INVESTIGATING NEWS ON A NUISANCE: MEDIA FRAMING AND STAKEHOLDER PERCEPTIONS OF INVASIVE PYTHONS IN FLORIDA

By

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A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS IN MASS COMMUNICATION

UNIVERSITY OF FLORIDA

2014

To my mom, Michelle, and my grandparents, Carol, Jean, and Wayne,
as well as Clyde, Garry, and Hannah.

ACKNOWLEDGMENTS

I thank my family for offering all their support through the years, and Professors Mike Foley, Christina Romagosa, and Debbie Treise for being on my thesis committee and guiding me in this year-long project.

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December 2014

Chair: Debbie Treise
Major: Mass Communication

A great deal of research has been devoted to invasive species, which have been labeled as the No. 1 environmental threat in the U.S. But analyses of the media coverage of this vast challenge are virtually non-existent despite the media's important scientific role of carrying messages from government officials and scientists to laypeople. Utilizing framing theory to analyze newspapers, this study sought to establish common themes in the coverage of one of the most prominent invasive species, the Burmese pythons in Florida. The pythons were found to be framed by newspapers as mostly a Florida issue instead of a national one despite the Rodda, et al. (2009) study, which proposed a range from California to Maryland. Other framing analyses were conducted concurrently to determine what consequences, solutions, and other aspects are most salient in the media's collective portrayal of the pythons.

Through qualitative interviews, this study also gathered reactions from key stakeholders—biologists, politicians, pet-industry employees, and the journalists themselves—to see how the issue is being reported: correctly, inaccurately, reasonably, sensationally, or otherwise. Overall, the media was found to have had a positive influence in stimulating awareness and action on the pythons and invasive species overall. But standing out were many flaws in the reporting on the pythons and complex scientific issues overall, leading to

misinformation and tension among key stakeholders when a unified effort is needed in working toward solutions. A discussion on practical solutions and further research is included.

CHAPTER 1
INTRODUCTION

The invasive population of Burmese pythons (*Python bivittatus*) in South Florida, an ecologically diverse area with much protected land, gained notoriety within the last two decades and has since drawn an increasing amount of scrutiny. It's accepted that they made their way into the state through the international pet trade (Willson, et al., 2011), but how they were physically released into the Everglades is greatly disputed, with some stakeholders arguing it was pet owners releasing snakes that grew too big, while others say it was escapees from Hurricane Andrew damage in 1992. This and many other biological and historical facts remain under debate, but the pythons' effects have been widely publicized. The growth of the population of pythons, which are generalist carnivores, has coincided with dramatic drops in native animals (Dorcas, et al., 2012). This population rise has brought a range expansion within Florida, and a study by Rodda, et al. (2009) found that current climate conditions are suitable for the reptiles to, if unstopped, inhabit portions or all of the states along the United States' coast from California to Maryland, as well as some inland states.

There is an extensive body of academic literature on invasive species and an advancing amount specifically on the pythons in Florida. Much of the Burmese python research, though, concentrates on the snakes themselves and doesn't analyze the main method—media coverage—of how those findings have been delivered outside of science. How specific invasive species are framed by journalists takes on importance because laypeople depend on news media to relay environmental concerns from scientists and the government (Griffin, et. al., 1995).

A viable solution hasn't yet emerged: Traps, organized hunting, and incidental run-ins are a few of the methods that have been tried, but none have made significant progress toward eradication. Because the invasion is believed to be gaining strength, even if just in Florida,

research into media framing of the Burmese pythons is warranted to see how media members are portraying severity, blame, proactivity, possible spread, and conflict, all of which then affect how stakeholders and laypeople react. This study used a quantitative framing analysis and qualitative interviews with stakeholders to look at newspaper coverage of Burmese pythons to determine themes; best practices, both in how journalists cover the issue and how sources remain positive relationships with journalists; and offer practical solutions for improvement.

CHAPTER 2
LITERATURE REVIEW

Framing Theory

Framing theory, as utilized throughout this study, notes how media take features of reality perceptions and turn them into salient communication themes (Entman, 1993). In other words, to frame is "to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (Entman, 1993). Scheufele and Tewksbury (1999) concluded that framing is a process that determines news messages affecting perceptions of how an issue can be understood. Jönsson (2011) said framing analyses could be used as media-content analyzers. Therefore, a framing analysis is a commonly used method to study the role of media and journalism in public discourse.

The framing of invasive species—and specifically for this study, Florida's invasive population of Burmese pythons—is particularly important because communities rely on the news media to relay environmental concerns from scientists and government officials to laypeople (Blumer, 1971; Krosnick & Kinder, 1990; Griffin, et. al., 1995; Soroka, 2002). Analyzing media frames will then help provide insight into laypeople's risk perception of the problems stemming from invasive species. These media portrayals and risk perceptions play major roles in public support for the proactive and reactive steps in combatting such problems. As Backstrand (2003) posed, "Citizens and the public have a stake in the science-politics interface, which can no longer be viewed as an exclusive domain for scientific experts and policy-makers only."

Invasive Species

The U.S. Fish and Wildlife Service's director has said that invasive species make up the top threat to the environment in the United States (Brown, 2006). They can present great difficulty in preserving ecosystems' biodiversity (Hoddle, 2004; Rodda, et al., 2009; Willson, et al., 2011), and their introduction, establishment, and growth can result in vast economic, ecological, and public-health damages (Andersen, et al., 2004). Many non-indigenous plants and animals do, conversely, better new environments, reverse effects from other invaders, or have no impact, but it can be difficult to weigh if potential benefits offset disturbances (Andersen, et al., 2004).

About 10 percent of species become invasive in the U.S. once they're introduced to an area (Adams, 2007). Invasive species are introduced to new territories by humans in several ways: travel and commerce carrying accidental pests, pet and plant industries, release of captive-reared game species, animal and plant farming, and biological control, which introduces another species to combat an already-existing invader (Hoddle, 2004). Invasive species are typically only noticed when their numbers have grown beyond potential control or elimination (Willson, et al., 2011). Internationally, the U.S. and China lead both in contributing invasive species and being victimized by them, with the main overlying cause being travel and trade between the two countries (Jenkins & Mooney, 2006). Though they are the most impacted, both countries lack "comprehensive, proactive, regulatory frameworks" in halting introductions and spread (Jenkins & Mooney, 2006).

Within the introduced animal species, snakes can be particularly problematic. Past research has found that they are especially hard to detect, are adaptable, don't need much energy, are popular as pets, and have several represented species that have settled beyond native borders (Willson, et al., 2011). Profits from the international trading of amphibians and reptiles are

estimated to climb into the billions, which likely guarantees continued invasions pending multi-country prevention efforts (Reed & Kraus, 2010).

Reed and Kraus (2010) argue that, in the past, mammals, plants, and insects have attracted the majority of invasive-species research because of how much they hurt economically and harm ecosystems. Meanwhile, reptiles and amphibians had "historically lagged" in attention but, because of increasing invasiveness, are drawing more scrutiny (Reed & Kraus, 2010). A few amphibian and reptile cases are well documented. At the end of World War II, brown tree snakes populated Guam after riding over in cargo. Out of 12 native birds there, just two remain, and only half of the indigenous lizard species are left (Leckart, 2010). In addition, the snake causes power outages, resulting in $4.5 million in total economic loss annually. Per square mile of Guam, which is naturally free of snakes, there are now an estimated 12,000 brown tree snakes (Pelley, 2008). There is worry that the snakes could spread to other U.S. lands, namely Hawaii, if allowed to board and ride in ships leaving Guam. Between 1981 and Pelley's 2008 publication, eight of the snakes had been found in Hawaii. U.S. federal agencies have developed regulation strategies to prevent further invasions from the snakes. Those include traps, dogs trained to smell the snakes, and visual checks in crates on ships. Dead mice containing acetaminophen, which kills snakes, are also being utilized. To bring the snakes to manageable numbers, an estimated $20 million annually is needed (Pelley, 2008), showing the high cost of invasive-species management after establishment.

Another problematic amphibian/reptile species is the cane toad, which originated from Central and South America but has become invasive in Australia. There, with their projectile toxin, they kill snakes, lizards, other wildlife, and even humans (Leckart, 2010). While the cane toad and brown tree snake are among the most well-known reptile/amphibian cases, several

others have received less attention but still stand to cause great ecological damage: the different constrictor snake species in Puerto Rico, common kingsnakes in the Canary Islands, boa constrictors in Cozumel and Aruba, and Nile monitors in Florida (Reed & Kraus, 2010).

Invasions in Florida

In the United States, Florida takes on a key environmental role because of its unique collection of ecosystems. From north to south, the state's climate goes from temperate to semi-tropic (Pearlstine, et al., 2002), and it is well noted for its ecological diversity and variety of plant and animal species (Kautz & Cox, 2001; Pearlstine, et al., 2002). The state's tropics and subtropics make it more vulnerable to invasions than the rest of the U.S. because these climates are welcoming to many foreign species. Moving southward from the panhandle toward the Keys, species common to the continental United States decrease while tropical ones increase, including those that, through the geological creation of islands in Central Florida long ago, are endemic by way of long-term evolutionary isolation (Kautz & Cox, 2001). A compilation of past research shows that among three "ecoregions," divided into 13 "subecoregions" and 82 "natural communities," there are 542 bird, amphibian, reptile, and mammal species; 126 freshwater fish species; 1,000-plus estuarine and marine fish species; and an unknown number of invertebrates (Kautz & Cox, 2001). These organisms are threatened by more than invasive species. Florida also supports a growing human population of more than 18.8 million residents (U.S. Census Bureau) and an estimated 80 million annual tourists (Rooney, 2011), leading to more development and less room for native ecosystems.

Florida has more non-native amphibians and reptiles than any other place in the world, with 137 introduced as of Krysko, et al. (2011). That includes 56 reproducing established species, of which five are snakes. Citing Cope (1863), Krysko, et al. (2011) found the first

recorded amphibian/reptile introduction to be the greenhouse frog. The first snake was the earthworm snake in 1930 (Myers, 1958 in Krysko, et al., 2011).

Krysko, et al. (2011) examined the 137 species—plus three that were intercepted before introduction for a total of 140—and determined the pathways that allowed for their introduction (a single species could have been introduced through more than one pathway). The most common pathway by far was the pet trade, with 125 species. It is illegal to release non-native animals into Florida without a permit, but because of the near impossibility of policing such releases, no prosecutions had been made for the establishment of exotic species as of Krysko, et al. (2011). The next most common pathway was cargo transportation with 18, then zoos with four, and then biological control with two. Because Florida is growing in global trade and population, Adams (2007) argues that the pathways will continue to contribute to the invasive-species problem.

Python Invasion

There could be as many six introduced python species in Florida. As of Krysko, et al. (2011), two—the Burmese python and northern African python—were known to be established, while reticulated pythons, Parker's pythons, carpet pythons, and ball pythons had unverified claims of introduction. The Burmese pythons have drawn perhaps the most attention in recent years from the python species, likely all the invasive species in Florida, and even invaders across the U.S.

They're native to southeastern Asia, including Laos, Vietnam, and Cambodia, and, in that range, they have an International Union for Conservation of Nature status of Vulnerable, one step away from being Endangered (IUCN Red List). Population declines—which, among native countries, are as high as 90 percent over 10 years—are attributed to habitat degradation, skin harvesting, the pet trade, and medicine (IUCN Red List).

In the United States, however, the python is spreading and threatening native species and habitats (Mazzotti, et al., 2010; Dorcas, et al., 2012; Nair, 2013). Willson (2011) and others (examples: Brown, 2006; "Constricting the pet," 2010) point to the exotic pet trade as the reason behind Burmese pythons settling in Florida. Brown (2006) says they're often dumped into the wild by their owners after they begin to grow toward full size (as will be discussed later, the pet-owner-release theory is debated, with some pointing instead to damage in 1992's Hurricane Andrew). Past research has shown that the snakes can grow to almost 20 feet long and weigh nearly 200 pounds (Dove, et al., 2011).

They now exist in thousands of square kilometers in the southern part of the state, including nearly all of the ecologically diverse strongholds of Big Cypress National Preserve and Everglades National Park (Reed, et al., 2011). The principle harm cited from the Burmese python, a generalist predator, is a drastic decrease of prey mammal populations in Florida. Numbers tallied in Dorcas, et al. (2012) based simply on animal sightings from 1996 and 1997 compared to those between 2003 and 2011 revealed decreases of 99.3% in raccoons, 98.9% in opossums, and 94% in white-tailed deer, likely because of the pythons. Birds are also being preyed upon, including at least four of Florida's species of special concern—little blue heron, snowy egret, white ibis, and limpkin—and at least one federally threatened species—the wood stork (Dove, et al., 2011). Top native predators, like the American alligator, Florida panther, and bobcat, existed before the pythons. But a predator-prey ecological balance among all species has developed over many thousands of years, putting the populations of prey species at great risk because of the relatively non-existent time to evolve and adapt (Dorcas, et al., 2012). Further conflict at the top of the food chain has developed because Burmese pythons can eat alligators (Willson, et al., 2011).

Encounters grew in the 1990s, starting regularly in 1995 (Willson, et al., 2011). From 2000 to 2009, the recorded number of annual captures specifically in Everglades National Park increased from two to 367 (U.S. National Park Service). But from 2010 to 2012, the number per year dropped from 322 to 152. The total recorded captures between 2000 and 2012 was 1,977 (U.S. National Park Service). The projected number of pythons in the state varies greatly, and there is no single reliable estimation (Reed, et al., 2011).

In 1979, the first Burmese python in the Everglades was recorded (Dove, et al., 2011; Krysko, et al., 2011). Assuming there were 10,000 as of 2008, the species had established a viable population between 1988 and 1993; assuming 100,000 in 2008, establishment was between 1983 and 1988 (Willson, et al., 2011). (These estimates were made assuming there was "a consistent relationship between python encounters and population size.") Based solely on the temporal factor, establishment between 1988 and 1993 would then support the theory for 1992's Hurricane Andrew, while the 1983-to-1988 approximation would discredit it.

But Willson, et al. (2011) overall argues against such possibilities that involve "large numbers" of pythons being released at once, including the theory of Hurricane Andrew in 1992. Among the reasons Hurricane Andrew is unlikely, Willson, et al. (2011) says, is that the core of the established population is 30 kilometers from South Florida's nearest reptile breeder or importer, meaning "large numbers of pythons" would have needed to move that distance to form what is believe to be the population's epicenter in the Everglades. Though the study says the "exact circumstances" that brought about the pythons' establishment "will never be proven," it notes establishment after 1990 would require either a "large number" of between 100 and 1,000 founders or "unrealistically high juvenile survivorship" for the pythons to survive and build into the current expansive population numbers. The conclusion of Willson, et al. (2011): The most

likely scenario was a "one-time release of a relatively small number of adult or juvenile pet pythons in mangrove regions" of Everglades National Park near Flamingo, an extreme southern Everglades recreation area, before 1985. Such a timeline "fits well with establishment dates estimated based on python encounter rates" and "is entirely consistent with the spatial and demographic patterns of python captures" Willson, et al. (2011). The encounters that started in the early 1990s likely came well after establishment in the Everglades because of the pythons' lack of detectability and while the snakes were initially reproducing in the park's southern mangroves.

Potential Spread Beyond Florida

The species is particularly known for its impact on the Everglades, but Rodda, et al. (2009) said it has the potential spread much farther. The study proposes that, at current climate conditions, Burmese pythons could live in portions or all of the coastal states from California to Maryland, as well as some inland states. For comparison, the study uses the python's full native range, which juts down into the tropics of Southeast Asia but does include more mild temperatures northward. The range is limited by aridity to the west as it approaches Pakistan, bodies of water to the south and east, and the Himalayan Mountains to the north.

Rodda, et al. (2009) uses two main factors to determine suitable python range: precipitation and temperature. Though preferring locations with mean rainfalls between 1 and 2,000 millimeters a month, pythons can live for two months in an area with no rainfall. Rodda, et al. (2009) found the python's range to have temperatures from 2 to 37 degrees Celsius (35.6 to 98.6 degrees Fahrenheit). It said the pythons can survive the colder temperatures by hibernating for months-long periods and hiding in burrows. The study does discuss many gaps in research on the pythons in their native habitats, but it argues that, while having those gaps filled in would be ideal, hypothesizing about the U.S. population is too important to ignore:

> Obtaining physiological, environmental, and behavioral data sufficient for parsing the evolutionary integration of energetic and physiological factors for a single site in the native range would be experimentally challenging and would require a comprehensive understanding of paleo-climates and the evolution of python hibernation behavior. Such information is likely to remain unavailable for some time; meanwhile, insight into the potential U.S. distribution is needed immediately to inform management of this rapidly expanding invader.

In the final range map suggested by Rodda, et al. (2009), there are some northward areas that may or may not be suitable, depending on how long the pythons are able to hibernate. There is also a pocket in southern California that is proposed as too dry. But mostly, even with these variances, the study's potential range from Maryland to California stays intact, with more expansions possible by the year 2100 because of climate change. If this proposed range proves to be true, and if the damages already being done by Florida's Burmese pythons or other invasive reptiles and amphibians are indications, the ecological damage across many states could be severe and perhaps irreversible.

Rodda, et al. (2009) acknowledges, though, that the "common assumption" from biologists is that the invasion "will be restricted to southern Florida." After the 2008 online publication of Rodda, et al. (2009), Pyron, et al. (2008) published a map showing only southern Florida and the very tip of South Texas as having acceptable Burmese python habitats in the U.S. Avery, et al. (2010) restricted the range even further, to the "subtropical environment of south Florida." While these reports formulated ranges based on their respective mapping techniques, two studies— Mazzotti, et al. (2010) and Dorcas, Willson and Gibbons (2011)—were able to draw from physical evidence from the usually cold winter in 2009-10, especially in early January 2010. This cold snap is believed to have killed as much as half of the invasive population at the time (U.S. Department of the Interior, 2010).

In studying Burmese python mortality from that winter, Mazzotti, et al. (2010) recorded nine python deaths out of 10 radioed pythons (90%) and 40 deaths out of 99 non-radioed wild

pythons (40.4%). Some of the pythons demonstrated poor survival abilities by attempting to sun bask instead of searching for shelter, but the snakes might not have had an alternative because of "a lack of suitable thermal refugia," such as potential burrowing holes being covered by seasonal rainwater (Mazzotti, et al., 2010). Snakes found in higher elevations were more likely to survive:

> Artificial habitats, especially raised levees associated with canals and roads, have abundant refugia (burrows, erosional holes, etc.) that would be more likely to remain dry and thermally secure. … We would expect higher survival in drier natural areas with burrows and large tree hollows and in artificial habitats as described above; paradoxically, this could allow relatively higher python survival in areas outside the Everglades which are mostly located farther to the north.

Validation of the Rodda, et al. (2009) study, then, comes down to a biological question posed by Mazzotti, et al. (2010): Did the pythons die during the winter because of "maladaptive behaviors or genetically fixed cold intolerance," or because of an "unavailability of suitable refugia" in certain areas?

Dorcas, Willson and Gibbons (2011) explored this question by constructing an artificial habitat in Aiken County, South Carolina—which is within the range proposed by Rodda, et al. (2009)—and releasing 10 males captured from the Everglades. The habitat included escape-proof fencing, a pond, trees, brush piles and underground refuges. The pythons were first placed into the enclosure in June 2009, and behavioral and biological data were recorded regularly.

As it was in Florida, that following winter was much colder than normal in South Carolina, starting most noticeably in the middle of October 2009 with a recorded low of 3.6 Celsius, or 38.5 Fahrenheit (Dorcas, Willson & Gibbons, 2011). As temperatures dropped, snakes did begin using the underground refuges but also, as previously noted in Mazzotti, et al. (2010), showed an increase in basking. Two of the snakes even entered the pond despite cold water temperatures. Five of the 10 snakes—two found in water and three on land with little to no

shelter—died in one day: on December 11, when the low temperature was -0.4 Celsius, or 31.28 Fahrenheit. Four of the five survivors used underground refuges.

Three more died from December 17 to January 4, all of which regularly took refuge at night but failed to do so on particularly cold nights. By December's end, the remaining two stayed underground and didn't emerge during the day to bask. By the time the severe cold snap in early January set in, temperatures fell as low as -9.2 Celsius, or 15.4 Fahrenheit (Dorcas, Willson & Gibbons, 2011). The last two snakes were found dead in the underground shelters in mid-January. Low body temperature wasn't found to be a distinct cause of death, as wasn't disease or respiratory-tract problems. Instead, the likeliest cause was "acute hypothermia … typically associated with cold stress in captive tropical reptiles" (Dorcas, Willson & Gibbons, 2011).

Dorcas, Willson & Gibbons (2011) conclude by saying the pythons "may" not be able to survive as temperate of climates as the central section of South Carolina, but, because of a multitude of biological, geographical, climate, and individual-conditioning factors, the findings "do not necessarily refute the Rodda, et al. (2009) model":

> Some pythons in our study were able to withstand long periods of considerably colder weather than is typical for South Florida, suggesting that some snakes currently inhabiting Florida could survive typical winters in areas of the southeastern United States more temperate than the region currently inhabited by pythons.

The studies from the 2010 cold could be seen as arguments for either side of the discussion on the python expansion because of the rarity of such extreme weather, the conflicting mortality and survival abilities, and their mediated conclusions. It is important for this study to have an understanding of Rodda, et al. (2009), its implications, and the follow-up research. But the aim of this study isn't to try to argue what theory is most likely to hold true but rather to see if media coverage was affected by framing the pythons as a Florida or national issue.

Pushing Back the Invaders

Range expansion is being discussed because there isn't yet a reliable method for widespread eradication at the current locations of Burmese pythons, which are typically well camouflaged and don't tend to make their presence known to nearby humans. Traps with funnel entrances, used in the control of invasive snakes in other countries, are lacking in published success stories in regards to large constrictors, like the Burmese python (Reed, et al., 2011). Reed, et al. (2011) set up baited traps in an area of expected high Burmese python population density over almost three months—August to November 2010. The nightly success rate of <0.05 percent per trap (three total Burmese pythons captured) couldn't be "considered successful in terms of potential control of an invasive species such as the Burmese python" (Reed, et al., 2011).

State wildlife officials organized a 30-day hunt in early 2013 that invited people from across the country to travel to designated state lands in southern Florida and harvest as many Burmese pythons as possible (Segelson & Hirth, "FWC Kicks Off," 2013). Monetary prizes were given for most pythons and longest individual python. The 800 registered participants at the start (Segelson & Hirth, "FWC Kicks Off," 2013) had increased to nearly 1,600 from 38 states, the District of Columbia, and Canada by the conclusion (Segelson & Hirth, "Update," 2013). In spite of the wide participation and covering more than a million acres, only 68 pythons were captured. Taking the mean participation of 1,200 hunters, that's an average of <.002 snakes per hunter per day. The hunt, though, was promoted, both before and after, as a way to collect data and raise public awareness, not necessarily make a step toward eradication (Segelson & Hirth, "FWC Kicks Off," 2013; Segelson & Hirth, "Update," 2013).

Meanwhile, a simpler method, spotting the snakes along the road at night, has resulted in several hundred caught since introduction (Reed, et al., 2011). But chance sightings; the rare

temperature drop discussed earlier, believed to have killed as many as half of the pythons; and the many other proposed combat methods (more of which will be explored throughout this study) haven't yet proved to be complete solutions in mitigating the problem.

Inconsistencies in Laws

Along with missing scientific solutions, researchers (examples: Brown, 2006; Boonstra, 2011) have noted that existing discontinuities between laws and agencies also hurt the U.S. in its abilities to deal with invasive species. Responsibility is scattered across agencies and their employees depending on the type of organism—aquatic, plant, or otherwise—and how it's being brought into the country (Boonstra, 2011). On the other hand, New Zealand, a country regarded as an international leader in invasive-species prevention, has a single person, the Minister of Biosecurity, in centralized control over strategy implementation. Additionally, all issues related to invasive species fall on one agency, the Ministry of Agriculture and Forestry (Boonstra, 2011).

A missing centralized federal effort in the U.S. opens the doors for states to handle non-native organisms with differing laws (Brown, 2006). This leads to deficiencies and fragmentation across states, though joint efforts are needed because animals don't observe political boundaries, only ecological ones. States also need consistent regulations, Brown (2006) argues, so sellers and customers can't do as they wish—for instance, traveling from tightly regulated states to those with more loose regulations.

Brown (2006) suggests that federal officials encourage consistency as they did in *South Dakota v. Dole*, which allowed 5 percent of money for federal highways to be kept unless states raised the drinking age to 21. Similarly, in the case of exotic-animal laws, Land and Water Conservation Fund money could be withheld for failure to institute consistent regulations. Adopting consistent regulations would save states resources in deciphering each problem by

working collectively, and resources from the actual damage associated with invasive species would be minimized (Brown, 2006).

Making these governmental decisions on invasive-species management are based on whether it's a species that could possibly invade or if it's a species that has already been introduced (Maguire, 2004). In the already-introduced category, resources are scare, leading to priorities being set for the numerous existing invasive species. Deciding on such allocations are complex because of the assessment knowledge needed: the likelihood of range expansion, how fast that expanse could happen, how numerous a species could become, and what environmental, economic, or other consequences stand to arise (Maguire, 2004). Making the implementation of proposed solutions even more challenging are: unknown consequences of those solutions, conflicting objectives for management, and many different involved groups with dissimilar opinions on available information and priorities (Maguire, 2004).

The invasive pigs in Hawaii, an environmentally harmful species, demonstrate the intricate decision-making processes that must go into control (Maguire, 2004). Efforts are continually underway to protect existing forests and restore damaged ones, and Hawaiians too have incentives, including medicine and food, for forest conservation. Conversely, Hawaiian hunters want wild pigs for food and cultural events, including funerals and weddings, and anti-cruelty activists protest the eradication of the animals, even stealing snares used to catch and kill them. Caught in the middle are managers who must weigh these conflicting values and act as they see appropriately (Maguire, 2004).

But even when appropriate regulations are finally decided on and put into practice, they don't always turn into action on behalf of enforcement agencies (Cangelosi, 2002). So a slew of problems that cause non-enforcement—such as underfunding, program delays, and failure to

provide stakeholders with exact clarity on what they should actually do—would also need improvement (Cangelosi, 2002).

The Lacey Act

In terms of existing national laws, the Lacey Act of 1900, which calls for import and interstate-commerce bans on certain harmful species, is perhaps the most cited legislative weapon in combatting invasive species. Its original intentions weren't as broad as they are today, focusing mainly on birds. As noted in *Forest and Stream* (1900), the Department of Agriculture wanted to specifically regulate the "preservation, distribution, introduction and restoration of game birds and other wild birds." The restoration component was to aid those birds that had become "scarce or extinct," while introduction referred to releasing "American or foreign birds or animals in localities where they have not heretofore existed." As shown by the invasive species mentioned in the original bill—"mongoose, the so-called 'flying foxes' or fruit bats, the English sparrow, [and] the starling"—snakes hadn't yet been considered.

More than a century later, in 2012, Burmese pythons, along with Indian pythons, northern African pythons, southern African pythons and yellow anacondas, were officially deemed "injurious" under the Lacey Act (*Federal Register*, 2012), thus banning those species' importation and interstate sale. The injurious classification for Burmese pythons came after the South Florida Water Management District requested so in 2006 to the Fish and Wildlife Service and 33 years after the first Everglades sighting in 1979.

Not all species under Lacey Act consideration eventually become banned. The Fish and Wildlife Service had originally proposed in 2010 that nine total snake species be considered injurious (*Federal Register*, 2012). The four aforementioned species made it into the final 2012 law, while reticulated pythons, boa constrictors, DeSchauensee's anacondas, green anacondas, and Beni anacondas did not but "remain under consideration."

The purpose of listing the final four snakes as injurious "is to prevent the accidental or intentional introduction of and the possible subsequent establishment of populations of these snakes in the wild in the United States" (*Federal Register*, 2012). But, because Burmese pythons are already established, the service acknowledges, "We have been criticized for not listing species before they became a problem" (*Federal Register*, 2012). The injurious classification given to Burmese pythons was an attempt "to prevent the further spread" (*Federal Register*, 2012).

To make the Lacey Act more effective, Fisher (2002) suggested combining it with another existing law, the Conspiracy Act. The Conspiracy Act could connect with the Lacey Act if "two or persons conspire" to break the restrictions set forth by the Lacey Act (Fisher, 2002). This combined legislative effort is meant to bring about more severe penalties and a greater amount of convictions. "A charge of conspiracy to violate the Lacey Act will not end the poaching and illegal wildlife trafficking problem. However, it will lead to more convictions, longer sentences, and deter future violations—saving wildlife in the process" (Fisher, 2002).

"Clean" Versus "Dirty" List

In accordance with the Lacey Act, the U.S. uses what's popularly called a "dirty" list approach to dealing with invasive species—in other words, allowing all organisms to be imported unless otherwise noted. The opposite approach is the "clean" list method, or banning all species except those that have been specially approved. Those wanting to have a species placed on the clean list would have to prove that the value—educational, financial, etc.—of importation is more significant than potential harm on the native environment, as well as the chances for accidental release (Brown, 2006). Researchers (examples: Brown, 2006; Boonstra, 2011) argue that clean lists, such as New Zealand's system, have been shown to be more effective in preventing the negative effects caused by non-native organisms. Once a species makes the dirty

list, they say, it has already established, is causing damage, and likely won't be able to be removed.

International Coordination

With the interconnectivity between countries in the pet trade, other commercial interests, and travel, Van Wilgen, et al. (2010) said regulations on invasive species need to be formed at "regional, national, and global" levels. While this study is mostly concerned with the land-dwelling Burmese pythons, aquatic species and sea transport also represent a crucial area, if not the most, of invasive-species research because of the mobility between countries bodies of water provide. Shipping over bodies of water is one of the most discussed country-to-country pathways of invasive-species introduction—specifically, ships' ballast water, which is added for stability and weight. Past research has shown three to 10,000 separate species in a typical cubic meter of the ballast water, ranging from microscopic organisms that could remain the same size but could also be juveniles that will grow much larger, to fish (Patrick, 2009). Even with this knowledge, "ballast water-mediated transport of organisms remains an unresolved problem that is growing in magnitude" (Patrick, 2009).

Ballast water presents another case of legislative text not translating into action. Countries do have many agreements on the discharge of ballast water, but most aren't binding, lack enforcement capabilities, and are generally symbolic only. There is "veritable alphabet soup of international organizations, laws, and guidelines that address the issue," but no progress has been made in 20 years on ballast water, which has likely even become worse because of increased trade (Patrick, 2009).

As of Patrick (2009), only three U.S. states—California, Oregon, and Washington—had laws on ballast water. The latter two replicated California's legislation, which says ships above 300 tons coming from somewhere outside the northwest Pacific Ocean have to switch their

ballast water from beyond 200 miles out. A lack of national, enforced regulation leads Patrick (2009) to argue that the U.S. Congress "must finally address this problem and pass a comprehensive federal law setting a national minimum standard."

Cost, Proactivity, and Savings

When harm is done by invasive species, the monetary damage can be monumental. For example, leafy spurge, a pest weed native to Europe, has settled in five-plus million acres in the United States' Great Plains, damaging rangeland and costing at least $100 million annually (Andersen, et al., 2004). Costs from invasive species are incurred, among other reasons, because of patrolling borders to prevent invasions, control, eradication, and habitat rehabilitation (Hoddle, 2004). Financial costs are not confined within the area of direct impact. Taxes paid to the federal government are used to suppress non-indigenous animals and plants across the country. The 2001 budget for the U.S. Department of Agriculture, for instance, had $580 million set aside for invasive species (Andersen, et al., 2004). Though dollars spent on invasive species might appear high, "major pathways of introduction have only recently been elucidated, and effective management interventions have been limited" (Reed & Kraus, 2010).

Using legislative powers to prohibit certain species before they establish has been shown to be less expensive than dealing with them afterward (Adams, 2007; Dresser & Swanson, 2013). Adams (2007) said such preventative measures would reduce the overall cost of invasive species by 70.91%. In studying a specific invasion, the zebra mussels in the Great Lakes, Adams (2007) constructed a scenario involving the species being transferred to Florida's largest freshwater lake, Lake Okeechobee. His findings are that if the mussels did establish in the lake, it would cost $349.34 million over 20 years. Even more would be the cost—$1.32 billion—to completely eradicate the mussels. Adams (2007) based the eradication price on Virginia's removal of the mussels from the Millbrook Quarry pond—the only successful zebra-mussel eradication in the

U.S. Adams compared the reactive costs at Lake Okeechobee to a plan that would cost much less—$152,800 annually—proposed by the U.S. Army Corps of Engineers for proactive arrival prevention and early warnings.

Reactive Success Stories

While pre-invasion tactics are heralded as the closest to failsafe, actions after species' establishment have, on rare occasions, proved successful. One notable case came in the late '90s, when Australian researchers found that millions of invasive black-striped mussels were established on the continent's northern coast (Kaiser, 1999). They were believed to have arrived aboard a yacht hull. Less than a week after the discovery and in spite of opposition, the Australian government closed and quarantined three marinas where the mussels had been found and used copper and chlorine to poison and kill all living organisms in them. The chemical releases came with a $1.5 million price tag, but in the months after, none of the mussels were spotted as native species reemerged (Kaiser, 1999).

Stokstad (1999) offered another success story. Nutria established in England after farmers brought the rodent in from South America in the 1920s because of the popularity of their fur. After escaping from farms and establishing, the nutria ate crops and native plants and dug holes at river dikes. In the 1950s, once the fur market had gone away, 200,000 nutria were estimated to be in England. Though actions to rid the country of the pest didn't initially work, all the nutrias were killed by 1989 (Stokstad, 1999).

The English government did this by first creating a laboratory in 1962 that employed six scientists and 14 trappers. Aided by an unusually cold winter, the laboratory eventually had gotten rid of up to 90 percent of the nutria, but subsequent mild winters allowed the population to bounce back. More in-depth research of nutria followed, and 30,000-plus were captured and dissected. The research showed how many workers were needed to combat the nutria, how much

it would cost, and when work would be completed. This research resulted in the government approving an additional $4 million to the eradication effort. Trapping in the early and mid-‘80s brought the species down to 40 individuals, and none were found from 1987 to 1989 despite continued trapping attempts. These two successful programs show that, while rare, post-establishment eradication can work if there is “unanimous political support and overwhelming force” (Stokstad, 1999).

Pet Industry Opposition and Power

Global dealing in live organisms has proven to be lucrative. The sale of boas and pythons alone totaled between $1.6 and $1.8 billion annually as of 2010 (*The Economist*, 2010). The trade and accompanying revenues bring a powerful lobby that influences local, state, and federal laws, presenting the most pronounced hurdle to legislative reforms that would deal with the pet trade (Brown, 2006). Meanwhile, from the pet industry’s point of view, the government and its regulations are the trade’s “most dangerous predator” (*The Economist*, 2010).

Pet traders came out in vocal opposition of the 2010 proposed federal ban on Burmese pythons and eight other snakes. The U.S. Association of Reptile Keepers highlighted the economic impacts, saying that if the original nine snakes proposed to be added to the Lacey Act’s injurious species list were, it would “potentially kill thousands of jobs and [bankrupt] countless family businesses in the process” (United States Association of Reptile Keepers, 2012). The association said that the “entire controversy revolves around a small remnant population of Burmese pythons introduced into the Everglades about 20 years ago” because of damage from Hurricane Andrew. The cold winter in 2010 killed up to 80 or 90 percent of those pythons, the association said, citing Florida Fish & Wildlife, the University of Florida and the U.S. Department of Agriculture (United States Association of Reptile Keepers, 2012):

> Licensed python hunters rarely see pythons anymore. But that has not stopped radical environmentalists and a small group of invasion biologists from attributing nearly every ecological problem of the Everglades to the scary specter of the Burmese python.

The association goes on to criticize politicians, scientists, and environmentalists for perpetuating the "myth" behind the pythons in southern Florida (United States Association of Reptile Keepers, 2012).

Even with wildlife bans, aspects of the pet trade would likely continue, even if they're made illegal, Fisher (2002) argued. As of Fischer's (2002) publication, the illegal trafficking of wildlife was smaller only than the drug trade, gaining more than $3 billion internationally a year from trafficking and poaching.

The Media's Role and Research Questions

The research into invasive species, their laws, and their environmental and economic impacts is abundant. But, even with the designation as the No. 1 environmental problem, research on invasive-species media coverage is seemingly non-existent. Willson, Dorcas and Snow (2010) called media coverage on the Burmese pythons in Florida "often sensationalistic" with "generally … little or no support or scientific evidence," like the discussion about python escapes from Hurricane Andrew. Without reliable means of containment and eradication, and because a broad range of expansion is considered at least possible, awareness and accuracy from the media and how messages are framed become increasingly important, especially in terms of layperson education and encouraging their political and environmental awareness and involvement.

Seeking to form a research framework at the important but untouched crossroads of invasive species and media coverage by using coverage of the Florida Burmese pythons as a

launch pad, this study utilized a content analyses of four newspapers and qualitative interviews of stakeholders to answer these research questions:

- **RQ1:** Is Florida's invasive population of Burmese pythons framed as a state or national issue?
- **RQ2:** What consequences appear in the coverage as a result of the invasive population?
- **RQ3:** What native species are mentioned most often as being negatively affected by the pythons and have become the "spokes-species" for the invasion?
- **RQ4:** What solutions appear most often in coverage?
- **RQ5:** What other frames appear in the coverage?
- **RQ6:** What are the reactions of four major stakeholder groups—biologists, journalists, politicians, and those in the pet industry—to the coverage, and what compliments and criticisms do they have on the coverage?

CHAPTER 3
METHOD

This study analyzed newspaper content on the pythons to gain insight into how Burmese pythons are being represented in the media. Newspapers were specifically chosen because their reportage, in the form of text, is more quantifiable; newspapers' style of writing and practice of journalistic norms tend to be consistent, allowing for findings from different publications to be joined under the same analyses; and their archives dating back many years are searchable for key words and phrases, making the sample base reliable across several years.

To examine frames on a comparative basis, content was retrieved from three Florida newspapers and a national newspaper. The Florida newspapers with the largest daily circulations—according to recent available circulation totals ("Florida newspaper circulation," 2013)—from each of the state's three geographic divisions were used: Fort Lauderdale's *Sun Sentinel* (151,413) in the south, the *Tampa Bay Times* (299,985) in the central portion, and Jacksonville's *Florida Times-Union* (82,340) in the north.

For the national newspaper, the *New York Times*, which has the second largest circulation in the U.S. with 1,865,000 ("Top 10 newspapers," 2013), was selected over No. 1 in circulation, the *Wall Street Journal*, because of the latter's emphasis mainly on business and economics, and the former's more general coverage of relevant happenings. (It should be noted that the circulation-counting source, Alliance for Audited Media, includes digital subscriptions, and more research will likely look to these numbers as news continues to move online.)

To be all inclusive of what themes are in the public discourse, the units of analysis for this study were articles and opinion columns written by staff members and expert contributors. News Bank (for the Florida newspapers) and ProQuest (for the *New York Times*) were searched for the terms "Burmese python" and "Burmese pythons" in the newspapers' archives. Because

there hasn't been a previous newspaper content analysis on the Florida Burmese pythons, all available articles since the first one was found in 1979 in the Everglades were used. *New York Times* archives were available well beyond 1979, so the year served as the beginning for the search; the end was Dec. 31, 2013. The end of 2013 was used as a cutoff to gather the most up-to-date coverage and so year-by-year trends could be fully observed—for example, comparing news content in all of 2012 wouldn't match up temporally to just eight months in 2013.

The archives of the *Sun Sentinel* were available back to Jan. 1, 1986, the *Tampa Bay Times* to Jan. 1, 1987, and the *Florida Times-Union* to Jan. 11, 1996. Dec. 31, 2013 was again the cutoff date. As will be discussed in the results, media coverage was found to have arisen in the 2000s, so varying archival start dates in the 1980s and '90s likely didn't affect the sample. To capture all frames entered in the public discourse, word length did not play a role in the selection of what coverage to analyze.

The analysis also involved labeling articles as either primary or secondary. Primary articles were those that have a clear main focus on the invasive population of Burmese pythons, or those articles on invasive species, in general, that still did still have a heavy Burmese python component. For example, a 2007 *New York Times* article titled "A Movable Beast: Asian Pythons Thrive in Florida" was considered primarily on the pythons, as was the January 2008 *Sun Sentinel* article "Campaign Tells the Dangers Exotics Pose to Everglades," which had this in the lede: "…the Burmese pythons, Nile monitor and sailfin catfish will appear on posters throughout the state…"

Secondary articles were those that had a different central focus—a single other invasive species such as iguanas, vacationing in Florida, compilations of news briefs, etc.—but did still mention Florida's invasive population of Burmese pythons. For example, a July 2005 *Tampa*

Bay Times titled "Florida's Iguana Infestation" leads heavily with the iguanas but does later make one mention of the pythons as one of the "nonnative species wreaking havoc in South Florida." Another example is the June 2008 *New York Times* travel feature "In Everglades, Lunchtime With an Extra Guest," which mostly deals with a kayak trip but does make quick note of the pythons late in the article.

While subjective, the primary-secondary distinction was made to provide an asterisk to each frame's dataset. In other words, a 2,000-word article solely on the pythons is more likely to explore the issue and include frames than a compilation of briefs that only provides 100 words on the snakes. So the numbers and percentages showing how many primary and secondary articles comprised each frame provide an extra level of context to the data.

State vs. National Frame

Articles were designated with a national frame if they offered the possibility of the invasive population spreading beyond Florida, and/or if they noted federal politicians, legislation, or action being involved in the problem. National articles could still highlight the pythons as being an issue in Florida but must expand it beyond state borders. Articles were considered to have a state (Florida) frame if they put the invasive population just in the Everglades, nearby parks, the Florida Keys, the state overall, etc.

Consequence Frame

Articles were designated with a national frame if they noted damages being done by the pythons, be they environmental, economic, or otherwise. Only the most specific consequences were recorded. For example, if an article stated the pythons were causing "environmental damage" but later clarified that damage was the mass consumption of native birds and mammals, only the consumption was recorded, not the more general phrase (many articles did, though, leave the consequence as "environmental damage" in general and were recorded as such). Two

or more consequences could have been included from a single article—such as native-animal consumption and battling with alligators and other predators for the top of the food chain.

Many times, consequences of the pythons included native animals that were being harmed by the snakes. So to establish native species had become the media's "spokes-species" for the python problem, these native species were recorded—for example, if an article said the snakes were competing with alligators at the top of the food chain, alligators were recorded as being negatively affected by the pythons.

Solutions Frame

The solutions frame involved analyzing articles to see if they presented a potential solution(s). Solutions were anything that was suggested to capture or kill the invasive pythons or prevent the population from growing or spreading. This could include a wide variety of actions—among them: legislation, hunting, devices, and the weather. More than one solution per article was possible, but chance run-ins and isolated captures by park rangers or visitors to the Everglades were excluded, as these are only singular incidents without the potential for widespread eradication.

Additional Frames

Any additional frames discovered in the course of analyzing the content sample were recorded and will be discussed in the results.

Stakeholder Interviews

Across the whole content sample (n=190), all biologists, pet-industry representatives, and politicians attributed as sources were recorded, as were the writers of the news articles and op-ed pieces. The term "biologist" was used loosely for employees of state, federal, and nonprofit wildlife agencies, as well as universities. In other words, biologists were included in the final list

simply because of their non-legislative positions relating to direct work and research with the pythons and not whether their title included the word "biologist" or whether they had a Ph.D.

To narrow the resulting vast list of sources and writers down to those most knowledgeable of not only the invasive population of Burmese pythons but also of the media coverage, only those who wrote or were sourced in at least three different articles across the content sample were contacted for an interview. In setting up interviews, there wasn't a single method employed for finding participants' contact information: Most were contacted through work numbers and/or email addresses available online, while others were through social media or, in the case of retirees, through their former co-workers.

The participants were asked open-ended questions—on the pythons and on the media coverage—that didn't reference any specific event, legislation, article, publication, etc., as to not lead the interviewees into certain responses and to let them control where they wanted the interview to go. Example questions included: "Do you work specifically with Burmese pythons? If so, tell me about that work" and "Talk to me about your impressions of the newspaper coverage of the pythons." The four full question guides, which varied slightly to focus on the specific stakeholder's specialty, are included as Appendices A through D. Responses to the questions were recorded in full, and interviewees' responses weren't restricted by time.

CHAPTER 4
RESULTS

In searching News Bank for "Burmese python" and "Burmese pythons," the *Sun Sentinel* search yielded 393 results, the *Tampa Bay Times* had 422, and *Florida Times-Union* had 59. The same search in ProQuest for the *New York Times* brought 138 results. All these totaled 1,012 articles across the four publications, which was reduced to 190 after reading all the results and eliminating duplicates; wire stories; user-generated blogs; letters to the editor; and many articles that mentioned zoos, science exhibitions, illegally owned pets, chance run-ins with single pythons characterized solely as escaped pets, etc. Left were only those original articles that made clear note of Burmese pythons and the fact they are an invasive species in the Everglades, Florida, and/or the United States. A very small amount of articles, five or fewer, made quick mention of Burmese pythons in Florida but did not provide any context. This study relied on the journalistic expectation that each article should provide enough information to stand alone, and thus, such articles were excluded because readers may incorrectly infer the pythons are native.

The final sample (n=190) of original content consisted of 105 news articles and opinion columns from the *Sun Sentinel*; 63 from the *Tampa Bay Times*; eight from the *Florida Times-Union*; and 14 from the *New York Times* (see Figure 4-1 for year-by-year distribution). Of the 190 articles, 103 were established as primary and the remaining 87 as secondary. The *Sun Sentinel*'s 67 primary articles had an average word length of 531, with 70 being the shortest and 1,235 being the longest. (Secondary-article word count isn't noteworthy because of the wide range of both main article focus and amount of text devoted to pythons.) The average number of words for *Tampa Bay Times*' 26 primary articles was 792, with 102 being the shortest and 2,934 being the longest. The three *Florida Times-Union* primary articles had an average of 594 words, with 458 being the shortest and 680 being the longest. The seven *New York Times* primary

articles had an average of 883 words, with 86 being the shortest and 1,904 being the longest. When combining primary and secondary articles, the *Sun Sentinel* had: news=84 and op-ed=21; *Tampa Bay Times*: news=47 and op-ed=16; *Florida Times*-Union: news=7 and op-ed=1; New *York Times*: news=11 and op-ed=3.

Of the four publications, the first article that clearly defined the pythons as being an established invasive population in Florida was a June 2003 secondary news article in the *Florida Times-Union*, the publication with the least coverage from the four analyzed. The article was headlined: "Moving on in Florida: Many kinds of non-native animals, birds, fish and insects are calling our state home now—and in some cases, they're taking over". The next article on the pythons was a *New York Times* secondary article in February 2004, then a *Sun Sentinel* primary article in May 2004 specifically on the Burmese python invasion. The *Sun Sentinel* wrote two more primary articles before the *Tampa Bay Times* published its first, a secondary article in July 2005 mainly on invasive iguanas. As shown in Figure 4-1, the year with the most coverage was 2009 (n=49, or 25.8% of all articles), followed by 2013 (n=33, or 17.4%) and 2010 (n=30, or 15.8%). Much coverage in 2009 was sparked by a pet Burmese python strangling a 2-year-old to death, the first recorded human death in Florida from the species, and the initial stages of federal legislation seeking to ban the import and interstate sale/transport of the species under the Lacey Act. The year with the fewest pieces of content devoted to the invasive population was the first year, 2003 (n=1, or <.01%). Two years later, in 2005, the well-known photo of a dead alligator in the remains of an "exploded" python resulted in much media coverage and would be referenced in many future stories.

RQ1: State vs. National Frame

Is Florida's invasive population of Burmese pythons framed as a state or national issue?

Figure 4-2 first offers the totals of primary and secondary articles across this whole study, then breaks those categories into the state and national frames. Of the 103 primary articles, 46 (or 44.7% of all primary articles) had a national frame, while of the 87 secondary articles, 17 (or 19.5% of all secondary articles) had a national frame. So together, across the whole sample (n=190), the national frame appeared about one-third of the time—in 63 articles, or 33.2% of all articles. That leaves the remaining 127 articles (or 66.8% of all 190 articles) to have a state (Florida) frame.

Figure 4-3 shows chronologically when the national frames were used and what the specific framing was: legislative or range expansion (some articles have both, and both were recorded). From the 190 total articles, the potential range expansion beyond Florida was only noted nine times, all coming after the February 2008 online publication of Rodda, et al. (2009). Those nine are 14.3% of all 63 articles with a national frame and 4.7% of all 190 analyzed articles. As shown in Figure 4-3, only three of those nine made specific note of Rodda, et al. (2009) or, without attributing the study, did still mention the specific range theorized in it.

Much of the national frame instead comes from the legislative prompting of Bill Nelson, Florida's senior U.S. senator, as shown in a March 2009 *Sun Sentinel* article: "(Federal wildlife officials) will soon decide whether to list the python as an 'injurious species,' which would result in a ban on imports and interstate trade. U.S. Sen. Bill Nelson, D-Florida, introduced a bill to impose the bans immediately." In July 2009, an op-ed from the *Sun Sentinel* said "we applaud" the federal effort because it "will close a major introduction pathway and help prevent pythons from becoming established in other parts of the country." But the editorial did note that the legislation wouldn't affect the existing population pythons, nor would it stop the other invasive species coming from "the pet trade that harm Florida's environment and put people at risk."

RQ2: Consequence Frame

What consequences appear in the coverage as a result of the invasive population?

Of the total sample (n=190), 145 (76.3%) included at least one consequence—made up of 81 (78.6%) of the 103 primary articles and 64 (73.6%) of the 87 secondary articles. The most prominent consequence was killing native wildlife (n=96, or 66.2% of the 145 total articles with consequence frames), followed by killing humans/public safety (n=49, or 33.8%); general threat to natural resources and native wildlife and habitats (n=30, or 20.7%); and food-chain disruption/competing with top predators (n=28, or 19.3%). The full list of consequences is laid out by publication and total in Table 4-1.

Killing Native Wildlife

The consequence of eating and killing native wildlife received by far the most attention, with it being in 66.2% of all articles with a consequence frame and the next closest, public safety, being in 33.8% of the articles. Examples of the killing native wildlife consequence included: “The monstrous snakes that have invaded the Everglades and gobbled up some of its endangered wildlife are Florida's problem, not cause for a nationwide ban, some Republicans in Congress declared on Thursday” (*Sun Sentinel*, November 2012); and, “Lately, however, he has been spending ever more time studying the remains of the park’s birds and animals, extracted from the stomachs of captured or road-killed Burmese pythons…” (*New York Times*, July 2007). How these eaten animals were described varied, with some being left as something general like “wildlife,” some described with a little more detail like “mammals” and “birds,” and some specific species—American alligators and raccoons, as examples—mentioned by name. Those mentioned as specific species were included in the “spokes-species” analysis below as RQ3.

Harming Humans/Public Safety

Much of the public-safety consequence was the result of the 2009 death of a 2-year-old by the family's pet. While the articles referenced the Burmese python as being a pet, they still typically tied the incident to Florida's wild population. Those articles on the death that didn't make the connection, and thus never mentioned the wild population, weren't included in this content analysis, which is concerned only with the wild, invasive population. Examples of the wild population being linked to human deaths included: "…the presence of pythons, which have swallowed alligators whole and put a kink in the Everglades' natural food chain. The worry was amplified after an incident last summer in which a pet Burmese python killed a girl in Sumter County" (*Tampa Bay Times*, April 2010); and, "State officials say they had no choice — especially after last July, when an eight-foot python sneaked out of its cage north of Orlando and strangled a 2-year-old. It led to a six-week hunting season to reduce the python population" (*New York Times*, May 2010).

General Threat

Some articles said that the pythons are causing ecological harm but never elaborated on what that harm is. So they were grouped in the "general threat" category. Examples included: "He's one of seven snake experts licensed by the Florida Fish and Wildlife Conservation Commission to stalk the slithering python, whose intrusion into the Everglades upsets the ecosystem's delicate balance" (*Sun Sentinel*, August 2009); and, "This has led to rising concern in South Florida that invasive species such as the Burmese python could endanger other animals" (*Florida Times-Union*, May 2008).

Competing with Top Predators

The competition consequence, which highlights a disruption at the top of the food chain caused by the pythons, often focused on alligators, as they share similar prey species and have

been filmed in bloody battles with the pythons. But occasionally, other predators—namely panthers and bobcats—were portrayed as victims of the python being a new leading predator. Examples included: "Gators have ruled Florida's swamps for centuries. But increasingly, they have had to share their turf with exotic invaders who are challenging their supremacy atop the food chain" (*Tampa Bay Times*, October 2005); and, "…but they are considered a serious threat to native wildlife, consuming them and competing with alligators, hawks, panthers and other predators" (*Sun Sentinel*, April 2013).

RQ3: Invasion's 'Spokes-Species'

What native species are mentioned most often as being negatively affected by the pythons and have become the "spokes-species" for the invasion?

The consequences specific to wildlife—most often the pythons eating and killing them, but also food-chain disruption and forcing native animals out of habitats—were further examined to see if certain species were identified by name, thus becoming representations of the python problem. Many animals were identified specifically enough to know their exact species: alligators, raccoons, opossums, Key Largo wood rats, and the other animals shown in Table 4-2. But sometimes, the reader was told more broad categories of animals, as shown in an April 2009 *Sun Sentinel* article: "The snake … preys on native mammals, birds, reptiles, amphibians and even fish." To establish the faces, or "spokes-species," of the python problem, only specific species suffering from the python invasion were recorded; the more broad categories, such as "birds" and "mammals," were left out because of the vast range of species these classes include, thus not providing the reader with a "face" with which to associate the problem.

Across the entire content sample (n=190), 76 (37.3%) articles mentioned at least one specific wild animal/species as being negatively affected by the pythons. As shown by Table 4-2, the species most commonly noted as being negatively affected by the pythons was the American

alligator. Alligators being mentioned in the Burmese python coverage really began to emerge when a dead alligator was photographed in 2005 in the belly of an "exploded" python; also increasing the mentions of alligators are: the species being the only documented Florida predator of the pythons, they themselves being eaten by the pythons, and the similarity in prey between pythons and alligators, causing food-chain competition.

The next most mentioned animals, in order from Table 4-2, are: deer, raccoons, bobcats, opossums, and rabbits—none of which have the special classifications of threatened or endangered. The Florida subspecies of panther, however, is the most commonly mentioned animal with a special classification (endangered). Panthers were typically framed as being in a food-chain battle with the pythons, but there was one mention of pythons killing panthers, even though there hasn't been any such documented case. The December 2009 piece from the *Sun Sentinel* said: "Here they make their new home, and kill bobcats, ibises, panthers and others." The other species listed in Table 4-2 with special classifications are: Key Largo wood rats (endangered), wood storks (threatened), and Key deer (endangered). Also of note from Table 4-2 is that the *Florida Times-Union* stayed mostly away from naming any animals, making only one mention of a specific species—raccoons—while also noting "wading birds" in the same article.

Some native animals/species weren't included in Table 4-2 because they were mentioned only once across the entire content sample (n=190). But they are included here for any analytical interest and to show that these species weren't left out completely from the content sample. They are: turkeys, hawks, great blue herons, ibises, white ibises, hogs (another non-native Florida species), gray squirrels, round-tailed muskrats, indigo snakes, cotton mice, mice, black rats, coots, house wrens, and limpkins.

RQ4: Solutions Frame

What solutions appear most often in coverage?

Of the total sample (n=190), 145 (76.3%) had a solutions frame. This included 94 (88.3%) of the 103 primary articles and 51 (58.6%) of the 87 secondary articles. As shown in Table 4-3, the most oft-cited solution was hunting, whether it be by hunters with special permits, encouraging officials to start offering hunters bounties, or organized mass hunts. Much of the hunting solution was driven by such a mass hunt, the Florida Fish and Wildlife Conservation Commission's 2013 Python Challenge. But while the event did bring a great deal of publicity to the issue, it had its success questioned in some articles after only 68 Burmese pythons were captured during the month of hunting. As a February 2013 *Tampa Bay Times* news brief said: "That might not seem like a success since roughly 1,600 people signed up for the state-sponsored Python Challenge." But the brief did come under the headline "Python hunt seen as successful," and its only source was a state official backing the success. And as noted in the literature review, officials classified the hunt as one centered on spreading awareness, not extermination.

The next solutions, in order of frequency, were: ban the important and interstate commerce of the pythons (actions that fall under the Lacey Act); require owners to acquire a special permit and/or install identifying microchips in the python; extreme weather controlling/killing the population; ban breeding, buying, or selling the pythons altogether, including online; and ban ownership and possession of the pythons.

Meanwhile, solutions appearing only once are included here for any analytical interest and to show that they weren't left out completely. They are: let alligators eat the pythons, let nature evolve around them, implement a pre-import screening tool, regulate sales (in general), launch a government investigation into all species being imported, put the burden caused by invaders on the importers, drought, fund the battle against pythons, the government purchasing pythons being sold online, using pheromones to attract pythons, legislation (in general), and a

ban (in general). The diversity of proposed solutions covered in the media appears to speak to the lack of a widely effective, accepted one. A wildlife official spoke to this inability in a March 2011 *Sun Sentinel* article, calling the species "tough and rugged" and saying that "almost nothing stops them."

RQ5: Other Frames

What other frames appear in the coverage?

In the search for additional frames in the coverage, two emerged: the responsibility frame (who or what is responsible for the pythons' release and/or introduction), and the conflict frame (the pet industry or politicians voicing disagreement over legislation that would more strictly regulate Burmese pythons).

Each time an article attributed blame for python introductions into the U.S. or for their releases into the wild, the blamed group, event, or idea was recorded under the responsibility frame. Each time an article included pet-industry workers or politicians criticizing, arguing against, or protesting laws meant to curb the python problem, that article was considered to have a conflict frame. As with other frames already discussed, more than one responsibility frame could be recorded from a single article, but an article either did or didn't have a conflict frame.

In addition, population estimates of the wild pythons were recorded from those articles that included them. This method involved simply recording numbers, including both ends of ranges—30,000 to 150,000, for example. The phrases "thousands," "tens of thousands" and "hundreds of thousands" were also noted. Population estimates emerged as important data to record because they are one of two quantifiable themes—along with the debate on Hurricane Andrew—that the media tend to be scrutinized most about, as will be shown in the stakeholder-interview section. The scrutiny stems from wildlife researches and other stakeholders agreeing that there is no reliable population estimate and that it'd be nearly if not impossible to compute.

Responsibility Frame

Of the total sample (n=190), 96 (50.5%) articles had a responsibility frame—made up of 61 (59.2%) of the 103 primary articles and 35 (40.2%) of the 87 secondary articles. As shown in Table 4-4, pet owners received the overwhelming majority of blame, with 81 articles mentioning them—or 84.4% of the 96 total responsibility-frame articles. The first article in the content sample that mentioned the invasive pythons, from the *Florida Times-Union* in 2003, attributed responsibility to pet owners. "Some wildlife are just let go," it said. "A python seems like a fun pet until it grows 20 feet."

The next four attributions of responsibility, in order, were: ineffective government, whether it be missing regulations, mismanagement, or underfunding; the pet industry; 1992's Hurricane Andrew; and "hurricanes" in general. An example of ineffective government comes from a July 2009 article in the *Sun Sentinel* titled "Scales of Justice?": Foreign reptiles, including the Burmese python "are here thanks to lax federal and state laws regarding the pet trade." The government-ineffectiveness responsibility was once even purported by a legislator: "State Sen. Eleanor Sobel said she decided to introduce the bill because the Florida Fish and Wildlife Conservation Commission was moving too slowly to stop the problem, using python hunts that generate publicity but capture too few snakes to make a difference," the September 2009 *Sun Sentinel* news article said.

Meanwhile, Hurricane Andrew was often presented as an alternate theory to pet owners. Pet-industry employees used as sources discredited the blame on themselves and shifted it to the hurricane, as shown in the December 2006 in the *Sun Sentinel*: One reptile dealer "said he suspects pythons came to Everglades National Park not through illegal releases, but because of the vast damage caused in 1992 by Hurricane Andrew, which destroyed the homes of many snake owners, allowing their pets to escape into the wild." The conflicting theories of how the

snakes first established in the wild have become major points of contention between stakeholder groups, as will be discussed in the stakeholder-interview section.

Hurricanes, plural, were used as a responsibility frame five times across the content sample. “Officials say the snakes escaped from pet shops during hurricanes or were released into the Everglades by owners who had grown tired of them,” said one of them, a January 2010 *Sun Sentinel* news article. Not mentioned in existing research or in the stakeholder interviews, the theory of multiple hurricanes doesn’t seem to be anywhere, except in these five articles.

Though the categories discussed above were the most prominent, four other theories were offered, but only once each. Three of those four—heavy rains, resulting in flooding; international food markets; and the snakes getting onto delivery trucks and into packaging materials—come from a single op-ed *New York Times* piece from October 2012 headlined: “Will Snakes Inherit the Earth?” The fourth one-time mention was “storms” in general.

Conflict Frame

Some articles presented protest to python restrictions or bans from pet dealers, industry representatives, and/or Republicans. Reasons cited for the dissent included job loss and impacts to the pet industry’s revenue. Of the entire content sample (n=190), 40 (21.1%) articles presented a dispute between legislation attempting to curb the pythons and the pet industry and/or Republicans. The 40 articles comprised 31 (30.1%) of the 103 primary articles and 9 (10.4%) of the 87 secondary articles. The total 40 were made up of 31 articles in the *Sun Sentinel*, seven in the *Tampa Bay Times*, two in the *Florida Times Union*, and one in the *New York Times*. Only four of the 40 mentioned conflict from Republicans: three in the *Sun Sentinel* that were in addition to conflict from the pet industry, and one in the *Tampa Bay Times* that mentioned just Republicans without the pet industry.

The *Sun Sentinel* was the first of the four publications to note conflict, quoting a West Palm Beach pet store owner in April 2006 as saying the $100 permit fee for python ownership will "hurt business tremendously" and the fee should "be more affordable." The *Tampa Bay Times*' first mention came in December 2006 with a quote on a petition from reptile collectors saying, "We do not need more laws." The *New York Times*' only article with the conflict frame was in January 2011, paraphrasing a professional breeder as saying that, even if released, his animals would be "picked off in an instant in the wild and would have no idea how to fend for themselves."

An example of adding Republicans in the conflict frame is from a January 2012 *Sun Sentinel* op-ed piece: "The new rule won't sit well with some snake breeders and Republican lawmakers who dispute the threat the constrictors pose and argue that the ban is another example of a 'job killing' regulation." The one Republican-only article—a June 2013 *Tampa Bay Times* op-ed column titled "Stopping Florida's Slithering Invaders"—said: "But so far, (a bill for more extensive wildlife importation screening) is failing to win enough Republican support in the House. House members who remain unconvinced should re-read last month's tale of (a college student) killing the record-sized Burmese python and ask themselves why they won't take action."

Population Estimates

Across the entire content sample (n=190), 48 (25.3%) of the articles offered an estimate as to how many Burmese pythons comprise the wild population, including 35 (18.4%) of the 103 primary articles, and 13 (14.9%) of the 87 secondary articles. As shown in Figure 4-8, those estimates vary wildly, even within the same publication over the same six-month period. The most notable case came during the second half of 2009. From July to December 2009, the *Sun Sentinel* said there are "thousands" in three articles; "thousands" and 150,000 in the same article;

5,000-140,000; 5,400-140,000; and "100,000-plus". During that same time period, the *Tampa Bay Times* said there are "tens of thousands"; 25,000; 30,000; 100,000 in three articles; and 150,000 in three articles. Similar cases are shown in Figure 4-8 for the first halves of 2012 and 2013.

But the majority of the articles—the remaining 142 articles, or 74.7% of the entire content sample (n=190)—did leave out such estimates, including all *Florida Times-Union* articles, and very few even left the population as simply "unknown."

RQ6: Stakeholder Perspectives

What are the reactions of four major stakeholder groups—biologists, journalists, politicians, and those in the pet industry—to the coverage, and what compliments and criticisms do they have on the coverage?

As shown by the results of the framing analysis, there is great diversity in what facts, aspects, and theories end up in the final articles on the Burmese pythons. Such coverage has drawn divides between stakeholder groups, as expressed by many of this study's interviewees. The interviews were done with the intent to gather perspectives mainly on the coverage, but the discussion did often center on the python issue itself. So, to provide context and insight not revealed in media reports or existing research, some sections in the qualitative interviews do focus on just the pythons without media involvement.

To obtain the interview base, all human sources and article authors were recorded from the content sample (n=190), and those sourced or bylined in at least three separate articles were compiled into a final list to be contacted for an interview. The final list of possible interviewees, 31 stakeholders in total, included: 14 biologists; six pet-industry employees, comprising trade-group representatives and breeder/dealers; four legislators; and seven writers, all news reporters. Only one person, a legislator, officially declined to be interviewed, while two pet employees,

four biologists, three legislators, and two reporters could not be reached for an interview after contact attempts through available phone numbers, email addresses, websites, spokespeople, secretaries, and coworkers. There was no one consistent contact method, as available contact information varied from person to person, and multiple emails and phone calls were sometimes needed to settle on an appropriate interview time.

In the end, 20 people agreed to be interviewed, or 64.5% of the 31 stakeholders with at least three mentions across the content sample. Those 20 were: 10 biologists, four pet-industry employees, five journalists, and one legislator, all of whom were granted anonymity throughout this study. Completed during the summer 2014 months, all interviews were done by phone except for two, which were completed in person locally at the request of the participants. Interviews were audio recorded and typically lasted between 20 and 30 minutes—though interviewees weren't limited by time, so one did last for nearly two hours. Any one person attributed more in this section is likely because of their lengthier, more varied responses. Identifiers—Pet Employee A, Journalist C, etc.—were assigned randomly and were meant to ensure anonymity. A few more details about each participant are offered in Appendix E.

Many of the themes found by this study's content analysis were closely associated with the themes revealed in the interviews. Estimates on the population size, for one example, were found to vary in news reports and were criticized by biologists and pet employees for, at times, being on the high end of 150,000 or for being estimated at all because the population remains unknown. So even though the stakeholders interviewed were asked questions only from the question guides (Appendices A-D) and hadn't read the results of the content analysis, the quantitative findings were closely related to the qualitative interviews.

The results below should be read in reference to the media in general unless a specific medium is noted. Even though the question guide did inquire about both the media in general and print, the media was almost always treated collectively, regardless of "print" being in the question. The exception was the interviewed journalists, who are all newspaper reporters and thus talked mainly from a print perspective.

The following analysis of the interviews stays mostly away from the things that "just are"—in other words, the simple facts of the issue that have already clearly explored in the research, by scientific agencies, in the media, etc. Instead, it focuses on disputed facts, unique behind-the-scenes viewpoints, and what approaches are helping or hurting the situation; it explores best practices from journalists and sources in how to best distribute messages; and it searches for root causes that have brought any animosity among key stakeholder groups. All this is done in an eventual attempt to find common ground and form practical resolutions.

Python Origins

Though not asked in the question guide, some respondents provided inside, nonsequential anecdotes of interest on how the Florida Burmese pythons came to be and how the issue entered mainstream public knowledge. The accounts offered mostly unreported explanations of what was happening behind the scenes prior to the first media reports.

Pet Employee B said he entered the reptile business "in a time before there were any laws or rules in terms of being able to collect and gather animals and just enjoy the pure beauty of life." He added:

> We started breeding the hell out of (Burmese pythons). There was other morphs and stuff, and I love Burms. They were my favorite snake. You can grow them up big. You can banzai them. You can wear them. You can eat them. They make a great pet. There were so many things. And the problem is, there's nothing wrong with Burmese pythons. The problem is people. The world's a great place if you just get rid of all the people.

Pet Employee B said he and others in the reptile business began to excel at reproducing Burmese pythons, and they "got real good at spinning the dream." When albino Burmese pythons entered the market, they were worth $75 to $100, he said. "The potential for making money … We got too good at what we were doing. Everybody was breeding Burms," Pet Employee B said.

President Bill Clinton opening trade negotiations with Vietnam in the 1990s brought in more Burmese pythons from outside the country, and regulations were much less stringent for those to then be re-exported over tight laws on exports of snakes bred in the U.S., Pet Employee B said. "My own government screwed over so many people with the system," he said. "They meant well, but the unintended consequences of people not knowing the ramifications of what they were doing, henceforth, there was a glut in the early '90s of Burmese pythons" that caused price declines. "If there's no value on an animal, you're not going to take care of it."

Later, in the mid-2000s, Everglades National Park employees told Biologist B that they were finding an increasing amount of pythons but that they couldn't contact the media directly because of restrictions on their federal employment. The employees were also reluctant because of potential impacts to tourism. "That kind of came as a surprise to me because, as stewards of the park, that should be a big concern to them," Biologist B said, adding that, initially, a blind eye was turned toward the python issue.

"At the time, (the state and federal wildlife agencies) felt like their plates were full on other issues," Biologist B said, "and they didn't want to take on something that would be controversial because the pet industry, it turns out, is very powerful. And they didn't want to get involved in something that is a Pandora's box because it is such a huge problem." Instead,

another state agency that has less of a political hierarchy sent out many press releases early on to alert the media and public of the situation, Biologist B said.

Once word began to spread about the pythons, much of the early research was devoted to learning the basics of the species, Biologist I said. "There's really not a lot known about pythons in their native countries," she said, "and certainly here, we knew nothing about what they were doing, where they were going, what they were eating." The "big, big learning curve" in studying the species is still ongoing, she added.

Legislator A said it's "ridiculous" that people keep Burmese pythons as pets and that she was "outraged" when the 2-year-old was killed by a pet python. The Everglades, she added, is "a national treasure" and is being "ruined" by the snakes. The python issue reached even the highest level of government, Biologist C said, noting a trip President Barack Obama made to Florida:

> When I went up to talk to him, I welcomed him to South Florida and invited him to (Everglades National Park), and I was walking away and he kind of grabbed me on the shoulder and said, 'Oh, by the way, what are you doing about those snakes?' I was kind of shocked because with all the stuff that he's got going on, he knew about those pythons. And I said, 'Well, we're working on it,' and we kind of laughed about it.

Solution Development: Trials and Challenges

As shown by this study's content analysis, a large variety of proposed solutions have been featured in the media, but a fully effective method hasn't been found. While everyone interviewed seemed to agree that the pythons need to be extinguished, be it for environmental, economic, or public-image reasons, much disagreement exists on what methods are best suited and would have the least amount of negative repercussions to stakeholder groups, mainly the pet industry.

All of the solutions discussed by interviewed stakeholders were mentioned in this study's newspaper analysis except for three: the use of drones to spot snakes; forming a program to

return them to their native Asian range, where they're classified as Vulnerable; and using infrared cameras. The one stakeholder who mentioned the drones, Biologist C, said that rules from Miami's airport and the lack of a next step after spotting a snake kept the idea from entering into a trial phase. Biologist B said researching whether captured pythons could be shipped to Asia was one of the first proposed solutions. But in Asia, the pythons fall into subspecies, while the Florida pythons have impure genetics because of inbreeding. "So we would be doing a disservice to the ecology of its native range," he said. Biologist D mentioned using infrared cameras to detect the pythons as a quick side note but didn't explain any more about this method. In addition, Biologist C said he received some "crazy ideas" from interested citizens on how to eradicate the pythons, including snipers on blimps and using elephants because they can smell, find, and kill pythons.

Among all proposed solutions, instituting a bounty that pays hunters for python captures was discussed at most length in the interviews, perhaps because it is one of the few proposed practical solutions that hasn't been physically tried on the pythons. While other solutions were highlighted by stakeholders—pet amnesty days and snake-sniffing dogs, for examples—the high level of debate around a bounty warrants its elaboration. On one hand, such a program would incentivize hunters, Biologist A suggested, noting the paid bounty program in New Orleans where he said nutria have a $5 reward per tail. "You give a bunch of hunters a way to make money and reimburse them for their fuel and time and effort, they'll figure it out," he said, adding the snake skins would also be marketable for uses such as purses and wallets.

But on the other hand, Biologist B said that hunters making money from the pythons would never hunt them to full extermination; that they'd personally breed, kill, and sell them for more returns; and that they'd collect pythons from pet owners no longer wanting the snakes and

misrepresent them as wild-caught animals. Biologist C said that even with a bounty, the pythons couldn't be found because of their low detectability. "I always remember somebody said, 'Well you put a bounty on these, they're just going to disappear,'" he said. "And I don't think it's a question of encouraging people to go find them; the fact of the matter is you just can't find them." Journalist E also noted that the willingness in helping hunt the pythons is alive among the general public. He said that when he mentioned the possible bounty program in a story, he would get calls from readers asking how much money they could receive from it. "They had their guns loaded, and they were ready to go," he said.

When taking all solutions into account, it seems as though the legislative ones have stirred the most debate and contention, in the media and elsewhere. Such solutions weren't needed because the pet industry was already self-regulating the python situation on its own, said two of the pet employees interviewed. They said they see government laws as an overreaction to something they had no control over—Hurricane Andrew—in spite of following all regulations in place at the time. Pet Employee B said the pet industry was able to put control measures in place outside of legislative influence after the hurricane. A python facility destroyed by the hurricane "was licensed. It was permitted. It was doing everything by the book, better than (in) any other state. But when you deal with a Class 4 hurricane, game's over. So we've changed our rules. We've adjusted our statutes to reflect that." In future storms, Pet Employee C said, snakes should be put in inescapable cloth bags so that they may be more easily recovered or perish. The ones that escaped from the hurricane, he said, had been in deli containers that protected them from the storm but freed them when they landed. "It literally was … the perfect containers, the perfect number of animals, and the perfect storm to come through on that day to create what happened

… and the perfect location," he said. "Anywhere else in the United States, they would have all perished."

Regardless of a solution's effectiveness or its perceived fairness to pet-industry workers, Biologist D said a comprehensive solution might not be necessary, at least for now. This is because a scientific use for pythons will someday be found and will encourage capturing of the snakes. "The reality is, the situation is over, meaning there's reasonable likelihood in 50 or 100 years, we'll have some technology that will have us justifying these animals just to capture them," he said.

Simply accepting that there isn't presently a solution for widespread eradication was further illustrated by a few of those interviewed, including Biologist B, who said he believes the U.S. won't ever be rid of the Burmese pythons. "There's never been an animal that's been successfully eradicated once it's established, at least in the U.S.," he said. Biologist C agreed in describing how the issue affected his agency's media-relations employees. "Our media people kind of just said, 'This is just killing us from a resource standpoint. How many things can they cover? Can't this issue just go away?' I'm like, 'That ain't going to happen. There's no way this is going away.'" Noting the problem started with Hurricane Andrew, Pet Employee B said: "The massive genesis seed stock that was released by the forces of nature has initiated this problem, and it's here to stay."

But solution attempts have pressed on. As they're proposed, enacted, or go unused, some stakeholders have disagreements with each other—and even within the same group—on how best to approach the situation. This is similar to the example discussed in the literature review on Hawaiian wildlife managers trying to find the best solution on invasive pigs. As conveyed by several of those interviewed in this study, such conflicts have resulted in strained relations

among groups and ununified efforts. Several biologists and all pet employees interviewed were highly critical of the journalists, which will be elaborated in later sections.

Meanwhile, biologists and pet employees were also critical of government officials. Pet Employee B, for example, said that legislators are concerned only with using Florida's natural habitats and wildlife as political leverage. "They don't give a damn about (the natural ecosystems) down there," he said. "They just wanted the Everglades as politics. … The politics with the Water Management District and the politics with the Everglades—Lord have mercy, probably when you're an old man, it'll be solid city from Loxahatchee to Naples." The clash between government officials and those in the pet industry was furthered by Pet Employee C:

> Unfortunately, most of the time the government's goal is not to take care of the problem because there is not necessarily money in the eradication portion of it. However, there is a ton of print money to study the problem. So in studying the problem, you don't necessarily want to eradicate it because when it's no longer a problem, then you lose your grant money to study it.

Pet Employee C also criticized legislators putting more regulations on python owners, who he said wouldn't have let their snakes loose otherwise but, because of new laws, contribute to mass releases because they won't euthanize their pets. Biologist E supported this theory in explaining why he helped organize amnesty days for pet turn-ins. New laws on pets have been "followed or associated with additional releases as people misunderstand the law or don't want to be criminals or whatever," he said. "So we got out in advance and did the exotic pet amnesty program."

The legislative face of the python issue, as shown in the articles analyzed for this study and the discussions from those interviewed, is Florida's senior U.S. senator, Bill Nelson. The pet employees interviewed were mostly critical of Nelson, with Pet Employee D saying Nelson used the pythons as a "scapegoat" in passing legislation. "He claimed the Everglades were being

killed and all because of these snakes, which has never been true," Pet Employee D said. Further criticisms of Nelson by stakeholders will be discussed in future sections.

Conflicts exist even within the government itself, said Legislator A, the only person from the legislator stakeholder group who agreed to an interview for this study. She said she had to perform much political maneuvering in getting a bill passed that put restrictions on python ownership in Florida. "I went up against the Fish and Wildlife Commission, and I had to work the bill very hard from their perspective because they had so much power. They were like the fifth branch—the media's the fourth—(of government)." Reptile breeders were "very influential for a very long time," so without support of the commission, the "bill would have been dead," she said. "I said I would just go after the Fish and Wildlife Commission if they didn't support the bill. I'd take away their power."

All legislators, though, aren't so proactive in developing legislative solutions, Journalist C said, noting the frequent hypocrisy between what is said and what is actually done:

> All the officials are saying, 'Yeah, it's a terrible problem. We've got to deal with the Burmese python.' Meanwhile, they're merrily letting in all these other species without very much regulation or study. … Who knows what else is going to break out and screw things up, and really not many people are even looking at that. They're just letting all this stuff in because there's an industry that makes money off of it.

Legislator A gave similar comments, saying that the Burmese python and the three other snakes banned by the Lacey Act aren't "making a big dent yet" in stopping invasive-species problems overall.

Another challenge to solutions frequently mentioned among stakeholders is the Everglades National Park being federal land while other protected natural areas fall under the state. Pet Employee C said at first, no organisms, native or otherwise, could be taken from Everglades National Park. "The biggest issue in the beginning was the snakes were somewhat

protected federally because, even though they were a non-native species, you could not legally remove anything from a national park," he said. Biologist A explained that the state couldn't extend the 2013 hunt into Everglades National Park because of these conflicting jurisdictions. "In the federal park, there's no hunting allowed, so it wasn't like we could open up python season in the federal park," he said. "We were kind of a victim of our own processes, and therefore, we had to kind of bring that part of the issue to light as well."

Biologist E echoed such struggles from his state agency's perspective: "Because the Burmese pythons in South Florida were on state and federal lands, we had to focus our efforts on the ones only on the state properties. … The (Everglades National) Park was solely responsible for what went on inside its boundaries." Biologist C said the national park's 30 authorized python hunters did still go out on the federal land and look for pythons conjointly during the hunt.

The hunt was another solution occasionally scrutinized by stakeholders for the same reason discussed in the literature review: that only 68 pythons were captured over 30 days and more than a million acres covered by 1,200 hunters—something that Journalist C said didn't "make a dent in the problem. It was a miracle that nobody was killed. … They had to rescue a couple" hunters who got lost.

As solutions are tried and some concede that there might not be one for full extermination, many stakeholders said they've turned their attention to putting measures in place that prevent future species from becoming established. "What (my agency) tried to do is capitalize on, 'Let's make sure this doesn't happen again,'" Biologist D said. "In other words, 'We have very liberal policies when it comes to importation of non-native species, whether they be for pets or for horticulture or landscape—you name it.'" This solution, better screening of live

organisms, is petitioned for in much of the research and was emphasized by several of the interviewed stakeholders, including Biologist B. “If there was some intelligent screening upfront,” he said, “we wouldn’t be spending, as a society, millions trying to manage after the fact.”

A lack in funding, for local, state, and federal levels, is another prominent block mentioned in handling the situation. Biologist A said federal funding specifically for the pythons is non-existent while billions are spent on overall Everglades restoration. “This is really part of our Everglades restoration if you really stop and think about it,” he said of stopping the pythons. Pet Employee B also touched on funding, saying that “tens of millions of dollars” have been given for Everglades studies, “but they never said this $10 million is for one thing and one thing only: study for the removal of Burms.” He added:

> I challenge anybody to show me where money was appropriated by the Florida Game and Freshwater Fish Commission for the removal of Burmese pythons. Money was spent in the invasive-species section looking at the overall problem, but money being earmarked to remove Burms, boots on the ground and doing something concrete, never a dime spent.

More Than Pythons

As noted throughout this study, the Burmese pythons are one of a great many invasive species in Florida, the U.S., and the world. Hence, the pythons are often lifted up by biologists as a symbol of the damages caused by those many other non-native animals and plants; conversely, reptile dealers say they have been unfairly targeted because of one species that pales in comparison to all the other species, many of which continue in the marketplace without increased regulation.

Biologist B said invasive animals don’t have origins in the food supply but instead almost always come from the pet trade. “The animals are pets,” he said. “These are things that aren’t critical for our food and fiber, and there ought to be a way—other countries do it—that we

regulate." He also mentioned invasive plants, which come from landscaping, not horticulture. "I don't have invasive broccoli issues; I have plants that come out of people's yards," he said. While noting animals, Biologist C also emphasized invasive plants: "The python always seemed to get all the play, and I thought that's OK. But it raises the bigger issue of exotics in the Everglades and, of course, the big issues with vegetation or Australian pine and melaleuca, … climbing fern, and Brazilian pepper." Biologist D said his agency used the pythons as "strategic messaging" to represent the many non-native species in the Everglades.

But while the Burmese python is used by biologists as a representation for all the other invaders, pet employees see the species, and their business, as being unfairly marked among the sea of other non-native species. Pet Employee C said the established melaleuca trees, Brazilian peppers, and Australian pines are more harmful than animals, including the pythons. "Who cares about a tree, you know?" he asked in explaining why the plants aren't targeted for media coverage or legislation. Even using the word "invasive" to describe non-native animals was questioned by Pet Employee B: "Well is it invasive, or is it just part of the order of life? … Is it good? Is it bad? No, it just is."

The reason attention is so focused on the python, according to several stakeholders, is its size and nature (the media portraying the species as somewhat of a monster will be further discussed later). Biologist J, for example, said:

> If you really sum it up, if this was a tree frog that was displacing native species of frogs, you would see no such media coverage as it's happening today. But you've got a snake that grows bigger than 15 feet, is certainly able to kill people to the extent that it does—we could argue about that—and as a result of that, I think it taps into a deep-seeded emotional reaction in people, and I think that's what the media loves.

Pet-Trade Consensus

Who or what released the pythons into the wild, how many are out there, and where they rank among all invaders are questions indeed debated between certain stakeholders. But how they initially came into the country seems to have found agreement: that it was in fact the pet trade.

Even employees of the pet trade by and large agree. Pet Employee C did so while discussing his disagreements with government officials: "I approached, with a couple of other colleagues, Florida Fish and Wildlife and said, 'We really have an issue with this here. You're blaming the pet trade or the reptile industry for these pythons being here; however, you're not allowing those of us responsible to help assist with the problem in removing these animals.'" Pet Employee D said the pet trade is responsible but, because of Hurricane Andrew's destruction, not intentionally. "There's no question that the pet industry is responsible for the pythons being here. … Yes, the pythons are here. Yes, they are here because of the pet trade. No, they are not here because of intentional releases by the pet trade."

Biologist B—who noted earlier that most all invasive animals and plants descend from pets and landscaping, not farming and horticulture—explained how even feral cats can be traced back to the pet trade, leaving feral hogs as the only non-native established species to come from the food supply. "Almost 100 percent of all the animal problems we've had come from the pet industry," he said.

Press Attraction to Pythons

Stakeholders discussed several factors that have kept news organizations interested in covering the pythons, including the politics involved, their huge size, and novelty news like the mass hunt in 2013. But the most resounding theme seemed to be simply feeding readers' interest.

Biologist A noted how political appeal helped spark press coverage. "When you have your elected leaders take a moment, take time to highlight it and have press conferences, that naturally just brings the press," he said. Attracting more attention than even a prominent politician was the 2013 python hunt, Biologist C said: "I think the media presence there was more than when Vice President Biden came to the park." Biologist H said the species "courted a lot of interest because it was large and often described as 'big and sexy and of interest.'" This interest turned into exponential growth in the amount of media coverage, Biologist H added. "It was hard to believe that you really needed to do yet another one to get the information out because you did so many," he said of reporters wanting to do more and more stories. "But the media (that) wanted to do it would argue that, 'Oh no, we have our audience, and we want to make sure that they hear about it.'"

Such coverage did indeed become quickly popular with readers, Journalist B said, adding that he writes about the topic "because they serve one sole purpose to exist, and that's to get people to click on our website." He continued:

> So our editors see python and gator or shark stories kind of all the same. We put a headline on the website with gator or python, shark, it gets clicks. So my editors, rightly or wrongly, are eager to cover anything that can get them to put a headline on the website that might entice somebody to click on it.

Journalist C also discussed how such stories achieve great numbers of Web hits. "The more grotesque, the better," he said. "I could spend six weeks on some story about water pollution and it'll get like 12 page views, and writing some little story about a python being found … and it'll get 1,000." Editors like the story because readers do, Journalist C said, "and that's perfectly legitimate. I mean, newspapers have certainly stooped lower to get clicks, and this is a legitimate story." But Journalist C did say that his publication has passed on some python stories because "one came after the other."

Journalist D described his publication's coverage of the pythons as more indifferent, saying it approaches coverage the snakes "the same way we approach anything: some combination of interesting and important. And so certainly the pythons and their place in the invasive issue is both those things and will continue to be both those things for a long time."

The rapid-paced coverage that attempts to over-simplify the issue, Biologist E described, can come into conflict with the more long-term and equivocal science. "When you have a high-profile issue like this," he said, "I think it's just always going to be, to some degree, a disconnect between the scientific approach toward dealing with the problem and then the inherent nature of the media to do what they got to do—and that's keep viewers, readers, listeners, etc."

The press coverage became so overwhelmingly frequent, Biologist C said, that his agency's media-relations office could have worked just on the python issue. "We kind of joke about it: It's just all pythons all the time. … We could've had one public affairs person or two, and literally they could have spent their entire time just fielding questions and inquiries and ideas for stories." Biologist D echoed such a perspective: "I felt like either I or my staff or the public-affairs officer at the park were being interviewed almost on a daily basis, sometimes multiple times a day. But, I mean, it became overwhelming."

But like some other stakeholders, Biologist D did say there was one positive to all the coverage: that the public's interest grew. "There'd be newspaper articles, then all of the sudden we'd get tons of letters from interested citizens or congressional representatives saying, 'Hey, we just read about this—what are you doing?' And when you start getting pressure like that, then sometimes you just start doing more."

General-Assignment Reporters vs. the Environmental and Science Beat

The five journalists interviewed for this study were at least somewhat knowledgeable of the pythons, but their expertise on the issue and how long they've covered it fluctuated. This

appeared to stem from whether the environment and/or science was their primary beat, which it was for two while the other three were general-assignment reporters who would pick up occasional science stories. As newsroom budgets and staff shrink, so do reporters covering just one beat, the journalists said. While their views were critical of what they feel is weakening scientific/environmental coverage, most remained positive.

This loss of scientific expertise in the newsroom can lead to factual inaccuracy, said Journalist E, one of the two environmental reporters interviewed. “In some cases, (reporters) have no prior knowledge of what they’re covering,” he said. “They have no expertise in that particular field, so they’re coming into it cold and they may not get the facts right. They may not know who to talk to. They may not talk to all the people they should.”

Meanwhile, newspapers are putting out fewer science stories overall, Journalist D said. “General-interest publications, their science coverage could be beefier. … I don’t think there’s nothing there if you’re a conscientious reader of printed matter, but I would also say that better, more pointed coverage and more exhaustive coverage is available in, of course, subject-specific publications.”

The work Journalists A and D did with the pythons was mostly brief and dealt mainly with the 2013 python hunt, they said. Journalist A said he “kind of parachuted in” on the topic. Another reporter wrote a preview while he went to the actual hunt and, like other journalists there, accompanied hunters. “It was one of those rat-race media-cluster things. … It was (like) covering a presidential race or something, like everybody is doing the exact same story, like hundreds of people trying to do the exact same story,” Journalist A said of the python hunt.

Journalist D also recalled the many reporters across various media who attended the hunt:

> That was unlike many, many events or items pertaining to science. That was a complete media scrum, especially in the beginning. It was just so sort of strange on

> the face of it that it attracted national media, international media, TV stations, newspapers in Florida, the *New York Times*—I mean, anybody was there.

Journalist D said he covered the hunt because his job "is that of a generalist. … I don't cover the environment as a beat per se. I end up writing some things about it just because it's something—especially here in Florida—it is interesting and important." Journalist D did note, though, that his paper has another writer who covers science specifically. "(The writer is) really, really good, and he is almost certainly the best reporter of his kind in this state. But he's one man, right?"

Conversely, Journalist C, who is a science/environmental reporter, said he has been pulled away from the beat more often and is doing greater amounts of general-assignment reporting. "All the papers down here have lost staff," he said. "Environmental reporters like me have had to spend time covering other beats. … I think more and more we're getting pulled into doing general-assignment work."

Journalist E remembered nearly every major Florida paper having an environmental reporter when he started covering the topic and said those niche positions are disappearing. "Now, environmental reporters have become an endangered species," he said. "Quite a few of my colleagues from back in the late '90s are gone—they're either covering something else or they're no longer employed." One, he added, was told he had been laid off while out covering a story, and another used his own vacation time to cover a science story his regular work time wouldn't allow. Meanwhile, though, there are "more stories now to be covered than ever before," Journalist E said, noting the specific examples of flesh-eating bacteria in the ocean, mounting invasive species, and red-tide algae blooms.

But the journalists still held some hopeful and positive perspectives on environmental reporting. Journalist C, for example, said his newspaper "takes the environment seriously as a

focus of coverage. Not every paper does. I mean, it's not perfect, but, I mean, they give me the time to work on stories—sometimes." Journalist A expanded his compliments to encompass all of Florida's coverage of science and the environment, which "tends to be pretty strong. … I think almost every newspaper has someone devoted to covering the environment. Even smaller papers had one reporter devoted to covering environment." Journalist B said specifically of the southern part of the state: "Environmental coverage is a pretty important beat on any South Florida newspaper." The reason Florida newspapers retain an environmental presence in spite of shrinking staffs, Journalist D said, is "because it is such an important feature of this large, interesting, important state." Legislator A underscored such importance: "The environment is really very important, and protecting and preserving the natural balance of the food chain really has a tremendous effect on how well the environment's going to be."

Whether still strong or weakening, science reporting is highly complex, and as such, is typically best done by print mediums, the journalists said. Journalist B spoke on the extensive process in generating such articles:

> Environmental stories typically take a longer time. They're typically not breaking-news stories that you need to get on paper immediately; they're more scientific in nature. They rely more on a higher level of source than simply police spokesman or a fire-department spokesman. There (is) a higher degree of sophistication in the environmental stories that come out of South Florida newspapers.

Such distinctions, Journalist B added, emerge mostly from print. "I think that higher level of sophistication is exhibited only in print media. Broadcast media—with the exception of public radio—typically don't cover too much environmental stories unless there's some sensation depth to them." In writing about science, Journalist D said the challenge is turning intricate subject matter into something digestible for readers. "The challenge, of course, is making often fairly complicated scientific concepts applicable to everyday people, laymen, non-scientists, readers, average citizens," he said.

Press Pros and Cons

Whatever their beat, it is important to detail what reporters are doing right and wrong in their coverage so that news organizations can potentially correct or redirect in an effort to improve reporting, relationships with stakeholders, and their role in working toward a solution on the pythons and invasive species. Highlighting the favorable qualities in coverage becomes just as important as those that have drawn objections because they build a model for how to approach the python issue in a manner that best serves stakeholders and laypeople. Among the compliments offered by this study's interviewees were: bringing widespread exposure to the pythons and invasive species overall; displaying some of the science behind the pythons, like the inability to locate them in the wild; and letting sources read stories prior to publication.

Biologist A offered praise on the coverage a few times, specifically noting the importance of the exposure brought to the issue. "I thought we achieved what we wanted to achieve with respect to giving the microscope, the focus, making sure people were aware of the problem." Legislator A said the published reports on the pythons helped push new regulations. "Nobody would know about this issue if newspapers didn't write about it," she said. "Journalism helped me to make changes in policy." Legislator A said the media is a means to the end of getting legislation passed. "If the media supports my position, I feel much better; if they don't, I get mad—and fortunately, the media was on my side" on the python issue "because there was a death of a little baby," she said, referencing the 2-year-old killed by the family's pet python. "It's not just about the media; it's about getting the legislation passed, and if the media can help, it's a good thing." Though not saying for better or worse, Biologist E said the media did compel action from his agency. "There is no question," he said, "that the media coverage also drove some of the politics behind all this, and that absolutely had a rebound effect in what we were trying to do."

Some spoke in more general endorsements, like Journalist D, who said his publication has "done a pretty reliable job" in covering the pythons. "There's only so much to say, really," he said, "so I think we've done a confident-and-then-some job as a publication as a whole." Journalist A complimented his publication, too, saying its coverage "was good." He noted that he was able to find plenty of background information online for writing his own stories. Specifically talking about his publication's reporting of the 2013 hunt, he said: "Our coverage of the python challenge was probably better than most in (Florida), probably just because of our location."

As for specific scientific features of the pythons, the inability to detect them was conveyed in the coverage of the 2013 python hunt, Journalist D said. "That was a surprise to people," he said, noting how so few of snakes were captured. "And here's where that coverage maybe helped." Biologist D also said coverage specifically on the scientific aspects of the pythons were "fairly strong":

> There were quite a few studies going on on trying to determine the impact of pythons on small mammals and birds and other prey items. And we had a lot of interest in, 'OK, what are the actual impacts?' We also had a lot of science going on related to potentially using everything from infrared cameras to pheromones to other tracking studies that we had occurring. And we definitely had a lot of media interest of those studies.

Like many of the stakeholders involved, Biologist F said the press is good way to relay messages, whether those messages be on a scientific discovery or otherwise. "As a public employee, it's our responsibility to educate the public," she said. "We can't always respond to the media maybe as often as they'd like us to. But all I want is to make sure the information is available to the public." While remaining critical of the media, Biologist J offered one similar positive: the attention given to the academic paper, Dorcas, et al. (2012), on possibly high consumption rates of mammals. It was the media coverage that was "scaring management" and "really got their attention," he said. "I have seen media coverage … stir positive action by

managers and decision makers to deal with the problem that was absent before the media coverage."

Traditionally, journalists don't let their sources read stories before publication, but those who did ended up with better reporting, Biologist G said:

> I have long relationships with certain people, and they're not going to misquote me. So I know I can say those things, and they'll also let me review something before they actually send it out in print. So those are fine. It's people that misquote you, that don't give you a chance to look over what they wrote, and that is where the problem starts.

Even though all stakeholders interviewed were prompted with a question on their impressions of just newspaper coverage, most stayed away from perspectives on specific mediums and described media collectively. When they did differentiate, it was to separate print from video, saying print approaches more cautiously and fairly.

Biologist I, for example, said the print media coverage "was good," but video media was sensationalistic. "We had some really high-quality (newspapers)—the *New York Times* reporters—and our local reporters were doing a good job. It was, in my opinion, the film producers that were coming in that started to really blow it out, sensationalize it." Biologist B said he was "impressed" with the coverage, but he didn't have a positive view of all media, specifically naming the Nat Geo Wild show "Python Hunters." Because of the difficulty in finding wild pythons, Biologist B said the show took pythons to filming locations, let them go, and re-captured them for footage:

> In my opinion, they were exploiting the animal for entertainment and they were missing the point of—it's a beautiful animal, it's threatened in its own native habitat … it's in the wrong place, and it's only here in the wrong place because of humans, and we need to keep the story on the ecological harm that's done by releasing these pets and not turning it into entertainment.

Biologist I was also critical of National Geographic's television coverage, meanwhile praising the coverage of the company's magazine. "The printed *Geographic*, the magazine,

would want to tell the real story," she said. "The videographers (for the TV channel) that came in were going for sensationalism. And it was really obvious." Another advantage newspapers have over other mediums is "space and time," Journalist E said. "When you do broadcast—TV and radio—really, they've only got two or three minutes for each story, and so they can only skim the surface," he said.

In between compliments and criticisms was Biologist F, who gave a purely neutral response because "it's not always helpful answering questions" that judge the media. "I guess my only statement is that we get a lot of media coverage on pythons. … Any of the media coverage, it varies a lot." Specifically in the cases when she has been interviewed, Biologist F said: "I've never been unhappy with any of the coverage where I have been interviewed."

Meanwhile, there were several pointed criticisms of the coverage discussed by stakeholders, including that there in fact wasn't enough coverage, and that the information used by reporters was outdated, inaccurate, or incomplete. But the most abundant criticism, albeit a sometimes general assessment, was that the media sensationalized the python issue, which is explored in its own section below this one. In addition, stakeholders were often critical of the media's coverage of what are likely the two most debated issues within the pythons: who or what is responsible for the pythons' establishment, and how many are in the wild population. So those items, too, are elaborated in their own section further below.

While many stakeholders said the press coverage was overly abundant, Biologist A said there was difficulty in keeping the media spotlight on the python issue. "Look at the issue of what's going on today in the world with the 24-hour news cycle. What you hear about last week seems like month's ago, right?" he asked. "It's kind of hard to keep the python on the front page." Legislator A also said the current coverage is lacking compared to its height. "I don't

think there's much follow-up now as there could be," she said. (Figure 4-1 shows that year-by-year coverage of the content sample dropped from 2009 to 2011 but actually rose from 2011 to 2013; 2013 was second in coverage total only to 2009.)

Biologist C, who no longer worked for his agency, said a national newspaper used an old press release that still had him in his former position and held onto it for eventual use during World Snake Day. "I went 'nice reporting' or 'nice fact checking.' I mean, here's somebody who just dredged up a press release and kind of had it fit the World Snake Day and ran it out there." Pet Employee A questioned newspapers' factual accuracy more broadly. "There's been very little fact checking. There's only been a few pieces that have attempted to be comprehensive or even-handed coverage," he said, specifically complimenting the *New York Times* and the *Christian Science Monitor*.

Biologist D said the media wouldn't always include or focus on the most important pieces of information he gave. "Sometimes they got the story right; sometimes they didn't get the story right; sometimes they unfortunately didn't include the pieces I had hoped they'd include, and in other cases, 'Wow, they did,'" he said. "Just the typical expectations when it comes to media interviews that we did."

The blame for such holes in the reporting could rest in falling budgets, as Journalist C said the struggles in the news industry have affected his workplace. "We're struggling with low-budget staff or weak staff, so it's hard on all of us," he said. That, plus he's "burnt to death with the story. I do not enjoy writing python stories. … The issue just bores me." Journalist C said, though, that the pythons are a "very easy story to cover, unfortunately," because of press releases and the accessibility of scientists as sources.

'Sensationalism' and Monster Portrayal

Of all compliments and criticisms used by stakeholders to depict the media's coverage of the pythons, the general theme of sensationalistic, monster-like portrayals was by far the most common. Most of the stakeholders used variations of the word "sensationalism" to describe at least some if not all of the coverage, including two of the journalists. The media's "if it bleeds, it leads" mindset, as Biologist J called it, has led to strained relationships between reporters and biologists, and especially between reporters and pet employees. Two biologists said they've even ceased communications with certain reporters. But in spite of harsh criticisms, some say not all reports are sensationalistic and that any way of getting the word out on invasive species is a positive step in combatting them.

Biologist E, like many of the biologists, discussed at length his reason for calling the media "sensationalized … pretty much across the board":

> There were sensationalized reports of how many there were, and nobody has any idea. There were sensationalized reports about what impacts they might have on the Everglades without any data to back that up. There were reports, sensationalized insinuations, about the danger to humans. And it was sort of a double whammy because you have a large non-native predator preying on the at-large fear of snakes that a lot of people have and then you have the Everglades ecosystem, which was frequently described as 'fragile and delicate.'

In focusing on the fear aspect, Pet Employee B said print media "scare(d) the hell out of people. Nobody cared about the truth." But he said he kept accepting interviews because "if you don't talk to them, they're going to write what they want to write, or they're going to talk to some knucklehead that knows just a little bit and doesn't know the facts."

Biologist D first said "sensationalism" when describing just the newspaper coverage. "People want a headline and a story that somehow or another sounds dramatic or exciting or scary or great news, bad news," he said. "So there was always a bit of an emphasis on that." A main problem that has led the media to "over sensationalize things," Biologist G said, is drawing

false conclusions from data and not including all factors from scientific papers. “You can say these data suggest that … mammals have declined seriously and it correlates with Burmese python introductions,” he said. “Well, all of the sudden, the press can twist that around and say that the mammals have declined because of pythons, which is not necessarily true.” Biologist G said he doubts that it was something other than the pythons that caused the declines, “but as a scientist, you can’t overrule that.”

But, in also pointing to the Dorcas, et al., (2012) paper on mammal declines, Journalist C said it was the press release that originally hyped the issue, not the resulting media coverage. “The news release put out by the scientists was just as sensational,” he said. “The coverage was key to that news release more than anything else. The quotes were very dire, but (it) was more convenient to criticize the press.” Biologist C agreed, saying media doesn’t necessarily accentuate sensationalism but merely reiterates the existing situation. “This isn’t an issue that’s just been propped up by the media. I mean, here we’ve got no small mammals in the park. You don’t see fox, rabbits, possum—they’re gone,” Biologist C said, adding that coyotes, bobcats and raptors do take “some” smaller mammals, “but the species that took the rabbits was the python.” Meanwhile, Pet Employee D said one media statement that he saw is that the pythons will “eat every living thing in the Everglades, and the only thing left will be Burmese pythons. But in fact, the numbers of the predators are completely controlled by the prey base.”

When academic papers are first published, Biologist G said reporters aren’t often fully informed because they only read the abstracts. “They don’t read, they don’t read,” he said. While complimentary of websites and newsletters that report specifically on scientific issues, Biologist H also expressed problems with the general-interest publications’ interpretation of academic papers, saying they mostly left out necessary qualifiers. “Within the newspapers and the general

outlets," he said, "it was often difficult for them to bother to write more detail about the caveats that all science has and the qualifiers."

Scientists would try to get reporters to focus on specific issues they were working on, such as the low detection probability of the cryptic pythons, Biologist C said. "We really tried to get the media to focus on that," he said, "but a lot of it was just the sensational part of a big snake eating a 78-pound deer—that kind of thing."

Pet Employee C said the media coverage "is extremely blown out of proportion" and that those reporting on the issue rely on citizens being "naturally" afraid of snakes. "When you have something like Sen. Nelson … talking about children being consumed," he said, "it's very easy for him to get laws passed against the possession of these animals because … he's scared the hell out of everybody." Pet Employee A said he feels the python situation is mischaracterized as, for one example, "giant pythons established in the Everglades and slithering across the United States eating pets and children along their way."

The media accentuating the danger to humans was described by other stakeholders, including Pet Employee D, who said the coverage is "almost completely filled with misinformation." Media reports have shown that the pythons can reach 20 feet and 300 pounds, and that they're capable of eating a small child, Pet Employee D said. "All those statements actually are true," he explained. "But the way you read it, you take it out of context because of the way it's written, and it makes you be apprehensive of the snakes and fear that it might, in fact, eat someone." Biologist G also said size and natural fears of snakes are why the pythons have attracted so much attention. "Burmese pythons have gained more media coverage than any other introduced species. There's no question about it," he said. "And that's largely because of

two things: because people are definitely afraid of snakes, and just the sheer size of these animals frightened people to death."

Reporting the potential harm to humans kept Biologist C fearful of tourism falling in the Everglades. "We were always concerned at the park that if you sensationalize the issue," he said, "then people are going to be afraid to come to Everglades National Park. … I mean the risk (to park visitors) is low. As far as I know, there's been no incident with a python and a visitor, but it could happen." (The risk of getting hurt by any of the animals in the Everglades, though, is "somewhere down below lightning," Biologist J said.)

While disassociating sensationalistic coverage from his own publication, Journalist B said there are such reports being published elsewhere. "I think the coverage outside of South Florida tends to be a little more sensational—kind of more of a 'look at this, look at how crazy this is' kind of coverage," he said. "Whereas here, we just report on them, and folks accept it as another condition of living down here."

But some stakeholders were more mixed than negatively absolute in using sensationalism to characterize media coverage. Biologist C, for instance, said: "Some of them got sensationalized, but my feeling was, overall, I liked the media coverage because … it was important to get that media coverage to focus on an exotic species that was having landscape-level effects." Journalist E presented both sides as well: "As you might expect, some of it's been very serious and very thoughtful. … But a lot of it is, 'Oh my God, the pythons are coming; oh my God, isn't Florida whacky?'" Biologist J was complimentary of "good coverage mostly by the better local reporters, but most of it really has just been sensationalistic. The people are writing superficial stories based upon on an exciting appeal with little regard to what the issues really are."

Similar to Biologist C's sentiments, Biologist D asked: Even if reports are sensationalized, does that necessarily have negative repercussions? In Floridians' busy lives, the Everglades isn't always on their minds, so "a little bit of color surrounding these things isn't always bad," he said, adding:

> The media coverage of the pythons was … the epitome of media coverage and that is the authors have to find some way to get a headline that grabs people's attention and find a way to sensationalize it—and I don't know that's always a bad thing because … finding a way to connect with the public on sciency issues and conservation issues is not always easy. So if you can connect with them, even if there's sometimes a little bit of hyperbole or drama associated with it, I guess I would say we'll take that.

Great Debates: Hurricane Andrew and the Python Population

As shown in the content analysis, the media assigned responsibility for the pythons most often to: pet owners, ineffective government, the pet industry, and Hurricane Andrew in 1992, respectively. But the gap between pet owners and the hurricane is tremendous: Pet owners were blamed in 84.4% of articles with a responsibility frame, while Hurricane Andrew was in only 17.7%. Coincidentally, Pet Employee B was close in estimating the percentage of responsibility-frame reports didn't include the Hurricane Andrew theory (the 17.7% of articles with Hurricane Andrew leave 82.3% that didn't). "I would say that 80 percent of the media I talk to says (the hurricane in) 1992, got it wrong. They don't care. They wrote what they wanted to write," Pet Employee B said. This relative overlooking of Hurricane Andrew as a possible root cause of establishment, plus the wildly varying population guesses also highlighted in the content analysis, are two main themes in the media coverage that pet employees and some biologists said were among the reasons of sensationalism accusations.

Like most of the pet industry, Pet Employee B pointed to Hurricane Andrew as the cause of the invasive population. It "basically looks like God took a putty knife and wiped off the earth between Florida City and Homestead." One licensed dealer had imported 1,500 juvenile pythons,

he said, "and not only him but the zoo (in Miami) lost animals, tons of animals." Pet Employee B said he received a call from a Florida Fish and Wildlife Commission official saying animals were freed in the hurricane's wake and that he didn't know what to do. "And I told him … I know you're a praying man. I suggest you pray." He added:

> We knew that what happened in terms of us finding Burms in the Everglades was going to happen (after Hurricane Andrew). And it was like, 'No money—we're not chasing (the freed juvenile Burmese pythons). When it gets to be a problem, we'll deal with it.' Well, all those people who made those decisions have died or retired. My argument was … that when this hits the fan, I said, 'If we don't do something, we're going to have a really big-ass problem.' We don't have the money. They never had the money, and the state of Florida has never spent a dime—neither has the federal government ever spent a dime—that was appropriated for the removal of Burmese pythons.

Pet owners couldn't be responsible, Pet Employee B said, because "nobody's ever been caught releasing an animal into the Everglades by the Game (and) Freshwater Fish Commission." Pet Employee C also noted that, though people have been found releasing several other species, wildlife officials haven't caught people releasing pythons. "When we confronted the national park, we said, 'Have you ever caught anybody releasing pythons in the Everglades,' and they said, 'No.'"

Instead of many releases by pet owners, Pet Employee C said the genetics of the established invasive population can be traced back to a few females; Pet Employee D also pointed to a lack of genetic diversity in the population. Pet Employee C added: "The argument we had as the pet trade was people that are irresponsible (enough) to go ahead and release their pets are not going to drive 100 miles in the Everglades to do it; they're going to find the closest wooded area." Pet Employee D conveyed similar thoughts:

> Nobody in other parts of the country, or even in Florida for that matter, are going drive hundreds or thousands of miles just to release a snake in the Everglades. I'm not saying it's never been done—probably there have been a few releases. But not any numbers for a population to start.

In addition, pet animals aren't used to hunting for prey or the elements, Pet Employee C said in reference to the difficulty for them to survive in the wild. Pet Employee C said the chances are better for python establishment to have had happened from the large number of hatchlings released by Hurricane Andrew. "Personally looking at the science behind it, the odds are a lot higher for something like that than individuals willy-nilly letting a snake go here and there." Pet Employee C said Sen. Bill Nelson didn't "want information to get out" that the releases were an accident instead of the pet trade. "If it was an accident … no one had more animals loose in South Florida than Metro Zoo (in Miami) after the hurricane went through, so if the zoo couldn't contain their animals, you really cant blame the pet trade," he said. Pet Employee D also pointed to establishment happening post-Hurricane Andrew, but he used 800—instead of Pet Employee B's 1,500 mentioned earlier—as the number of imported juvenile pythons that were freed. "Generally, you would think more than a person dropping one off here and a person dropping one off there" would lead to establishment, he said.

While confidence among pet employees remains on Hurricane Andrew, some aren't as convinced. Journalist C said his publication hasn't done any "soul searching" in terms of deciding how to approach covering the python issue. "I mean, I realize there is some disagreement over the source of the pythons—that first the state was very confidently saying and the feds were saying that they're released as pets" but that the pet industry claimed Hurricane Andrew, he said. "To me, either way, it's still the exotic pet industry" as the root cause, he added. Legislator A labeled pet owners as the problem. "People were taking these pets and throwing them back into the Everglades and they just keep multiplying," she said.

As for the population debate and the media claims of various estimates on the size, Biologist C explained the origins of the high number of 150,000. He said 55 pythons were found

in a select area and were extrapolated based on the full Everglades area, leading to an estimation of 140,000. Biologist C added:

> Sen. Nelson, I ran into him somewhere and he said, 'Well, how many snakes do you have in Everglades National Park?' And I said, 'Well, our scientist briefly told me it could be up to 140,000,' and then (Sen. Nelson is) using 150,000 all over the place. And the media picked up on that.

After that, Biologist C said, "I'd always ask our scientists, 'How many are out there?' And they would say, 'Just tell them lots. No numbers. Don't do that again.'" Biologist H said he saw the estimate of 150,000 being used in the media more than any other number. "Typically, all that ever got reported was that there are 150,000. … They would only choose one number, and they didn't include any of the qualifiers about the science or how it was done." Biologist E said the first thing most people want to know is how many pythons are in the established population. "And I can remember being at meetings, not even with media, and somebody, we all looked at each other said, 'Well, we don't know. There's no way to know.'" Biologist E continued, noting his frustration in the media's reporting of numbers:

> Many, many times I told reporters this: We couldn't ever know, and it would take more resources than we even have to try and figure it out. And I would rather deploy those resources elsewhere. But I watched as the number went anywhere from thousands to 30,000 to 50,000 to 80,000, and I saw the number as high as 180,000. It just kept accelerating. And those numbers ended up getting repeated by political-type people and everything else, and I mean, that drives the story. But it doesn't really do a whole lot for you as a management agency if you're trying to react to a bunch of stuff rather than trying to craft it.

Biologist H also detailed how establishing a number isn't possible. "Biologically and technically," he said, "we don't know how many pythons there are in South Florida. … Population is a problem because they are extraordinarily difficult to detect." Pet Employee C noted that at the height of coverage in 2009 and 2010, estimates in the media were as high as 150,000 but that, according to the Florida Fish and Wildlife Commission, it takes hunters about 100 hours to locate one snake. He continued:

> If there's 150,000 in the Everglades—these are big snakes—they should be hanging from trees, they should be on every piece of dry ground. We would just be hauling them in like crazy. There's definitely thousands of animals out there. But the news media blew that up, and a big portion of that was Sen. Nelson's campaign. He had absolutely no clue what any of the wildlife regulations were and what Fish and Wildlife was trying to do. He was too busy trying to get things done at a national level.

Feedback

In an attempt to find out if they had heard about these or any other issues stakeholders had with their reporting, the journalists interviewed for this study were asked specifically if they received feedback after stories were published, with four of the five remembering that they had. Two said feedback mostly centered around finding faults in their reporting, including sensationalizing the pythons or paying too much attention on the snakes while largely ignoring other invaders. The other two who had received feedback said it was mainly questions about the pythons from readers.

Journalist C said he gets feedback on python reporting from four different groups: those in the pet industry, scientists, people who care about animal welfare and suffering in the pet trade, and those who wonder "why on earth (do) we allow large, constricting snakes" into the country. In describing the input from the pet employees, he said: "You've heard the line, and I've heard it, too: 'This is being sensationalized by the media and by the scientists and by the environmental groups.' They say the problem is greatly exaggerated, especially the potential geographic range of the pythons." As for the scientists, some but not all have been "critical" of his reporting. "I'm sure I've made mistakes, but I'm pretty careful," he said.

Journalist A said he only received feedback when contacting sources for follow-up stories, and they would push the problem of other invasive species. "They might say things like, 'Why are you focusing on this to cats or a bigger problem than Burmese pythons in the Everglades? They kill five times as many native species.'" But the sources, Journalist A added,

were instead mostly critical of the Florida Fish and Wildlife Commission for organizing the mass hunt in 2013.

Not all feedback criticized the journalists' reporting, though. Journalist B said he instead heard from readers relaying their own experiences, such as: "'I saw what I thought was a python in our yard.' They feel compelled to tell you their own experiences about (wild animals)." Journalist D said the main feedback he received was questions from people concerned about their pets. "'When will I have to be worried about a python eating my poodle in my yard?' … Until they start slithering up here, the problem is something that's happening elsewhere, whether that's in the Everglades or something international—it's not in their backyard."

Refining Message

Stakeholders were asked if any past interactions with the media had changed how they interact with journalists. This was to establish if sources had worked to improve distributing messages through the media, or if they became more leery about talking with certain reporters or the media in general. Many stakeholders did, in fact, say they had greatly altered their disclosure with reporters over time, with two biologists saying they have stopped talking with certain journalists.

Biologist D said that once his agency was covered in the media—on the pythons and all other issues—it would "try to refine the message in the future." Biologist E said journalists are "looking for certain things that fit within a certain number of words, and they're looking for things that fit within the general storyline." So that led him to make his responses more concise:

> Overtime, I learned the kinds of things to say, I learned how to shorten my responses to give them reasonably accurate data, but rarely did we go below the surface and rarely did it appear to me that there was a great desire to do so. The more it went on, the more I came to realize what they were looking for. I mean, there were plenty of times when I'd talk at length to the media … and rarely did much show up more than just a couple sentences as they interpret it to fit.

Biologist H said his agency works against such source-to-journalist problems by pre-planning and packaging material for journalists that highlight only a few key points rather than letting them determine what was and wasn't most important. "We tried to orchestrate press releases and frequently asked questions and highlight points—in other words, package it, if you will." Even with packaging, Biologist H added, some aspects would be continuously reported incorrectly, so public-relations improvement was a continual cycle. "There were some aspects of the work that seemed to be repeatedly portrayed incorrectly or incompletely," he said, "so we would maybe relook at how that was put together in the package or how we responded to that."

To avoid any misquoting or misinformation, Pet Employee C said that when he was interviewed, he chose his words more carefully and even did a pre-interview with reporters to see what information they already had and what angle they were coming from.

Going even further, Biologist J said that, with "very few exceptions," he doesn't speak with reporters, explaining he has done his work "underground" and has "kept it out of the media":

> I seriously clamped down on the coverage of my work. … The ability to control stories and deliver a good message about pythons was nonexistent. All this sensationalism, by and large, ruled the day. You could not improve the situation by participating in it, so the best thing is to follow in the advice of a former First Lady, who said: 'Just say no.'

A main concern for Biologist J was the media's mischaracterization of people's intelligence. "My philosophy … is anytime you do a story in the media, if they don't make you look too stupid, you've won," he said. "But basically the comments you get are of people pretty much telling you how stupid you are and then you explaining that you really have no control over what (reporters) say." Biologist I said her agency also stopped talking with some reporters:

> (We) cut certain people off we know are just going for the sensational story, and we're going to talk to the people that actually have something worthwhile to report,

> or that they're taking more of a scientific slant on it versus just a, 'Wow that's a big python, and it ate a deer.'

Impacts to Pet Industry

From this multitude of responses to the established pythons—the scientific studies, the press coverage, the legislation, and how the three intermix and push one another along—pet-industry employees said their business has been greatly damaged, both from the loss of Burmese python sales and the overall public-relations image. This conclusion stems from pet-industry employees' answers to being asked if the media coverage specifically has affected their business.

Pet Employee B said his own business lost "hundreds of thousands" from the laws on Burmese pythons and that he had to fully retool. "People lost millions of dollars; the government has lost millions of dollars," he said. "Everybody has. It didn't need to go that way. We could have still accomplished the same thing without having this, but this issue, this perception issue just accelerated." Pet Employee B said the laws on Burmese pythons forced him "to kill what I loved because I couldn't win." He continued:

> I said, 'We'll be OK—we need to change our business model.' And I convinced a few other guys. We got to because we're not going to win. We don't have as much money as the *Miami Herald* or the *Florida Times-Union* or *Orlando Sentinel* or on and on and on—all these people that have a political agenda to call attention to the Everglades at our expense. It's not our fault. Nobody did anything wrong. It just happened. It's called life.

Pet Employee A agreed that the media coverage has negatively impacted the pet industry. "You have to be in defensive mode and being out there explaining why the media was wrong," he said. "Instead of advocating for your cause, you're having to be in reactionary defensive mode against the irresponsible stories that area floating around in the media." The impacts haven't been felt universally, though, at least in the case of Pet Employee D, who said simply that the media hasn't affected his business.

Pet Employee C also said laws have been unfairly imposed on the pet industry and that Burmese pythons are more regulated than handguns in Florida. Someone buying a python has to have a license, the original owner has to have a license to sell, the python must be microchipped, and the original owner has to report where the snake ends up, Pet Employee C explained. "Other than a gun dealer," he said, "there is absolutely no tracking of a firearm."

Regardless of regulations, all aspects of the pet industry's business will continue, even if it has to be done as a black-market industry, Pet Employee B said, adding that dealers should be given incentives to stay legitimate:

The pet trade is all about building relationships with people and the licensed, registered pet-trade people are the ones that need to be identified, encouraged, and honored and worked with instead of being pissed on, aggravated, and slandered. … If you look at the small percentage of animals that are actually coming from licensed, regulated, retail facilities, and then all these laws—everybody's going underground. And you can't catch them when they go underground, and that was the whole thing with the reptiles and the Burmese pythons is you got to work with people because people are going to have snakes, big snakes or little snakes, whether you like it or not. You've got to make it profitable to be legal.

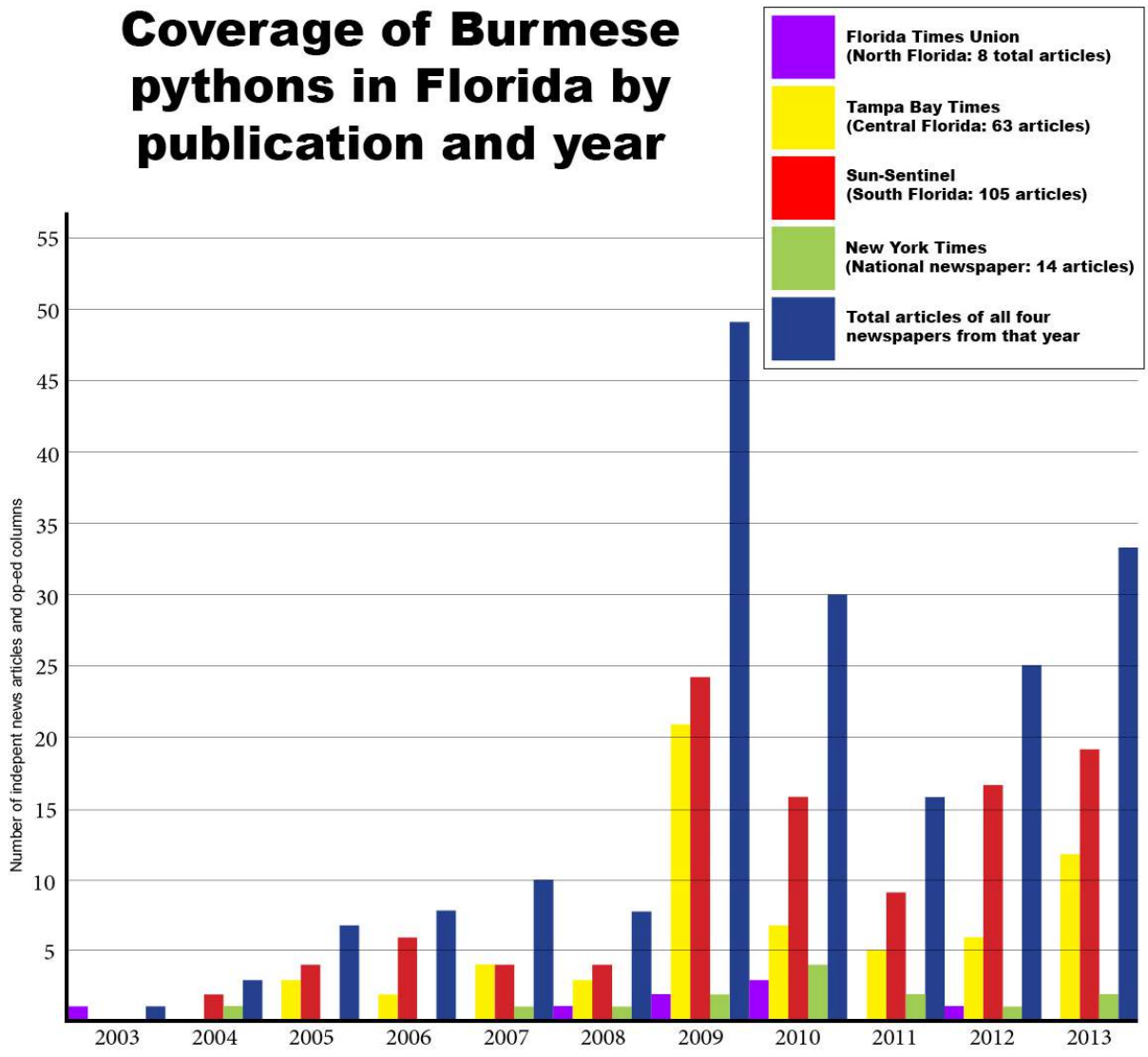

Figure 4-1. Coverage of Burmese pythons in Florida by publication and year.

	Primary Articles	Secondary Articles	Primary Articles (n=103)		Secondary Articles (n=87)	
			State Frame	National Frame	State Frame	National Frame
Sun Sentinel	67	38	40	27	31	7
Tampa Bay Times	26	37	12	14	29	8
Florida Times-Union	3	5	3	0	5	0
New York Times	7	7	2	5	5	2
Total	103 (54.2%) [1]	87 (45.8%) [1]	57 (55.3%) [2]	46 (44.7%) [2]	70 (80.5%) [3]	17 (19.5%) [3]

[1] Percentages are compared to the entire content sample (n=190)

[2] Percentages are compared to all primary articles (n=103)

[3] Percentages are compared to all secondary articles (n=87)

Total State
127 (66.8%) [1]

Total National
63 (33.2%) [1]

Figure 4-2. Primary and secondary articles by publication, and then state and national frames by publication and total.

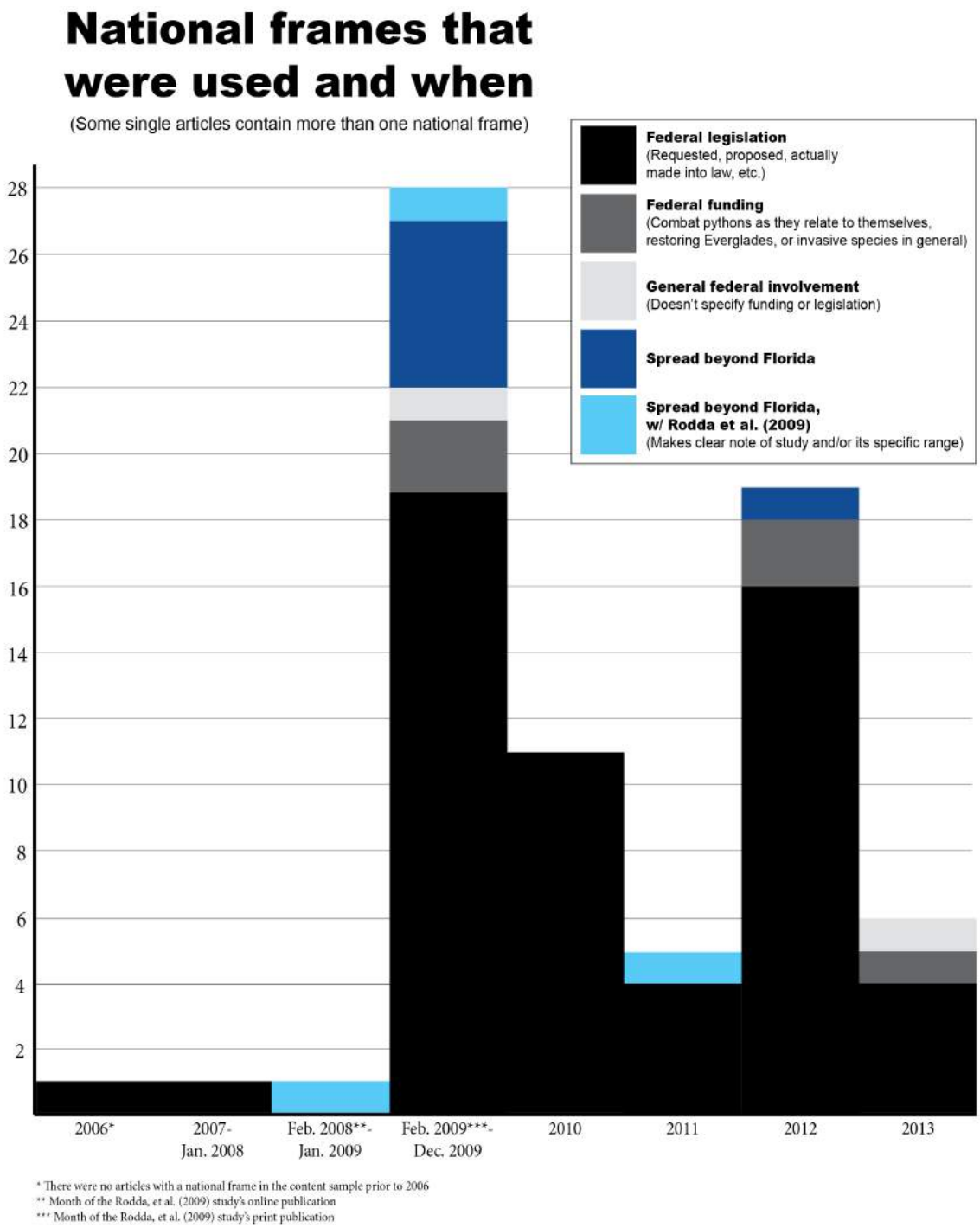

Figure 4-3. National frames by date and type used.

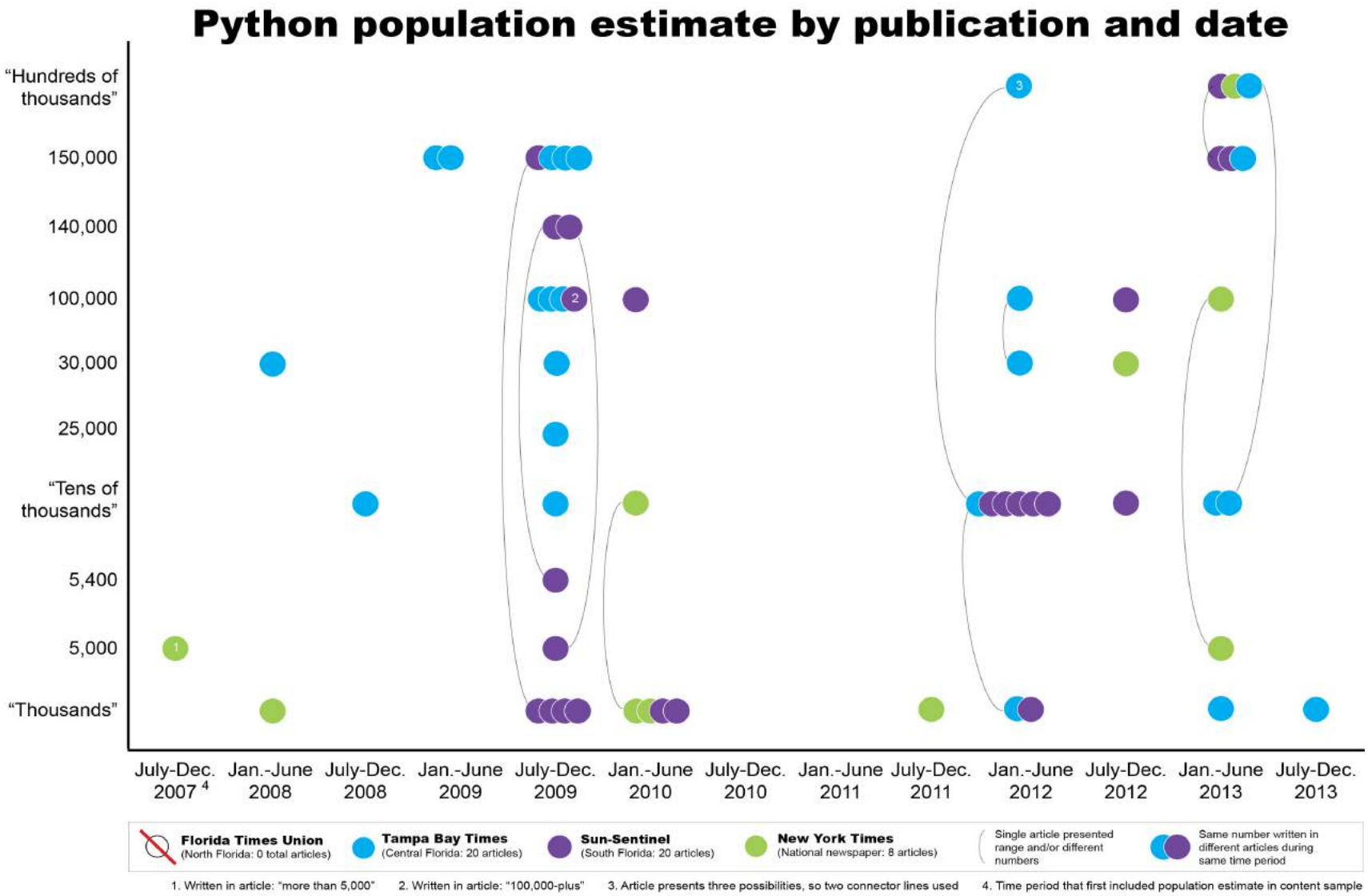

Figure 4-4. Python population estimates by publication and date.

Table 4-1. Consequence frames by total and publication.

Consequence (in order of total)	Sun Sentinel	Tampa Bay Times	Florida Times-Union	New York Times	Total*
Eating/killing native wildlife	53	31	2	10	96 (66.2%)
Harming or killing humans/public safety	21	24	2	2	49 (33.8%)
General threat to natural resources/native wildlife/habitat	15	12	3	0	30 (20.7%)
Food-chain disruption/competing with top predators	17	9	2	0	28 (19.3%)
Financial expense from curbing pythons or to tourism	6	5	0	2	13 (9.0%)
Taking over habitat/forcing out other species	4	1	0	1	6 (4.1%)
Harming/killing humans' pets	3	1	0	0	4 (2.8%)
Releasing exotic diseases	2	0	0	0	2 (1.4%)
Breeding with African rock python to make "super snake"	2	0	0	0	2 (1.4%)
Hurting PR of the animal industry	1	0	0	0	1 (0.7%)

*Percentage compared to all articles (n=145) with a consequence frame.

Table 4-2. “Spokes-species” by total and publication.

Species negatively affected (in order of total)	Species/ subspecies status *	Sun Sentinel	Tampa Bay Times	Florida Times-Union	New York Times	Total**
Alligators (*A. mississippienisis*)	Least Concern (IUCN)	27	13	0	8	48 (65.8%)
Deer (in general)	—	14	8	0	5	27 (37.0%)
Raccoons (*P. lotor*)	Least Concern (IUCN)	14	6	1	3	24 (32.9%)
Bobcats (*L. r. floridanus*)	Least Concern (IUCN)	7	7	0	3	17 (23.3%)
Opossum (*D. virginiana*)	Least Concern (IUCN)	6	4	0	3	13 (17.8%)
Rabbits (in general)	—	4	2	0	5	11 (15.1%)
Panthers (*P. c. coryi*)	Endangered (USFWS)	5	2	0	2	9 (12.3%)
Foxes (*V. vulpes*)	Least Concern (IUCN)	4	2	0	1	7 (9.6%)
Marsh rabbits (*S. palustris*)	Least Concern (IUCN)***	6	1	0	0	7 (9.6%)
Key Largo wood rats (*N. f. smalli*)	Endangered (USFWS)	1	4	0	1	6 (9.2%)
Wood storks (*M. Americana*)	Threatened (USFWS)	4	1	0	1	6 (9.2%)
Muskrats (*N. alleni*)	Least Concern (IUCN)	0	3	0	0	3 (4.1%)
Cotton-tailed rabbits (*S. floridanus*)	Least Concern (IUCN)	1	1	0	0	2 (2.7%)
Cotton rats (*S. hispidus*)	Least Concern (IUCN)	1	0	0	1	2 (2.7%)
Egrets (in general)	—	0	1	0	1	2 (2.7%)
Key deer (*O. v. clavium*)	Endangered (USFWS)	2	0	0	0	2 (2.7%)
Pied-billed grebes (*P. podiceps*)	Least Concern (IUCN)	1	0	0	1	2 (2.7%)
Rats (in general)	—	1	1	0	0	2 (2.7%)
Squirrels (in general)	—	0	1	0	1	2 (2.7%)
White-tailed deer (*O. virginianus*)	Least Concern (IUCN)	1	0	0	1	2 (2.7%)
Wood rats (in general)	—	1	0	0	1	2 (2.7%)

*Status only included when species/subspecies can be distinguished from article; classifications from either International Union for Conservation of Nature or U.S. Fish and Wildlife Service.
** Percentage compared to all articles (n=73) that mention at least one animal/species being impacted by pythons.
*** The Lower Keys subspecies (S. p. hefneri) is critically endangered, but these articles appear to refer to the common mainland species, found in and beyond the Everglades

Table 4-3. Solutions frame by total and publication.

Solution (in order of total)	Sun Sentinel	Tampa Bay Times	Florida Times-Union	New York Times	Total*
Hunting: permitted, bounty, or in organized mass	32	22	3	4	61 (42.1%)
Ban import/interstate commerce	35	15	2	5	57 (39.3%)
Require owners to get a permit and/or put an ID microchip in python	13	13	1	3	30 (20.7%)
Cold weather	11	3	1	4	19 (13.1%)
Ban breeding/buying/selling, including online	7	7	2	2	18 (12.4%)
Ban ownership/possession	8	5	0	0	13 (9.0%)
Provide amnesty days for owners to surrender pets at no penalty	7	3	1	1	12 (8.3%)
Police for illegal releases/issue fines/prosecute violators	10	1	0	0	11 (7.6%)
Institute stricter caging regulations	3	8	0	0	11 (7.6%)
Use “Judas” or female snakes with transmitters to find other snakes	4	1	0	1	6 (4.1%)
Use trained dogs to sniff out pythons	4	1	0	1	6 (4.1%)
Traps	0	3	0	1	4 (2.8%)
Upgrade pythons to dangerous Class 1 classification for captive animals	1	2	0	0	3 (2.1%)
Launch public outreach/anti-release campaigns	2	0	1	0	3 (2.1%)
Set up a python hotline for people who spot the snakes	1	0	0	2	3 (2.1%)
Institute age restrictions on purchase/ownership	2	0	0	0	2 (1.4%)
Trade/import legislation (in general)	1	0	0	1	2 (1.4%)

*Percentage compared to all articles (n=145) with a solutions frame.

Table 4-4. Responsibility frames by total and publication.

Responsible group, event, or idea (in order of total)	Sun Sentinel	Tampa Bay Times	Florida Times-Union	New York Times	Total*
Pet owners	44	23	4	10	81 (84.4%)
Ineffective government: regulations, management, funding, etc.	15	9	0	2	26 (27.1%)
Pet industry	16	2	0	1	19 (19.8%)
Hurricane Andrew (1992)	12	3	0	2	17 (17.7%)
Hurricanes (plural)	3	0	0	2	5 (5.2%)
Heavy rains, resulting in flooding	0	0	0	1	1 (1.0%)
International food markets	0	0	0	1	1 (1.0%)
Snakes hitchhiking on delivery trucks/in packaging materials	0	0	0	1	1 (1.0%)
Storms (in general)	1	0	0	0	1 (1.0%)

*Percentage compared to all articles (n=96) with a responsibility frame.

CHAPTER 5
DISCUSSION

In the United States and across the world, through global mobility and trade, invasive species continue to grow in number at the detriment of the environment and economy. This expansion has been allowed to continue because enforceable regulations on live organisms are greatly lacking in and between nations. Because reactive actions typically come nowhere close to eradicating an invader, the most reasonable approach for each country, including the U.S., appears to be instituting the proactive "clean list" approach that bans importation of all non-native species unless they've been specially approved.

While all these observations on invasive species have been clearly and repeatedly stated in prior research, little if anything has examined the source, the news media, that many laypeople depend on for information on such an important scientific issue. To build a foundational framework in this area, this study utilized framing theory to examine newspaper coverage of a well-known notorious invader, Burmese pythons in Florida, and qualitative interviews to gain insider perspectives from stakeholders on the coverage.

First, this study sought to establish whether newspapers were framing the pythons as an issue that is tied only to Florida, or if the issue had been expanded to a national level, whether that be because of a range expansion to other states or because of involvement from the federal government. Establishing if the pythons are portrayed as a national issue becomes important because the federal government holds funding and powers such as the Lacey Act in curbing invasive species, and because cross-state coordination is needed to block invasive species, which don't recognize political boundaries. Also, more widespread support could be given to the issue if environmental organizations, governments, and laypeople felt their ecosystems could be in jeopardy in the wake of a python spread.

In almost exactly one-third of the articles analyzed did the writer frame the pythons as a national issue, with most of those focusing on federal politics and very few suggesting the possibility of the pythons moving beyond the Florida's borders.

Some disagree with the Rodda, et al. (2009) study, which proposed that the pythons could move into other states along the coast from California to Maryland. Their research has questioned, and even claimed to refute, the possibilities of range expansion beyond Florida. However, definitive proof either way is missing, as the established population is relatively new, and research is sparse in even the pythons' native range. Climate change is also a factor in the potential for a larger range, and the population survived the unusual cold of January 2010, which could have even worked as a selection event. Regardless of which range theory proves true, simply the possibility of this nationwide environmental danger warrants more mentions in media coverage, more so than including a responsibility frame, which often harps on an unanswered and now relatively unimportant debate from the past, and wild guesses at a completely unknown population total.

In an effort to respect all stakeholders' views, though, the range possibility should be clearly framed as a theory and should be accompanied by the alternative of them being isolated to Florida. At best, such framing could lead to more of a national, unified effort in somehow discovering a means for eradication, stopping their expansion, or encouraging legislators and managers to install regulations that discourage future invaders. At worst, it simply makes the coverage more comprehensive and further highlights the many remaining unknowns about the python situation.

Second, this study sought to find what consequences from the pythons are most often mentioned in the media coverage. It comes as no surprise that three of the top four are ecological

consequences: eating and killing native wildlife, a general threat to nature, and disrupting the food chain by competing with top predators. What was unexpected, though, was the consequence of the pythons harming humans and public safety, the consequence mentioned second most often across the content sample. This coverage was mostly a result of the 2-year-old Florida girl being killed by a family's unsecured, malnourished pet python. So while journalists and some politicians did often associate the death with the wild population, the fact that it was a hungry pet with a small, living mammal (the girl) in the same house makes that python vastly different than the wild population, which has yet been documented as physically harming a human. While this enhances the case for some stakeholders to claim the media reports are sensationalistic, it did help in building political steam against the pythons.

Unfortunately, as is often the case with invasive species, regulations came after the pythons were already established, doing little if any good and even having the potential to worsen the situation by encouraging additional releases from pet owners and reptile breeders, or by fueling an underground market. The ban also expanded already-existing tensions from the pet industry and, as some of those interviewed for this study said, could drive reptile dealing underground. This reactive scramble builds yet another case in the existing many for adopting a clean-list approach in importing non-native organisms.

Third, this study sought to establish which animals are the "spokes-species" for the python problem—in other words, which species are most often framed as being negatively impacted by the established python population in Florida. American alligators were mentioned by far most often, in many cases because of dramatic photos and videos showing battles between the alligators and pythons—two species that wouldn't naturally meet—or one eating/digesting the other. Except for a single reference to indigo snakes, the alligator was the only reptile species

mentioned as being negatively impacted by the pythons across the content sample. The rest of the list comprised mammal and bird species. Only one obvious flaw stuck out from this analysis, and that's the one media report that said the pythons are killing the Florida subspecies of panthers. Though there is a fear that this could indeed happen, such an instance hasn't been documented.

The spokes-species analysis instead serves mostly as a way for wildlife agencies to steer the information on wildlife impacts they're releasing to the media. If pied-billed grebes have been documented as being eaten more often than most bird species, for a hypothetical example, wildlife agencies could take note of their relatively low number of media coverage and adjust public-relations strategies accordingly. Also of note is the relatively fewer mentions of species—panthers, Key Largo wood rats, wood storks, and Key deer—with a conservation status lower than Least Concern. These animals could also play a role in more strategic messaging from wildlife agencies because, while there could be fewer documented cases of them being impacted by the pythons, their already-imperiled populations could be more greatly damaged.

Fourth, this study sought to determine what solutions for curbing or exterminating the pythons are mentioned most often across the content sample. The python hunt greatly helped bump the hunting solution to the top of the list, followed by: banning the importation/interstate commerce of the pythons; requiring owners to acquire permits and microchips for their pythons; cold weather causing python mortality; banning the breeding, buying, and selling of the pythons; and simply banning ownership and possession. This diversified coverage might suggest that media organizations have done a favorable job in covering solutions, keeping up with proposed solutions—and the politics and science behind them—as they develop, and showing laypeople

that despite a great deal of ideas and effort, little can be done against an already-established invader.

Interestingly, four of the top six solutions are legislative ones enacted after the wild pythons already formed an established population. So in an effort to stop future invaders, such legislative techniques could and should be used proactively instead of reactively on species that have the potential to also become established. The top solution, hunting, has done little good in removing large numbers of the snakes from South Florida, mainly because of the discreet nature of the species, but it certainly helped build awareness of the problem. And while the January 2011 cold likely killed more pythons than anything else, unique weather events can't be depended on, especially because of the growing climate-change threat.

While no fully effective solution has been found, those that will play the biggest role in exterminating the wild population are perhaps the ones that can increase detectability and luring success by capitalizing on python genetics and instincts. Such solutions—using Judas snakes, scent-sniffing dogs, baiting traps with food, and attracting pythons with pheromones—were mentioned relatively few times across the content sample. But these more scientific solutions could gain more prominence as reactive legislative solutions continue to be exhausted and mass hunting has proved largely ineffective in terms of numbers eradicated.

Fifth, this study searched for additional frames that appear frequently in the newspaper coverage. Two were found: framing people or things as responsible for the python's introduction and establishment in the wild; and framing a conflict between legislative attempts to solve the python problem, and the pet industry and/or Republicans. Also, the many different population estimates proposed across the coverage were quickly noticed.

Pet owners received the vast majority of the blame for introduction, widely accused of releasing their pythons once they grew too large. Next, in order, were: ineffective government, the pet industry, 1992's Hurricane Andrew, and hurricanes plural. Ineffective government, especially in terms of regulating the importation of foreign organisms as a whole, seems justified based on the existing research and what stakeholders expressed in their interviews. Multiple hurricanes, however, don't appear anywhere but in those few news reports, so factually, reporters shouldn't have included this theory.

The pet employees interviewed for this study presented a logical theory when it comes to Hurricane Andrew: that the pythons released by the hurricane all at once in a close geographic location are more likely to begin breeding than owners traveling however far to the Everglades to free their individual, tame pets. Also, even though wildlife officials do widely point the finger at pet owners, an owner releasing her or his python into the Florida wild hasn't been caught. However, as emphasized in Willson, et al. (2011), there are flaws in the Hurricane Andrew theory, including the distance between the population's epicenter and the nearest reptile facilities, the unusually high juvenile survival percentages needed to grow into the current population over a relatively short period of time, and the years of virtually hidden isolation in the Florida wild the population would go through before expanding into such that sightings happen regularly. Journalists could include, if they so choose, both the pet-owner and Hurricane Andrew theories as boilerplate background information in their articles to promote fairness for both sides. But pointing to a specific answer on the elusive question of how the pythons went from importer to wild establishment is unimportant because it was originally the pet industry's importation in all plausible scenarios, it offers little if any help in solutions, and it stirs unnecessary debate. To avoid instigating such polarized guessing, the most suitable solution is journalists leaving the

blame on the original responsible party, the pet industry, something that is generally agreed upon.

Appearing in only 40 of the 190 articles in the content sample, the conflict frame is symbolic of the opposition some stakeholders express toward more restrictive python regulations. Of those 40 articles, 36 featured opposition from just pet-industry employees, three from pet employees and Republicans, and one from just Republicans. The main point of contention was job and revenue loss resulting from the legislation. The 40 articles represented only 21.1% of the 190 in the content sample—a relatively low number that could present yet another opportunity for journalists to build positive relationships with the pet-employee stakeholders by giving them more of a voice in stories. Because of each stakeholder group's influence, abilities, and knowledge, it is important to maintain such relationships.

While most no one would likely disagree with proactive legislation that would have actually prevented the establishment, the reactive inclusion of the pythons under the Lacey Act, for a legislative example, seems to have been too little too late, giving the pet industry and their Republican supporters the somewhat legitimate argument that their businesses shouldn't needlessly suffer and be unfairly targeted. This builds yet another case for the clean-list approach to importing foreign beings—so that all pet and plant businesses start on an even playing field and reptile dealers aren't singled out arbitrarily based on a single species amid a great many other invaders.

Meanwhile, a piece of evidence emerged from the content sample that showed weakness at least in consistent information if not fact checking: the varying estimates on the python population when, according to biologists interviewed for this study, there's no way to guess or know. The numbers bounced all over the place, even from the same publication during the same

six-month period. Of positive note is the *Florida Times Union* leaving out any population guesses, and more broadly, 142 of the 190 total articles also doing so. Very few even clarified that the population is, simply, "unknown." But for those publications that do continue to include population totals, the most obvious practical solution is to exclude them. The first few published numbers are far more excusable than the continued trend, something that should stick out in the research process of reading newspaper archives. The numbered guesses should encourage all journalists to ensure their sources of information on science issues are expert sources—something that ordinarily should go without saying—and such information found in the news-gathering process, including in their own publication's archives, can't always be trusted.

From the interview portion of this study, the Burmese python issue emerges as even more complex, with stakeholders of varying backgrounds frequently holding conflicting theories on how to best deal with the situation and the facts behind it. They do seem unified, however, in wanting the invasive population removed, whether it be for environmental, economic, public-relations reasons. So in terms of gaining public attention and support, as well as maintaining accuracy in reporting and working relationships between stakeholder groups, it is important to establish best practices and stakeholder-desired improvements in the coverage of the pythons and invasive species overall. So this discussion breaks the interview findings down by, simply, positives and negatives.

The biggest positive contribution the media has made to the python issue, according to stakeholder interviews, is raising awareness on the problem, which led to wildlife agencies approaching it more aggressively and even encouraged the passing of legislation. Some stakeholders commended specific coverage that explored the science of the pythons, such as the inability to detect them in the wild or the snakes' native-animal consumption. Even reporting

labeled "sensationalistic" was praised for raising awareness by one biologist, who said, "…a little bit of color surrounding these things isn't always bad." This power to influence still held by the press should encourage journalists in their reformist efforts on environmental and other issues. Specifically for invasive species, this power suggests that if the press was to diversify its coverage to other species, beyond what many stakeholders felt is an overabundance of python coverage, more action would be taken to address other invasive species as well. Newsrooms are indeed suffering from the changing industry, which is more and more siding with quantity on the Internet over quality. So in invasive-species coverage and beyond, perhaps fewer quality reports published less often could provide a niche role for newspapers since another outlet probably already reporting the news aspect first. Also, fewer quality reports would help general-interest publications regain credibility in their science reporting and would embrace the notion that they're able to accurately report on such topics with more, as one journalist called it, "sophistication." Further, fewer reports, and thus fewer interview and information requests, could also cause less stress on already-overwhelmed wildlife agencies, bettering the biologist-journalist relationship and giving the agencies more time to thoroughly prepare press-release packages with fresh angles and real news value.

With invasive species being such a primary threat to ecosystems in the U.S., the press building a case for corrective action, as it did with Burmese pythons, is essential to protecting environments that have suffered so greatly already at the hands of pollution, habitat loss, and many other factors. Coverage on a variety of invaders would help frame the continuing need of a clean-list approach, something that a great deal of invasive-species research has already called for. Such a ban on all imports of live organisms, except those specially approved, would stop invaders before they become a problem. Reactively, little to nothing can be done to rid an area of

an established invader, as has been shown thus far by Florida's Burmese pythons and many other species. The economic savings from a clean list would be immense, and specific trades, like the dealing of reptiles, wouldn't be singled out legislatively and financially by reactive policies that are too late to actually curb the problem and could indeed make it worse.

In addition, one biologist complimented journalists for allowing him to review stories prior to publication to avoid incorrect quotes or information. This did come as a surprise, as news organizations don't tend to let sources review material prior to publication. But in the cases of general-assignment reporters covering scientific issues of which they had no previous knowledge, it might be wise for newspapers to allow experts to review. Distributing an accurate, complete article to laypeople should take precedent over journalistic norms, in an effort to have not only a more informed public, but also more positive stakeholder relations.

While not to diminish the positive aspects of coverage, the negative criticisms were far more abundant. Some centered on a lack of fact checking and focusing on the wrong facets of the issue. But the criticism mentioned most often is that the coverage is sensationalistic. "Sensationalism" is too general to offer a pointed discussion, but it is possible to attempt to isolate specific criticisms that fall into the sensationalistic theme. One factor, the varying population estimations, has already been explained as a simple correction: leaving the population as "unknown."

Another sensationalistic factor is the pythons' alleged threat to humans and public safety, much of this coming from the death of a 2-year-old Florida girl by the family's malnourished, unsecured pet python. It is understandable that a starving animal would attempt to prey on whatever food is available. But as for the wild population of not only the python but any animal in the Everglades, one biologist said the risk of getting hurt is "somewhere down below

lightning." And as another biologist said, there hasn't been a harmful encounter between a python and an Everglades visitor. So, at least in terms of what is presently known about the snakes, the wild population should be portrayed in the media as solely an environmental threat, not a public-safety one.

Another sensationalistic factor identified by stakeholders is journalists making scientific papers more dire and absolute than they really are by excluding qualifiers that provide context to the findings. But in the case of Dorcas, et al., (2012), which identified steep drops in mammal sightings in the Everglades, one journalist said that study's press release "was just as sensational." A biologist also defended the press on the mammal study, saying: "This isn't an issue that's just been propped up by the media. I mean, here we've got no small mammals in the park. You don't see fox, rabbits, possum—they're gone." Regardless of scientists or journalists hyping or over exaggerating findings, journalists should fully read a scientific study before reporting on it so that their coverage may be more thorough—that, plus any other relevant studies. In addition, taking extra time to work on a more complete, accurate report would, as noted earlier, help publications attract an audience for their quality versus the many other outlets concerned with speed and quantity. Such a process would, again, better inform readers and build better relationships between the press and other stakeholders.

In an effort to combat the sensationalistic factors, biologists and pet-industry workers said they employed several methods that adjusted their messaging to reporters. First, they learned to keep their responses short so reporters would have less quotable material to choose from. Quick, more pointed responses from scientists and other stakeholders to interview questions could be more likely to deliver desired results from strategic messaging and would better serve laypeople, who would then read only the most important aspects.

Second, they learned to better package their information as a whole, meaning that if there was something new on which to alert the media, press releases, supporting materials, interviews, and other media-relations items would together focus only on a few key points. This would, again, provide journalists with very little choose from but is meant to keep the resulting news coverage accurate and directed at the most pertinent items.

Third, they worked continuously to revamp their interactions with the media. Some items, stakeholders said, would be repeatedly reported incorrectly or incompletely, so adjusting and refining after each news report stands to also steadily improve following each report. In addition, stakeholders should be unafraid to contact outlets to report corrections when needed and, in very extreme cases, to also write letters to the editor, for not just laypeople's knowledge but to put pressure on reporters, especially those covering difficult science issues, to write accurately.

Fourth, one pet employee said he pre-interviewed reporters to determine their existing information and from which angle they're approaching the story. While this non-traditional tactic from sources could stand to come off as abrasive, some degree of informal conversation prior to the interview could make both sides more comfortable with one another and what direction they think the story should head. While the phrase "nothing is off the record" is common, and certainly may be true with some reporters and outlets, many journalists, noticeably so at newspapers, do often hold onto this practice. If they don't, they should be encouraged to do so, for building such trust ensures sources will continue to talk with reporters, disclose more information and opinion, and provide leads that reporters may not know.

Fifth, two biologists said they've gone as far as ceasing communication with certain reporters—an extreme example of what can happen if trust isn't continued between media and

source. This tactic from expert sources isn't advisable because journalists could turn to those less knowledgeable for voices in their stories. But it is an understandable action if the media has, in fact, misquoted the sources, reported their findings incorrectly, and done more overall harm than good to the actual python situation.

To not only prevent being rebuffed by sources but also ensure more accurate reports, journalists should exercise extreme caution in reporting on science, taking more time on stories, if needed, and considering new routes toward fully truthful coverage, such as allowing pre-publication expert review. From this study's findings, it is apparent that media need to tweak such items, not only in covering the pythons, but also invasive species and science overall. Journalists must accept that scientific reporting is indeed a great undertaking, perhaps so much so that some stories are better left to those covering the beat, even if it means delaying the story. A spike in Web hits today isn't as important as having a complete, accurate report tomorrow. Such is an important mindset for journalist but perhaps more so for editors, who may be forcing too tight of deadlines that sacrifice accuracy and completeness.

Media should fully explore the issue at hand by reading available academic articles and other materials, and, for each new report, they should crosscheck all information, even that which appears in their own publication. All would regain standards of quality, accuracy, and reader and source trust, rising above the fast-paced and shock-oriented nature of much of the online blogosphere.

But the media shouldn't take on total responsibility for all errant reporting. It is indeed the easiest, most visible target, but before blame is placed, critics must first examine from where the journalist got her or his information. In the case of population estimates, for example, Sen. Bill Nelson used a high number that began appearing in the media. Retrospectively, the

population should have been left at "unknown," and certainly so by now. But at the time, reporters cannot merely ignore such statements coming from federal legislators, especially if no one is disputing them. So even stakeholders should err on the side of caution because their words and information, as shown by the population estimates, can continue through follow-up reports years after they're first released. Stakeholders should also avoid writing off and generalizing the media as just looking for headlines that shock and thrill, and should instead address any concerns with specific facts or theories first with the media outlets so that corrections can be run and follow-up reporting can be improved. Such co-understanding would benefit all sides—the journalists, sources, and readers—much more than settling into negative stereotypes that do nothing but manifest their own realities.

While this study's findings do extensively cover media framing of the pythons and stakeholder perspectives on the issue, it wasn't without limitations. Because of the relatively few legislators who met the standard to qualify for an interview and then only one actually agreeing for an interview, the political perspective was largely missing, leaving interrelation analyses focusing mainly on journalists, pet employees, and biologists. Also, while still offering a foundation, the focus on only four publications and their sources is not necessarily indicative of all journalists, media outlets, mediums, or the media in general. Also, the content analysis focused only on those four newspapers while the interview responses most often addressed the media as a collective entity, presenting possible disconnects between the two sections' findings. Also, only *New York Times* archives were available from as far back as 1979, when the first Everglades python was discovered, so while extremely unlikely, wild Burmese pythons could have been featured in articles prior to the archival start dates of the other three publications. Also, while anonymity was a condition guaranteed to all interviewed stakeholders upfront and

resulted in much material that wouldn't have otherwise been disclosed, such namelessness could be perceived as weakening the credibility of the speakers and their responses. Further, any of the preceding recommendations could be applicable to a multitude of scenarios but should be approached with caution, as very few processes are met with universal success, especially in the fields of science and scientific reporting. Finally, the nature of this study, as is the case in much research, is inherently subjective.

CHAPTER 6
CONCLUSION

It is obvious that the media coverage of the Burmese pythons has positively affected the situation through increased awareness and resulting steps toward corrective action. While perhaps sometimes too liberally associating the wild population with an unjustified danger to humans, reporters have consistently revealed that the snakes are indeed negatively impacting Florida's wildlife and ecosystems. The impacts to specific species of wildlife, especially the American alligator and certain mammals, are often present, helping readers more clearly picture the impacts by associating the face of specific animals with the python problem. By covering a diversity of often-ineffective methods for eradication, the media has also shown that a long-term, widespread solution doesn't exist—further emphasizing the need for preemptive guards against invaders instead of reactive stabs in the dark.

The media does need improvement, though, in terms of both accuracy and completeness. More reporters should give consideration to including the potential spread beyond Florida's borders as background information in news articles. This theory, mentioned quite rarely across the articles analyzed, comes from a published, in-depth academic study, and if it holds true, it would carry the pythons' impacts across the United States. In that same boilerplate, they should consider leaving out the pet-owner and Hurricane Andrew theories on establishment, instead going back to the root cause, pet owners, if they so choose, but more importantly, looking instead toward the future of the pythons and invasive species overall, as those are what matter now. Unless a more precise, scientific way of counting comes along, publications should also exclude population estimates, and they should ensure and re-ensure that all facts are scientific, carefully worded, and up to date. This need arises from such findings as the use of an outdated press

release, theorizing that "hurricanes" plural released captive pythons into the wild, and saying the pythons have killed panthers in spite of there being no documented case.

By making such proactive steps in providing more precise reporting, tensions among journalists and other stakeholder groups stand to be mended, and better working relationships toward common goals would be fostered. This also applies to the media's sources, who should be understanding of what are probably most often accidental errors and are best remedied through collaboration instead of excommunication and discrediting. Only in this collaboration among stakeholders with various skills and influence can the python and invasive-species issues be sufficiently addressed.

The possibilities for moving research forward on the crossroads between invasive species and the media are numerous. To build a deeper consensus on the framing of the python coverage, research could explore TV, radio, Web, and magazine coverage. Studies could also examine other species that have received a great deal of attention and look for themes similar to those found with the python to see if trends in such coverage have developed: For example, are there debates on establishment, like in the case pet owners and Hurricane Andrew, or is this something unique to the Burmese python? Oppositely, lesser-covered invasive species—perhaps insects, fish, and especially plants—could also be examined for such trends but might also draw less criticism because the coverage is more infrequent and specialized. More opportunities to study the intersection of media and invasive species are likely to arise as long as the U.S. holds to the dirty-list approach, allowing most any live organism into the country. So long-term research could track media reports from the very beginning of a new invader to see how framing develops over time. In terms of more effective caretaking of invasive species, research could explore news coverage on the issue in New Zealand, known for its ability to keep invaders out. The most

effective timeframe there might be around when the country first adopted its clean-list approach, perhaps to see how such regulations were pushed into law and if the media and its sources played a role in the passage.

Constructing more research on the central issues explored in this study will increase in importance as invasive species, in the United States and globally, only worsen in number, environmental damage, and economic harm. There is a need for such research so journalists can be encouraged to improve their coverage for layperson understanding and societal pressure to action; for biologists and other non-political stakeholders to widely and accurately distribute their findings and theories through the media while maintaining working relationships with reporters; and for legislators to be confronted with a public that has a thorough understanding and uses it in their political compliments, criticisms, and voting. All of this starts with individual journalists taking the time to meticulously articulate exhaustive truth in their scientific reporting.

APPENDIX A
QUESTION GUIDE: BIOLOGISTS

What is your title(s)?

What specific field(s) of scientific work are you involved in?

How long have you been involved in that field(s)?

Talk to me about your work with Burmese pythons, and specifically, the invasive population in Florida.

Talk to me about the media coverage of the pythons.

Talk to me about your impressions of the newspaper coverage of the pythons.

Talk to me about coverage specifically on scientific work on the pythons?

Has or does the media coverage affect your research on the pythons?
    Tell me a little bit more about that.

Have you ever been interviewed by the media about the pythons?
    If so, what type of media (print or another type)?
    Talk to me about the type of questions asked.
    Talk to me about the resulting coverage.
    Has any of this affected how you work with the media?

APPENDIX B
QUESTION GUIDE: JOURNALISTS/MEDIA REPRESENTATIVES

What is your title(s)?

Talk to me about your job as it relates to the environment or science.

Talk to me about of the media coverage in general of science and the environment.

Talk to me about how your coverage of the environment and science compare to other beats at your publication.

What are your impressions with just print media's coverage of science and the environment?

Do you work/have you ever worked specifically on Burmese pythons?
If so, talk to me about that work.

Talk to me about the overall newspaper coverage of the pythons.

How about media coverage in general?

Talk to me about your own publication's coverage of the pythons.

What have been your publication's experiences in gathering information and deciding on how to approach reporting on the pythons?

Have you ever received any feedback from anyone after a report on the pythons was published?
Who did the feedback come from?
What did the feedback say?

APPENDIX C
QUESTION GUIDE: PET INDUSTRY

What is your title(s)?

Talk to me about your job as it relates to animals.

Do you work specifically with Burmese pythons?
    If so, tell me about that work.

Talk to me about the media coverage of the pythons.

Specifically, talk to me about the newspaper coverage of the pythons?

Talk to me about the coverage of the pet industry within stories on the pythons.

Did or does the media coverage affect your work with the pythons or business overall?
    Talk to me more about that.

Have you ever been interviewed by the media about the pythons?
    If so, what type of media (print or another type)?
    Talk to me about the type of questions asked.
    Talk to me about the resulting coverage.
    Has any of this affected how you now work with the media? How so?

APPENDIX D
QUESTION GUIDE: POLITICIANS

What is your title(s)?

Talk to me about your environmental work or legislation in Florida.

Talk to me about such work as it pertains specifically to the invasive population of Burmese pythons.

What has the local, state or federal government done in relation to the pythons?

Talk to me about the media coverage of the pythons.

Specifically, talk to me about the newspaper coverage of the pythons.

What about coverage specifically on legislation on the pythons?

Talk to me about how the media coverage has affected your work with the pythons, if at all.

Have you ever been interviewed by the media about the pythons?

- If so, what type of media (print or another type)?
- Talk to me about the type of questions asked.
- Talk to me about the resulting coverage.
- Talk to me about how all this has affected how you now work with the media?

APPENDIX E
SOURCE GUIDE

Pet Employees
Pet Employee A: male, lead position in a reptile-industry trade group
Pet Employee B: male, Florida reptile breeder
Pet Employee C: male, Florida reptile breeder
Pet Employee D: male, Florida reptile breeder

Journalists
Journalist A: male, former* general-assignment reporter for Florida newspaper
Journalist B: male, general-assignment reporter for Florida newspaper
Journalist C: male, environmental/science reporter for Florida newspaper
Journalist D: male, general-assignment reporter for Florida newspaper
Journalist E: male, environmental/science reporter for Florida newspaper

Biologists**
Biologist A: male, former* lead position with state conservation agency
Biologist B: male, lead position with state government conservation agency
Biologist C: male, former* lead position with federal government conservation agency
Biologist D: male, biologist for federal government conservation agency
Biologist E: male, former* leader for state government conservation agency
Biologist F: female, lead position for state government conservation agency
Biologist G: male, biologist associated with university
Biologist H: male, former* biologist for federal government conservation agency
Biologist I: female, biologist for federal government conservation agency
Biologist J: male, biologist associated with university

Legislators
Legislator A: female, elected legislator in state government

*Former could mean retired, moved away from Florida but stayed within same organization, or took a job elsewhere with a new organization.

**The "leader" and "biologist" distinction in the biologist category doesn't necessarily mean a leader wasn't biologist; it's just whichever fit more based on her or his official title.

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BIOGRAPHICAL SKETCH

Michael Stone completed this thesis as part of his graduate curriculum in the University of Florida's Health/Science Communication program with the College of Journalism and Communications. There, he also taught undergraduate students majoring in journalism and public relations. His academic and professional background includes Web media, newspapers, and wildlife, and this thesis represents an intersection of, and attempt to bridge, those interests.