal, the majority fosters the multi-billion dollar black market of illegal wildlife trafficking, otherwise known as the exotic pet trade industry.⁸⁸ The demand for exotic species has grown in recent years, primarily due to social media presence.⁸⁹ This is because the animals can easily be displayed and advertised through online sites. Many animals are poached, smuggled, and sold under the false “captive-bred” label.⁹⁰ This illegal trade industry has devastated wildlife populations of animals leading to the endangerment of many species.⁹¹ This industry also causes distress to the animals involved, with many of them unable to eat and move when they reach their final destination, assuming they make it alive.⁹²

i. Control of Trade in Exotic Species

In addition to being harmful to animals, this industry also affects humans who are at risk from disease carried by wild species as well as temperamental problems with the animals, resulting in attack.⁹³ In example, Charla Nash, a woman in Connecticut, received a face

⁸⁵ *A Brief History of the Global Exotic Pet Trade*, WORLD ANIMAL PROTECTION (Oct. 31, 2018), <https://www.worldanimalprotection.us/news/brief-history-global-exotic-pet-trade>.

⁸⁶ Jani Actman, *Exotic Pet Trade, Explained*, NAT’L GEOGRAPHIC (Feb. 20, 2019), <https://www.nationalgeographic.com/animals/reference/exotic-pet-trade/>.

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² Jani Actman, *Exotic Pet Trade, Explained*, NAT’L GEOGRAPHIC (Feb. 20, 2019), <https://www.nationalgeographic.com/animals/reference/exotic-pet-trade/>.

⁹³ *Id.*

transplant in 2011, following an attack from her friend's pet chimpanzee.⁹⁴ During the attack, she lost her nose, lips and eyes, leaving her with permanent disabilities.⁹⁵ There are many organizations working hard to combat the illegal pet trade, including U.K. based non-profit, World Animal Protection.⁹⁶ Another is The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which is an international agreement signed by 183 countries in an effort to limit or ban the trade of wild animals.⁹⁷ Many of these organizations deter potential exotic pet ownership by stressing the risks that these wild animals could pose to humans, through attack or disease, rather than emphasizing the negative effects on the animals involved.⁹⁸ The World Animal Protection organization found that this was a more effective method of deterrence.⁹⁹

According to National Geographic, "Habitat depletion, continued demand for Burmese pythons in the pet trade, and hunting for their skins and flesh have landed these graceful giants on the threatened species list."¹⁰⁰ In their natural habitat "[s]cientists believe that Burmese python populations have plunged at least 30 percent of over just the last decade."¹⁰¹ It is clear that the biggest threat the Burmese python is faced with is overexploitation due to the illegal

⁹⁴Linda Carroll, *Charla Nash Seeks Primate Safety Act: I Don't Want it to Happen Again*, MSNBC: TODAY (JULY 9, 2014), <https://www.today.com/health/charla-nash-seeks-primate-safety-act-after-chimp-attack-1D79907907>.

⁹⁵ *Id.*

⁹⁶ *A Brief History of the Global Exotic Pet Trade*, WORLD ANIMAL PROTECTION (Oct. 31, 2018), <https://www.worldanimalprotection.us/news/brief-history-global-exotic-pet-trade>.

⁹⁷ Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243.

⁹⁸ *Id.*

⁹⁹ *A Brief History of the Global Exotic Pet Trade*, WORLD ANIMAL PROTECTION (Oct 31, 2018), <https://www.worldanimalprotection.us/news/brief-history-global-exotic-pet-trade>.

¹⁰⁰ *Burmese Python*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/b/burmese-python/> (last visited Mar. 28, 2019).

¹⁰¹ Jeremy Hance, *'I Don't Want to Imagine a World Without Giant Snakes In It'*, THE GUARDIAN (Sept. 26, 2017), <https://www.theguardian.com/environment/radical-conservation/2017/sep/26/burmese-pythons-snakes-bangladesh-tracking-radio-rahman-conservation>.

trade industry.¹⁰² Aside from the commercial pet trade industry, which is responsible for their invasive status in South Florida, the python is also hunted for food and skins in Southeast Asian countries.¹⁰³ Specifically, they are made into snake wine and their skins are used for leather as well as musical instruments, such as hand drums.¹⁰⁴ The species has become very rare in China, Cambodia, and Vietnam due to hunting, the pet trade, the leather industry and habitat degradation, but remains vital in Hong Kong and Thailand due to its protected species status and well-enforced regulations.¹⁰⁵ Hong Kong lists the Burmese python as a protected species under their Wild Animals Protection Ordinance, which makes it a crime to harass the python or its eggs.¹⁰⁶ Hong Kong conserves the Burmese python, as well as other species, to address biodiversity loss in the area that has resulted from the overexploitation of many animals.¹⁰⁷ These species have been primarily exploited through the exotic pet trade industry as well as their use for traditional Chinese medicine.¹⁰⁸

III. Invasive Species Law and Management

a. Federal Controls: Lacey Act

The applicable federal law for addressing invasive species, is the Lacey Act.¹⁰⁹ The Act was enacted in 1900 by president William McKinley after being introduced by John Lacey, an Iowa congressman.¹¹⁰ Designed to protect wildlife from illegal trafficking, the Act imposes civil and

¹⁰² Stuart B. Nguyen, ET AL., *Python Bivittatus*, THE IUCN RED LIST: THREATENED SPECIES (Sept. 2, 2011), <http://dx.doi.org/10.2305/IUCN.UK.2012-1.LRLTS.T193451A2237271.en>.

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ Wild Animals Protection Ordinance, (2012) Cap. 170, 6, § 5 (H.K.).

¹⁰⁷ *Id.*

¹⁰⁸ *Id.*

¹⁰⁹ Lacey Act, 16 U.S.C. §§ 3371-3378 (1900).

¹¹⁰ Rebecca F. Wisch, *Overview of the Lacey Act (16 U.S.C. §§ 3371-3378)*, ANIMAL LEGAL & HISTORICAL CENTER (2003), <https://www.animallaw.info/article/overview-lacey-act-16-usc-ss-3371-3378>.

criminal penalties for violations of the Act.¹¹¹ The original language of the Act stated that its primary purpose was to help wild birds repopulate and to “aid in the restoration of such birds in those parts of the United States adapted thereto where the same have become scarce or extinct, and also to regulate the introduction of American or foreign birds or animals in localities where they have not heretofore existed.”¹¹² In 1969, the Act was amended to include reptiles, as well as amphibians, mollusks and crustaceans.¹¹³ When enacted, the Act became the first federal law that protected wildlife. Under the Lacey Act,

it is unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants that are taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law.¹¹⁴

The Lacey Act contains a provision that is meant to address injurious wildlife. This specific list dictates species that have been deemed dangerous to nature and therefore banned from being imported to the country.¹¹⁵

i. Injurious Species

The injurious species provision of the Lacey Act had two separate sections: a black list, which included laws that listed banned species, and a white list, which detailed laws banning the importation of “all species *except* those on an approved list.”¹¹⁶ Initially, the Act was primarily focused on white list law, until 1949 when the amendments transitioned into exclusively black list law.¹¹⁷ This shift in law is strange in that it emphasizes the lesser effective measure of

¹¹¹ *Id.*

¹¹² Lacey Act, 16 U.S.C. §§ 3371-3378 (1900).

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ *Injurious Wildlife*, U.S. FISH & WILDLIFE SERVICES: OFFICE OF LAW ENFORCEMENT (Nov. 3, 2017), <https://www.fws.gov/le/injurious-wildlife.html>.

¹¹⁶ KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 4 (2013).

¹¹⁷ *Id.*

reducing the spread of invasive species.¹¹⁸ Originally, there were only four species on this black list: the mongoose, fruit bats, sparrows, and starlings.¹¹⁹ Later amendments to the injurious species provision in 1960, added scientific names for the mongoose and fruit bat, included fish, amphibians, and reptiles to the term “animals and birds,” and removed the English sparrow and starling from the black list.¹²⁰

The current listing responsibility is shared between the Fish and Wildlife Service (FWS) and Congress.¹²¹ If FWS decides to add a species to the list they must issue a proposed rule, allow time for public comments, then issue a final ruling.¹²² Mixed results come from this shared responsibility because FWS is more suitable to determine whether a species is potentially harmful, but Congress can act faster as they can surpass formal Administrative Procedure Act (APA) requirements.¹²³ The Secretary of the Interior is authorized to list as “injurious” any species that is considered harmful “to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States.”¹²⁴ In deciding whether a species should be added to the list, FWS undertakes a risk analysis to determine the “likelihood of escape, establishment, and eradication of a proposed injurious species.”¹²⁵ Under this provision of the Act, it is illegal to import or ship listed living creatures and/or their eggs.¹²⁶ There are exceptions for those with permits.¹²⁷ Permits may be awarded to import said species to

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ *Id.* at 5.

¹²¹ *Id.* at 1.

¹²² KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 8 (2013).

¹²³ *Id.* at 9.

¹²⁴ *Injurious Wildlife*, U.S. FISH & WILDLIFE SERVICES: OFFICE OF LAW ENFORCEMENT (Nov. 3, 2017), <https://www.fws.gov/le/injurious-wildlife.html>.

¹²⁵ KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 10 (2013).

¹²⁶ *Id.* at 4

¹²⁷ *Id.* at 7.

individuals for “zoological, educational, medical, and scientific purposes.”¹²⁸ In March 2012, four python species, including the Burmese python, were added to this list.¹²⁹

Most species are added to the list by regulatory action and is subject to the Administrative Procedure Act (APA,) which governs how administrative agencies of the United States federal government may propose and establish regulations.¹³⁰ The APA requires that the agencies provide adequate notice of the proposed rule to the public and give a “meaningful opportunity” for the public to comment on the proposed rule.¹³¹ Regulatory action also requires that the listing complies with the National Environmental Policy Act (NEPA,) which “requires the agency to consider the impacts of proposed major actions on the environment, and, if significant, prepare an environmental impact statement.”¹³² The problem, however, is that this regulatory listing process is slow and can take up to six years.¹³³ Before the enactment of NEPA, regulatory listings could be complete within a matter of months.¹³⁴ This delay in legislation allows potentially threatening species to become well-established, making management much more difficult a task.¹³⁵ For example, although the petition to ban the importation of the Burmese python was filed in 2006, the final rule was not issued until 2012, six years later.¹³⁶ During this time, Congress introduced legislation to ban constrictor snakes, but neither bill was voted on by its respective house.¹³⁷ Conflict that arises from those who do not want the animal listed may

¹²⁸ *Id.* at 4.

¹²⁹ *Id.* at 12.

¹³⁰ Administrative Procedure Act § 1, 5 U.S.C § 553 (2012).

¹³¹ *Id.*

¹³² National Environmental Policy Act of 1969 § 102, 42 U.S.C. § 4332 (2000).

¹³³ KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 11 (2013).

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ *Id.* at 12.

¹³⁷ *Id.*

affect the time of the listing process.¹³⁸ Here, pythons are a popular breed among pet owners, so they were of huge economic interest for the pet trade industry. The competing economic and environmental interests potentially added critical time to the listing of these pythons as injurious.

The problems are captured by the following:

While the Lacey Act may have been somewhat effective at preventing transport into the country of the few taxa listed prior to their introduction, over half of listed taxa were already present in the US when listed, and most taxa already established in the wild continued to spread after listing. Currently, five taxa are being considered for listing. Mean time for a petitioned listing has increased to over 4 years, and only one species has been added by petition in the past decade. If the goals of the provision are to be met in the face of increasing international trade in live organ-isms, then revision or replacement of the provision is required.¹³⁹

Since the passage of the Lacey Act very few species have been successfully added to the list by petition and the Act includes no emergency measures prior to official listing.¹⁴⁰ An emergency measure would be useful in stopping the spread of an invasive species during the lengthy listing process by putting a halt on transportation.¹⁴¹

Of the four steps in the invasion process: transport, introduction, establishment, and spread, the Lacey Act falls short, particularly regarding the spread factor.¹⁴² This is because even after a species is listed as injurious, the creature may still be retained by owners.¹⁴³ This does nothing to prevent the accidental or purposeful release of species in cases of emergency, I.E. flooding or other reasons people release pets.¹⁴⁴ Another way that invasive species are able to spread is

¹³⁸ *Id.*

¹³⁹ Andrea J. Fowler, ET AL., *Failure of the Lacey Act to Protect US Ecosystems Against Animal Invasions*, THE ECOLOGICAL SOCIETY OF AMERICA 353, 357 (2007).

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

across state borders.¹⁴⁵ This is because the Lacey Act does very little to regulate interstate transport of species.¹⁴⁶ The Lacey Act is criticized for being ineffective due to the “lack of an efficient and consistently applied risk assessment procedure, which would allow USFWS to control the one step of the invasion process which the Act may effectively interrupt: initial transport into the country.”¹⁴⁷

The U.S. Fish and Wildlife’s Office of Law Enforcement is responsible for enforcing the provision. While the maximum time one can be imprisoned for violating this provision is up to six months, fines are as high as \$5,000 for an individual offender and \$10,000 for an organization.¹⁴⁸ When initially enacted in 1900, the maximum fine for violation was no more than \$200.¹⁴⁹ Additionally, punishment generally includes destruction of the species at the expense of the violator as punishment in addition to fines.¹⁵⁰ This is not fair to the animal that has done nothing wrong.

ii. Gaps in Legislation

The gap in this provision is that the Act does not “authorize agencies to take any measures against injurious species already present in the United States unless part of interstate commerce, so once a species has entered the country, it may flourish.”¹⁵¹ This is the exact problem occurring in the Everglades. Burmese pythons were listed as an injurious species in 2012, but had already established in 1992 during the time of Hurricane Andrew. Because of this gap in legislation,

¹⁴⁵ Andrea J. Fowler, ET AL., *Failure of the Lacey Act to Protect US Ecosystems Against Animal Invasions*, THE ECOLOGICAL SOCIETY OF AMERICA 353, 357 (2007).

¹⁴⁶ *Id.*

¹⁴⁷ *Id.* at 358

¹⁴⁸ KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 8 (2013).

¹⁴⁹ *Id.* at 7.

¹⁵⁰ *Id.*

¹⁵¹ *Id.* at Summary.

there is very little guidance on how to deal with the current issues these pythons have created. This legislation, leaves a gap that has allowed the spread of the species. The injurious species provision also exclusively refers to live animals and their eggs, only referring to dead animals in the context of scientific collections, and not mentioning insects, plants, or parasites at all.¹⁵² This is problematic because dead species can still carry disease harmful to the ecosystem.¹⁵³

Another issue with the Injurious Species provision is that the law is open for interpretation. The language states that it bars “importation into [the United States or its territories] or any shipment between [the states].”¹⁵⁴ It is not clear whether the law bans *importation and shipping* from other countries only or if it includes any form of interstate *movement*.¹⁵⁵ If read to include only the import or shipping of species from other countries, the law would be seriously weakened.¹⁵⁶ This is because the species would still be able to move around within the states and across state lines.¹⁵⁷

Consequently, in *United States Association of Reptile Keepers, Inc. v. The honorable Sally Jewell, et al.*, plaintiffs challenged a ruling by the Department of the Interior prohibiting the importation and interstate transportation of certain species of constricting snakes, including the Burmese python.¹⁵⁸ Plaintiffs contend that the Department of the Interior lacked the authority to prohibit all interstate transportation of these species, arguing that “any shipment between the continental United States, the District of Columbia, Hawaii, the Commonwealth of Puerto Rico, or any possession of the United States” does not include transportation of listed species between

¹⁵² *Id.* at 17.

¹⁵³ *Id.*

¹⁵⁴ KRISTINA ALEXANDER, CONG. RESEARCH SERV., R43170, INJURIOUS SPECIES LISTINGS UNDER THE LACEY ACT: A LEGAL BRIEFING 1, 6 (2013).

¹⁵⁵ *Id.* at 13.

¹⁵⁶ *Id.*

¹⁵⁷ *Id.*

¹⁵⁸ U.S. Ass’n of Reptile Keepers, Inc., v. The Hon. Sally Jewell, et al., 103 F.Supp.3d 133, 133 (D.D.C. 2015).

two states within the “continental United States.”¹⁵⁹ Defendants argue, however, that the Department of the Interior’s interpretation of the Lacey Act is essential to preventing the spread of these species.¹⁶⁰ This interpretation is essential because an evaluation of the threat posed by these snakes showed that they are:

Likely to escape from captivity or be released into the wild”; are “likely to survive, become established, and spread” if released in a suitable habitat; are “likely to prey on and compete with native species for food and habitat”; are “likely to be disease vectors for livestock and native wildlife”; “cannot be easily eradicated”; and are “likely to disturb ecosystems beyond the point of recoverability.”¹⁶¹

Defendants also argued that the popularity of the pet trade would allow these snake species to be spread to other parts of the United States.¹⁶² Despite Defendants strong public policy argument, the Court held that Plaintiffs adequately showed that they were entitled to injunctive relief.¹⁶³

b. State Controls: Florida FWC

i. Nonnative Fish and Wildlife Program

Under Florida Statute 379.2311, the legislator established a “pilot program” that allows individuals to capture or destroy animals belonging to priority invasive species found on public lands or in the waters of the state.¹⁶⁴ The Burmese python is considered a priority invasive species under Florida Statute 379.372(2)(a)(1).¹⁶⁵ The Florida Fish and Wildlife Conservation Commission (FWC) is responsible for invasive species management. Its “Nonnative Fish and Wildlife Program” focuses on minimizing the impacts of invasive species through “prevention,

¹⁵⁹ *Id.* at 139.

¹⁶⁰ *Id.* at 165.

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ *Id.* at 166.

¹⁶⁴ Fla. Stat. § 379.2311 (2018).

¹⁶⁵ Fla. Stat. § 379.372(a)(1) (2017).

early detection, rapid response, control and management, and education and outreach.”¹⁶⁶ As recently as February 21, 2019, Commissioners approved rule changes in Chapter 68-5, F.A.C., regarding nonnative species.¹⁶⁷ The new rule essentially changes the definition for twelve key terms making them more understandable and giving them clearer intent. The FWC rule update also added four reptiles, including the yellow anaconda, four birds, and five mammals to the prohibited and injurious species list.¹⁶⁸ The injurious species list consists of species that have been determined to pose a high-risk to Florida if introduced.¹⁶⁹ These species were added to the injurious nonnative wildlife list under Rule 68-5.006, because a risk assessment screening determined that these species presented high risk to the state if not regulated effectively.¹⁷⁰ Rule 68-5.007 “grandfathers” individuals who already possess newly listed prohibited species as pets, allowing them to apply for a permit.¹⁷¹ The condition is that they may not acquire any new prohibited species unless they are receiving the animal from a permitted owner who has passed away.¹⁷² This type of management is useful for controlling the spread of new invasive species, but does very little to address the problem of invasive species that have already become a problem in Florida. This amendment does not address the fact that invasive species can still be released into the wild, accidentally or purposely even when a permit is obtained. There is nothing to suggest that a “grandfathered” individual will be any more competent to adequately take care of an exotic animal that has been prohibited due to its high risk to nature and the state.

¹⁶⁶*Florida’s Nonnative Fish and Wildlife*, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, <https://myfwc.com/wildlifehabitats/nonnatives/> (last visited Mar. 15, 2019).

¹⁶⁷ Fla. Admin. Code r. 68-5.002 (2007).

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ Fla. Admin. Code r. 68-5.006 (2007).

¹⁷¹ Fla. Admin. Code r. 68-5.007 (2007).

¹⁷² *Id.*

ii. Amnesty Program

The FWC has an “Exotic Pet Amnesty Program” that allows people to surrender their exotic pets without penalty on a specified day of each year.¹⁷³ This preventative measure limits the amount of nonnative animals that are released into the wild by addressing the problem before it begins.¹⁷⁴ It is likely that many people harboring exotic animals keep them or release them because either they don’t have the appropriate resources to take care of the animal, or they are afraid of the penalties they may face if the animal is owned illegally.¹⁷⁵ Having an amnesty program incentivizes individuals to responsibly release animals they are unable to care for. This is also an excellent way to educate the public on the dangers of exotic pet ownership and invasive species management. However, it would be more effective to extend the Amnesty Program year-long. This would open opportunity for animals to be surrendered at any point, making their intentional or accidental release less likely.

iii. Python Capture and Removal

The Florida Fish and Wildlife Conservation Commission (FWC) allows for a “humane” killing of Burmese pythons.¹⁷⁶ The FWC considers humane killing any killing done by legal means that comply with local and state laws.¹⁷⁷ Approved methods of euthanasia include the use of captive bolts, firearms and decapitation.¹⁷⁸ The FWC established a Python Pickup Program

¹⁷³ Exotic Pet Amnesty Program, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, <https://myfwc.com/wildlifehabitats/nonnatives/amnesty-program/> (last visited Apr. 22, 2019).

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

¹⁷⁶ *Florida’s Nonnative Fish and Wildlife*, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, <https://myfwc.com/wildlifehabitats/nonnatives/> (last visited Mar. 15, 2019).

¹⁷⁷ Fla. Admin. Code r. 68A-4.001 (2004).

¹⁷⁸ *AVMA Guidelines for the Euthanasia of Animals: 2013 Edition*, AMERICAN VETERINARY MEDICAL ASSOCIATION, 5, 79-80 (2013), <https://www.avma.org/KB/Policies/Documents/euthanasia.pdf>.

offering prizes, such as t-shirts and snake skin boots, as an incentive for removal.¹⁷⁹ The problem is that the pythons are very difficult to detect in the first place making the program largely ineffective.¹⁸⁰ In order to be eligible for prizes, proof only requires: (1) a photo of the dead python to identify that it is a Burmese python, (2) the date the python was captured and killed, (3) the location where the python was captured and (4) the name, phone number, address, and t-shirt size of the person submitting.¹⁸¹ Although available, no training is required to participate nor is proof of humane euthanasia.¹⁸²

c. International Efforts to Control Invasive Species: Biosecurity Act

The Biosecurity Act of 2015 is an Australian Law that manages threats to plants, animals and humans in Australia. The purpose of this Act is to manage the risk of serious diseases spreading into Australia.¹⁸³ Measures taken at the border includes the use of modern technology to “inspect[s] and clear[s] the millions of people, mail parcels, baggage, ships, animals, plants and cargo containers entering Australia every year.”¹⁸⁴ One of the objectives of the Act is to change the way Australia protects its borders from invasive species.¹⁸⁵ Invasive species are partially to blame for Australia having the highest rate of mammal extinction of any country.¹⁸⁶ Although this Act was meant to replace the Quarantine Act of 1908, there is criticism from the Invasive

¹⁷⁹ Python Pickup Program, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, <https://myfwc.com/wildlifehabitats/nonnatives/python/pickup/> (last visited Mar. 28, 2019).

¹⁸⁰ Nala Rogers, *Burmese Pythons Breeding in the Florida Keys*, THE WILDLIFE SOCIETY (Oct. 7, 2016), <http://wildlife.org/burmese-pythons-breeding-in-the-florida-keys/>.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ Biosecurity Act 2015 (Cth) (Austl.), <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-biosecurity-bill.htm>.

¹⁸⁴ *Biosecurity in Australia*, AUSTRALIAN GOVERNMENT DEPARTMENT OF AGRICULTURE AND WATER RESOURCES, <http://www.agriculture.gov.au/biosecurity/australia> (last visited Apr. 22, 2019).

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

Species Council that the new Act lacks accountability and transparency.¹⁸⁷ The Council has made several suggestions in changes to legislation to make the Act more effective, one of which includes redefining “environment” to include biodiversity local to Australia.¹⁸⁸ Another recommendation is to add “conservation zones” as a category of biosecurity for “high value conservation areas.”¹⁸⁹

Even considering criticism for the Biosecurity Act, the Act prevents the spread of invasive species before it becomes a problem unlike the Lacey Act, where the species has to be shown to be injurious then added to the list through a lengthy process. The Biosecurity Act simply requires a scientific showing that a particular species has the capacity to become problematic for the ecosystem.¹⁹⁰ Many of the changes sought by the Invasive Species Council for the Biosecurity Act would also be effective changes if added to the injurious species provision of the Lacey Act. By amending the Lacey Act to include a provision for the scientific showing that a species has the potential to become a problem, the spread of such species could be drastically minimized.

IV. Recommendations

The Burmese python, an invasive species in the Everglades, should not be captured then killed, but rather captured then released back into its native habitat, because (1) capture and release is a more ethical solution and (2) capture and release promotes biodiversity. In order to successfully rid South Florida of the Burmese python, while preventing the future spread of invasive species, laws must change. This is an issue that should be prioritized because

¹⁸⁷ *Id.*

¹⁸⁸ *Biosecurity Bill – Six Year in the Making*, INVASIVE SPECIES COUNCIL, <https://invasives.org.au/project/biosecurity-bill-2014/> (last visited Apr. 22, 2019).

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

biodiversity is essential to sustainability of life on earth and without it, the ecosystem would ultimately fail.¹⁹¹ There is an animal welfare argument to be made as many states exempt invasive species from their animal cruelty laws because they are considered “pests.”¹⁹² This means that often times invasive species are killed in inhumane ways.¹⁹³ There needs to be balance between protecting native species and managing invasive ones in a humane way. Effective capture and release can be achieved by strengthening the Lacey Act. In effect, this will stop the introduction of a potentially harmful species before it has the chance to become established. Another solution is to create stronger tax law to be placed on the exotic pet trade industry, which will later serve as a fund for management efforts.

a. Capture and Release

In order to effectively combat the spread of invasive species, particularly the Burmese python, a possible solution is to capture and later release the pythons into their native habitat of Southeast Asia. This would improve biodiversity by filling the gap their removal has caused in Southeast Asia.¹⁹⁴ It is also a more ethical solution to killing which is the current protocol.¹⁹⁵ Using lethal control measures as a way to eradicate invasive species is a controversial subject and “conservation biologists who aim to manage invasive species should take measures to ensure that the actions they take are morally permissible, especially when they propose killing a large

¹⁹¹ Eric Chivian, M.D., *Biodiversity: Its Importance to Human Health*, HARV. MED. SCH.: THE CTR. FOR HEALTH AND THE GLOB. ENV'T., 7 (2002)

https://www.uttayarndham.org/sites/default/files/3_biodiversity_v2_screen_0_0.pdf.

¹⁹² Cassandra Burdysaw, *Detailed Discussion of the Laws Concerning Invasive Species*, ANIMAL LEGAL & HISTORICAL CENTER (2011), <https://www.animallaw.info/article/detailed-discussion-laws-concerning-invasive-species#id-7>.

¹⁹³ *Id.*

¹⁹⁴ Stuart B. Nguyen, ET AL., *Python Bivittatus*, THE IUCN RED LIST: THREATENED SPECIES (Sept. 2, 2011), <http://dx.doi.org/10.2305/IUCN.UK.2012-1.LRLTS.T193451A2237271.en>.

¹⁹⁵ *Florida's Nonnative Fish and Wildlife*, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, <https://myfwc.com/wildlifehabitats/nonnatives/> (last visited Mar. 15, 2019).

number of organisms they have deemed unwanted within an ecosystem.”¹⁹⁶ This usually includes conducting an ethical analysis as well as a cost benefit analysis, which is standardly done when deciding how to handle an invasive species.¹⁹⁷ This moral question of whether the euthanasia of these creatures is ethically permissible is especially difficult in the instant case because there is an unintended bias against snakes. Regardless of the fact that most people don’t find snakes particularly “cute,” this does not mean they don’t serve an important purpose in their native habitat. According to People for the Ethical Treatment of Animals (PETA,) expert veterinarians have warned that “there’s no humane way for laypersons to decapitate and destroy the brain of a snake in the field.”¹⁹⁸ After decapitation, often the pythons remain alive and in pain hours before they die.¹⁹⁹ More needs to be done to protect this species. As Florida spends thousands attempting to kill off the pythons in the Everglades, next to nothing is spent trying to protect them in their native habitat of Southeast Asia.²⁰⁰

As a method for capture, the U.S. Department of Agriculture's (USDA) Wildlife Services' (WS) National Wildlife Research Center (NWRC) have created and issued a patent for a large reptile trap that is designed for live and humane capture.²⁰¹ NWRC wildlife biologist and trap inventor, John Humphrey stated,

Though the trap is based on a standard live trap design, the Large Reptile Trap is the first to require two trip pans to be depressed at the same time in order to

¹⁹⁶ Avery Messing, *An Ethical Analysis of Lethal Control Practices for Invasive Species Management*, (2015) (unpublished thesis, University of Nebraska- Lincoln), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1150&context=envstudtheses>.

¹⁹⁷ *Id.*

¹⁹⁸ *People Will Decapitate Snakes in Florida, Compete for Prize*, PETA (Jan. 11, 2016), <https://www.peta.org/blog/people-decapitate-snakes-florida/>.

¹⁹⁹ *Id.*

²⁰⁰ Jeremy Hance, *‘I Don’t Want to Imagine a World Without Giant Snakes In It’*, THE GUARDIAN (Sept. 26, 2017), <https://www.theguardian.com/environment/radical-conservation/2017/sep/26/burmese-pythons-snakes-bangladesh-tracking-radio-rahman-conservation>.

²⁰¹ *USDA-Developed Snake Trap for Invasive Burmese Pythons Issued Patent*, USDA https://www.aphis.usda.gov/aphis/newsroom/news/SA_By_Date/SA_2013/SA_08/CT_python_trap (last revision date: Jan 17, 2018).

close the trap door. The pans are spaced such that non-target animals are unlikely to trigger the trap. This trap was developed with the invasive Burmese python in mind. It capitalizes on their larger length and weight.²⁰²

This groundbreaking technology could be an essential tool in the capture of these elusive pythons. Since 2002, only a fraction of the population, somewhere around 1,000 pythons have been captured.²⁰³ This is an especially low number considering that the Burmese python, as noted, can lay up to one-hundred eggs in one nest.²⁰⁴ At the current rate of capture, the already large population will only increase, making it more difficult to rid South Florida of these pythons. There needs to be a more aggressive form of capture and the Large Reptile Trap may be a shift in the right direction, if scaled and implemented properly.

After successfully capturing these creatures, they should be returned to Southeast Asia to address the gap in their ecosystem created by the illegal pet trade industry. In deciding what resources are allocated to relocating these species, policy makers must weigh the cost of ecosystem destruction against the cost of relocation.

b. Creating a Tax on the Pet Trade Industry

An effective way to address the issue of invasive species would be to place a tax on the exotic pet trade industry that would create a fund to manage the problems, of which it is an active contributor. Ideally, the tax would be modeled after the Oil Pollution Act of 1990 (OPA,) which was designed to respond to catastrophic oil spills quickly and efficiently.²⁰⁵ The OPA was enacted after the Exxon Valdez spill in 1989, which resulted in the spill of 11 million gallons of

²⁰² *Id.*

²⁰³ *Id.*

²⁰⁴ *Burmese Python*, NAT'L GEOGRAPHIC, <https://www.nationalgeographic.com/animals/reptiles/b/burmese-python/> (last visited Mar. 28, 2019).

²⁰⁵ Oil Pollution Act, 33 U.S.C. § 2701 et seq. (1990).

crude oil into the water of Prince William Sound in Alaska.²⁰⁶ The OPA established a trust funded by a tax on oil that is used to finance the cleanup of an oil spill if the responsible party is unable or unwilling.²⁰⁷ The Act also was created to amend the Clean Water Act (CWA) by requiring oil facilities to prepare Facility Response Plans (FRP.)²⁰⁸ This consists of the submission of a detailed plan showing how the facilities will respond to big spills by oil storage facilities and vessels.²⁰⁹ This would be a useful type of tax to place on the pet trade industry because similarly, the effects of invasive species can have a devastating effect on the ecosystem and economy. The tax would also incentivize those involved in the pet trade industry to act responsibly, knowing that they could be held liable for any disruption they cause.

Furthermore, the tax can be used to pay for the relocation of invasive species to their native habitat. Captured pythons will need to be held somewhere such as a sanctuary or a reptile habitat until there are enough to justify the cost of a relocation back to their native environment of Southeast Asia. The most efficient way to send the pythons back is likely through a large vessel, such as a ship. Once established, the fund created by the tax on the exotic pet trade industry will pay entirely for transportation costs. The revenue created from this tax will be a crucial component for the success of the capture and release program.

V. Conclusion

The Burmese python should not be killed, but rather captured and released back into its native habitat because (1) capture and release is a more ethical solution and (2) capture and release promotes biodiversity. In order to successfully rid South Florida of the Burmese python,

²⁰⁶ *Id.*

²⁰⁷ *Id.*

²⁰⁸ Clean Water Act, 33 U.S.C. § 1251 et seq. (1972).

²⁰⁹ *Id.*

while preventing the future spread of invasive species, the laws that allow these invasions to happen must change.

Aside from capturing then releasing these pythons back into their native environment, The Lacey Act needs to be strengthened to include resolution for species that are not yet listed but have the potential to become dangerous. Additionally, there needs to be a tax and stronger regulations on the pet trade industry to alleviate the costs imposed by gaps in legislation that allow these infestations to take place to begin with. If these steps are achieved, the likelihood of invasive species entering Florida, and other states will be minimized.