

Public Comments Processing  
Attn: Docket No. FWS-R9-FHC-2008-0015  
Division of Policy and Directives Management  
U.S. Fish and Wildlife Service  
4401 North Fairfax Drive, Suite 222  
Arlington, VA 22203

**RE: Proposed Rule, FR Docket No. FWS-R9-FHC-2008-0015**

To Whom It May Concern:

On behalf of the Florida Chapter of The Nature Conservancy (TNC), I am providing comments for the Proposed Rule (FR Docket No. FWS-R9-FHC-2008-0015) pertaining to the addition of Indian python (*Python molurus*, including Burmese python *Python molurus bivittatus*), reticulated python (*Broghammerus reticulatus* or *Python reticulatus*), Northern African python (*Python sebae*), Southern African python (*Python natalensis*), boa constrictor (*Boa constrictor*), yellow anaconda (*Eunectes notaeus*), DeSchauensee's anaconda (*Eunectes deschauenseei*), green anaconda (*Eunectes murinus*), and Beni anaconda (*Eunectes beniensis*) to the list of injurious wildlife under the Lacey Act (18 U.S.C. 42).

The Nature Conservancy owns and manages more than 60,000 acres of conservation lands in Florida. We have been involved in the purchase and protection of millions more. Our Mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. We do this not only through purchase, but also by using a data-based conservation planning approach to assess the threats to native habitats and determining what needs to be done to reduce the threats. One of the largest threats to our conservation lands and waters in Florida and globally are invasive non-native species. Studies have shown that invasive species are threatening the persistence of almost 50% of 1,880 federally listed threatened and endangered species (Wilcove et al 1998). In Florida, this threat is magnified due to our productive climate and major ports of entry. Florida has over 130 non-native plants that are considered to be invasives and harmful to our conservation lands. There are also over 400 exotic wildlife species in Florida, 125 of which are established and "not likely to go away." Included in these are 3 of the species being considered under this legislation, the Burmese python, the boa constrictor and the Northern African python.

The United States needs comprehensive legislation addressing all taxa of wildlife, focused on preventing new invasions as well as addressing established invaders. By this, we mean the restriction of importation and sale of non-native wildlife species that are either not present in the wild or are newly found in the wild and are predicted to be harmful as well as those species that are established invaders that are already causing harm. This is important not only for preventing a new species from being imported, but also to reduce the "propagule pressure" of those newly established and established species. We should be using the best available science for risk assessment and adopt a pre-import screening tool prior to allowing importation of non-native wildlife into the United States. Prevention is the least expensive and most effective way to promote native wildlife conservation and to avoid long-term management responsibilities.

Under consideration in this Federal Register is the listing of 9 large constrictor species as federal injurious species under the Lacey Act. The Nature Conservancy supports the listing of all 9 large constrictor species assessed by the U.S. Geological Survey in the report, "Giant Constrictors: Biological and Management Profiles and an Establishment Risk Assessment for Nine Large Species of Pythons, Anacondas, and the Boa Constrictor," dated 2009 (Reed and Rodda, 2009). This comprehensive scientific risk assessment reviewed nine species of large constrictor snakes and found that all nine pose high or medium risk to our environment. Three of these species, the Burmese and North African pythons and the boa constrictor are already present in conservation lands in Florida. The harm caused by the Burmese python to the native wildlife of Florida is well documented and includes predation on state-listed wading birds, the federally-endangered Key Largo wood rat as well as more common species from round-tailed muskrats to small bobcats.

The South Florida Water Management District petitioned the U.S Fish and Wildlife Service to include the Burmese python as an injurious wildlife species under the Lacey Act (18 U.S.C. 42) in June 2006. The Nature Conservancy has written letters to support this petition as well. To date, the Service has not made a determination for listing this species. This delay in listing is not unique to the Burmese python. In October of 2007, the black carp was designated as injurious by the Service, seven years after the original petition. During that time, the black carp spread to Arkansas, Illinois, Mississippi and Missouri, harming both native fish and mussel populations. This delay in regulatory action highlights not only the current need to expedite the overall listing process for the Burmese python and the other 8 large constrictor species in the USGS report, but it also demonstrates the need for an overall revision to the Lacey Act and the process for listing species as injurious.

It is important to recognize that the threat posed by these large constrictors is not restricted to Florida alone. The Burmese python also threatens other Gulf coastal states and island states. To quote Lodge et al 2006 (emphasis mine),

“Invasive species do not respect political boundaries. In a country as large and ecologically diverse as the United States, an ecosystem likely exists that would be suitable for growth and reproduction for species from most other parts of the world. Furthermore legal tools and practical methods to prevent the transport of a species introduced into one state to another state are rare and many that do exist are rarely used. Entry requirements into the United States should therefore be stringent and rigorously enforced. **Species should be allowed entry only if no U.S. Ecosystem exists where the species poses a high risk.**”

Thank you for the opportunity to comment.

Sincerely,



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Invasive Species Program Manager  
The Nature Conservancy, Florida Chapter

**Specific Comments (in Response to Questions):**

**(1) What regulations does your State have pertaining to the use, transport, or production of any of the nine constrictor snakes? What are relevant Federal, State, or local rules that may duplicate, overlap, or conflict with the proposed rule?**

Currently, 5 species of large constrictors are listed as Reptiles of Concern (ROC) under the Captive Wildlife rules of the Florida Fish and Wildlife Conservation Commission (FFWCC) (68A-6.007 F.A.C.). This designation restricts personal possession to those people who have applied and received a permit. The permit has an annual fee of \$100 and covers proper handling and biosecurity for ownership. The species of relevance listed as Reptiles of Concern are: Indian or Burmese python (*Python molurus*), Reticulated python (*Python reticulatus*), African rock python (*Python sebae*), Amethystine or Scrub python (*Morelia amethystinus*) and Green anaconda (*Eunectes murinus*).

Recent draft Florida rulemaking would expand this list to 9 species of large constrictors (based on clarification of species), and would reclassify all under the Conditional Species designation (68-5.002, F.A.C.). The species clarification in this Florida rulemaking would essentially add 4 additional constrictor species. Per staff FFWCC staff notes during the April 28, 2010 Commission Meeting: African Rock pythons are now considered two species, Northern African python (*Python sebae*) and Southern African python (*Python natalensis*). These are closely related and similar in size and habits. The Amethystine pythons from Australia and New Guinea have three species that routinely exceed 12 feet as adults, and this group has recently been split: Amethystine python (*Morelia amethystinus*), scrub python (*Morelia kinghorni*), and black python (*Morelia boeleni*).

The draft rulemaking introduced would prohibit personal possession but would still allow commercial breeding for export out of state only. These are good rules and a great first step for restricting possession of those species that threaten Florida's habitats and wildlife. However it is theorized by the FFWCC and the reptile industry that one of the massive introductions for Burmese pythons in an area adjacent to Everglades National Park (ENP) was from a nearby breeding facility during Hurricane Andrew. This release, as well as multiple additional single animal releases into and adjacent to ENP has resulted in our current infestation. This demonstrates that restricting personal possession alone may not sufficiently mitigate the threat of these animals.

It is important to note that 4 of the species being considered under this Federal Register are not currently (nor in the draft rulemaking) listed as Reptiles of Concern by FFWCC. These species are: boa constrictor (*Boa constrictor*), yellow anaconda (*Eunectes notaeus*), DeSchauensee's anaconda (*Eunectes deschauenseei*), and Beni anaconda (*Eunectes beniensis*).

**(2) How many of the nine constrictor snakes species are currently in production for wholesale or retail sale, and in how many and which States?**

**(3) How many businesses sell one or more of the nine constrictor snake species?**

**(4) How many businesses breed one or more of the nine constrictor snake species?**

**(5) What are the annual sales for each of the nine constrictor snake species?**

The specific numbers to questions 2-5 above are unknown to this commenter.

**(6) How many, if any, of the nine constrictor snake species are permitted within each State?**

According to staff presentation at the December 9-10, 2009 FFWCC meeting, there are currently 387 ROC licensees (as of December 10, 2010). Agenda and presentation of this meeting can be found at

[http://myfwc.com/COMMISSION/2009/Comm\\_09\\_AgendaDec.htm](http://myfwc.com/COMMISSION/2009/Comm_09_AgendaDec.htm)). Please note that this references individual permits, not the number of snakes held by the permittee. The permits range from individual owners to commercial breeders. Of relevance, the ROC species that are also being considered under this request are Indian or Burmese python (*Python molurus*), Reticulated python (*Python reticulatus*), African rock python (*Python sebae*), Amethystine or Scrub python (*Morelia amethystinus*) and Green anaconda (*Eunectes murinus*).

**(7) What would it cost to eradicate individuals or populations of the nine constrictor snakes, or similar species, if found? What methods are effective?**

Local efforts to eradicate Burmese pythons in the Florida Keys have a high likelihood of success. Eradication on the Florida mainland is unlikely; however, placing the Burmese python on the federal injurious species list would be significant in the sense of a reduction of propagule pressure. Burmese pythons are reproducing outside of captivity and their range is expanding in Florida. It is estimated that there are 30,000 to 100,000 individuals in the wild. However, the continued release of new snakes into the population further exasperates the problem.

According to the "Annual Tally of Burmese Pythons Removed In and Around Everglades National Park by Authorized Agents, Park Staff, and Park Partners," 1,334 pythons were removed between the years 2000 and 2009 (ENP, 2010). As of March 21, 2010, an additional 321 Burmese pythons have been removed.

There has not been a significantly funded eradication effort for the Burmese python in Florida. An effective mean or means of control has not been found. Available tools for removing reptiles generally include trapping, toxicants, barriers, dogs, and introduced predators. Visual searching and pheromone attractants are also potential control tools. However, many existing methods are often inappropriate in sensitive environments where impacts to non-target species are unacceptable. Currently, inter-agency python control efforts in and around the Everglades region are limited to visual searches, hunting, radio-telemetry and trapping. Initial funding estimates for trap development, population assessments, public relations campaign and creations of regional rapid response team range from \$1 to \$2 million. It is important to note that this is not a comprehensive cost, just the cost of initial development of control tools, monitoring and response.

Hunting has recently been allowed on all Wildlife Management Areas in Florida. Hunting will be one tool in the tool box, but will not be sufficient to reduce the numbers of pythons in the wild. The effectiveness of visual search for this species is limited and experts believe that it will not result in eradication. The effectiveness of hunting to even locally suppress the species is currently unknown. Pythons are cryptic and invade largely inaccessible habitats. They have a broad dietary and habitat diversity, the ability to consume large prey, are long lived in nature, have a rapid rate of growth (40mm/month) and have a high reproductive output (up to 100 eggs in a single clutch) (Krysko et al, 2008). This high reproductive rate has been confirmed in wild caught Burmese pythons from Everglades National Park. They are difficult to locate and remove from natural areas. They have been confirmed breeding in three southern Florida counties and there have been documented recoveries from as far north as Okeechobee and St. Lucie counties. Model predictions recently published by USGS show potential range to be most of the southern 1/3 of the United States (Rodda et al, 2008).

A program is needed with dedicated, sufficient funding to address the numbers of pythons in the wild. The objectives of this program would be to: 1) reduce python numbers in the area where they are already widespread – the southern Everglades south of Lake Okeechobee - to a point where we are minimizing harm to native species; 2) stop their movement out of the infested area. This would be through trained observers and FFWCC and/or other agency personnel that are qualified and trained to respond to reports of outlier animals; and 3) continue to strengthen interagency

cooperation towards this effort. A comprehensive program such as this is necessary to reduce the risk Burmese pythons pose to native habitats and wildlife.

The other two constrictors that are currently found in the wild in southern Florida, the Northern African rock python and the boa constrictor, are thought to have smaller populations, distributed in a smaller geographic range. Eradication of these populations is more likely than for Burmese pythons and would be less expensive. However, the tools to eradicate these 2 species have also not been developed.

**(8) What are the costs of implementing propagation, recovery, and restoration programs for native species that are affected by the nine constrictor snake species, or similar species?**

It is difficult to place a value on natural resources. Through endangered species recovery plans, we know that it is extremely expensive to protect a species once it has become threatened. Far cheaper, is to reduce threats to common species and natural habitats. Invasive species are one of the greatest threats to biodiversity around the world, and are the second-greatest threat to listed threatened and endangered species in the United States (Wilcove et al 1998). Preventing invasive species is the best way to protect native biodiversity and also the most cost effective option.

In 2003, the USFWS published the “Three-Year Summary of Federal and State Endangered and Threatened Species Expenditures” for fiscal years 1998-2000 (<http://www.fws.gov/endangered/expenditures/19982000.html>). This report estimated expenditures on endangered species protection for fiscal year 2000 alone as \$610.3 million. Many experts agree that this cost is actually significantly lower than the true cost of protecting threatened species in the U.S. In 1998, researchers estimated that the cost of managing currently occupied habitats of U.S. endangered species by looking at just 2 of the many threats faced by endangered species, threats by invasive, non-native species or disruption of fire regimes. Their totals for management based on these 2 threats ranged between at least \$32-42 million per year (Wilcove and Chen 1998).

In a letter to Congressional Requesters, dated April 6, 2006, the US Government Accountability Office gave a median cost estimate of \$1.4 million to recover one endangered species (GAO, 2006).

“Twenty of the 107 plans include cost estimates. These plans have an average cost estimate for recovery of \$15.9 million and a median cost estimate of \$1.4 million. The highest estimate is \$125 million to recover the Whooping crane and the lowest is \$58,000 to recover the Decurrent false aster—a flowering plant in Illinois and Missouri. While both FWS and NMFS guidance documents discuss including overall time and cost estimates for achieving recovery in recovery plans, we found that most plans only included time and costs estimates for implementing recovery actions for just a 5- to 7-year period.”

The current concern is not only the wildlife species that are already listed as endangered or threatened, but also the populations of more common species whose numbers may decline in direct response to predation and disturbance as a result of the current Burmese python invasion or other non-native constrictors becoming established.

**(9) What State threatened or endangered species would be impacted by the introduction of any of the nine constrictor snake species?**

Given the generalist nature of the Burmese python, along with documented consumption of large prey and wading birds, many State-listed species could be impacted. The USGS report lists a total of 64 State-listed threatened or endangered species at risk from “*P. molurus* or other giant constrictors in Florida” (Reed and Rodda 2009).

To date, stomach contents have already shown predation on 2 endangered species - Key Largo woodrat (*Neotoma floridana smalli*) and wood stork (*Mycteria americana*), 1 threatened species – mangrove fox squirrel (*Sciurus niger avicennia*), and 4 species of special concern - limpkin (*Aramus guarauna*), little blue heron (*Egretta caerulea*), snow egret (*Egretta thula*) and white ibis (*Eudocimus albus*) (Greene et al 2007; Heacker, 2010). To date, a total of 5 Key Largo woodrats deaths can be attributed to ingestion by Burmese pythons (Greene et al 2007; Snow, 2010). The total population size of Key Largo woodrats in the wild is estimated to be less than 200 individuals and its distribution is limited to northern Key Largo, Florida. If the USFWS population estimates are correct, even these 5 individuals represent a few percent of the entire wild population.

**(10) What species have been impacted, and how, by any of the nine constrictor snake species?**

The USGS report (Reed and Rodda, 2009) lists imperiled wildlife just within the state of Florida that could conceivably be consumed by a Burmese Python, including federal, state, and Florida Natural Areas Inventory conservation designations. Of these, a number of them have already been consumed by pythons in Florida (see comment to Question 9 above for listed species), and evidence thus far suggests that pythons will eat just about any bird or mammal (or crocodylian) of a suitable size that they encounter. Recent congressional testimony reported on declines in marsh rabbit abundance and round-tailed muskrats:

“In Everglades National Park the presence of pythons has been related to the absence of marsh rabbits and Florida muskrats. We are very concerned about impacts of pythons on Everglades fauna, and the difficulties involved in removing a large cryptic predator from a large expansive wetland wilderness area” (Mazzotti, 2010).

An earlier publication lists the following prey species found in the digestive tracts of Burmese pythons collected and examined in Florida (Snow et al. 2007).

Mammals

Rabbit (*Sylvilagus sp.*)  
Hispid cotton rat (*Sigmodon hispidus*)  
Cotton mouse (*Peromyscus gossypinus*)  
Gray squirrel (*Sciurus carolinensis*)  
Fox squirrel (*Sciurus niger*)  
Domestic cat (*Felis catus*)  
Raccoon (*Procyon lotor*)  
Old world rats (*Rattus sp.*)  
Virginia opossum (*Didelphis virginiana*)  
Bobcat (*Felis rufus*)  
Round-tailed muskrat (*Neofiber alleni*)  
Rice rat (*Oryzomys palustris*)

White-tailed deer (*Odocoileus virginianus*)  
Key Largo woodrat (*Neotoma floridana smalli*)

Birds

Pied-billed grebe (*Podilymbus podiceps*)  
Limpkin (*Aramus guarauna*)  
White ibis (*Eudocimus albus*)  
American coot (*Fulica americana*)  
House wren (*Troglodytes aedon*)

Reptiles

American alligator (*Alligator mississippiensis*)

**(11) What provisions in the proposed rule should the Service consider with regard to: (a) The impact of the provision(s) (including any benefits and costs), if any, and (b) what alternatives, if any, the Service should consider, as well as the costs and benefits of those alternatives, paying specific attention to the effect of the rule on small entities?**

There have been concerns raised about the repercussions of bans. Some feel that there may be a mass release of banned animals because people would be scared of the breaking the law, or that a ban would drive the trade underground and could possibly result in the mass euthanasia or release of banned reptiles. There is also a

concern in the State of Florida that if any of the species become listed as federal injurious species that permitted ROC amnesty holders would be less willing to take these animals because they would not be able to sell them later.

There are actions that could be taken to address the concerns noted above. Grandfathering is important; equally important is good communication on the rules and how they affect personal possession and grandfathering provisions. However, we are not talking about a large percentage of species that are available to the reptile industry. The Broken Screens report documented that from 2000-2004, at least 710 different fully-identified species of reptiles were imported. At a minimum, 47 additional reptile species were imported during that period without full species identification. In sum, at least 757 reptile species were in trade. With reference to this request, reptile importers and breeders face losing nine species, six of which were in trade during 2000-2004. This represents less than 1% of the total number imported reptiles. Restricting trade in these expensive 'bad actors' would not restrict trade in the vast majority of non-native species. The only way to effectively and economically address our current situation and to protect Florida's, and the U.S., native plants, animals, lands and waters is to practice prevention with regards to importation of non-native wildlife. There needs to be acceptance that certain species of non-native reptiles pose an unacceptable risk to the environment and should not be allowed for possession. The species proposed in this discussion are not the only reptiles that may pose a risk. Moving towards addressing this with reptiles that pose a threat to native habitats and wildlife through legislation/rulemaking that allows for proactive screening would be ideal.

**(12) How could the proposed rule be modified to reduce any costs or burdens for small entities consistent with the Service's requirements?**

Please see comments above regarding grandfathering. Additional modifications are unknown to this commenter.

**(13) Why we should or should not include hybrids of the nine constrictor species analyzed in this rule, and if the hybrids possess the same biological characteristics as the parent species.**

Some of the species under consideration are known to produce hybrids in captivity. It is likely that the average interspecific hybrid has reduced fitness in some way, based on what's known from captivity. There are many examples from the herpetoculture world of breeders who are producing novel hybrids - some sample websites are listed below. Among these, the 'highendherps' site has a link to a lengthy page on their very successful Burmese/Northern African python hybrids, wherein they discuss the wide range of phenotypes produced by these pairings, note that hybrids don't get as big as either parental species, and mention that hybrids might live just as long as parental species. Fertility of hybrids isn't mentioned, and appears to be largely unreported in the peer-reviewed literature. Most of the hybrids involve pythons, but there are also hybrid green x yellow anacondas and some hints of anaconda x boa constrictor. Note – this commenter recognizes that these hybrids are often a result of mating from some pairings that requires 'tricking' the male, often by rubbing a freshly-shed skin of a female of the 'right' species on the back of a female of the 'wrong' species. It is unknown if these species could reproduce in the wild without this human assistance.

Based on this information – it would be prudent to gather more information about these 9 species reproduction and cross-breeding without human involvement.

<http://www.highendherps.com> (see this link in particular for Burmese x African hybrids:  
[http://highendherps.com/wst\\_page13.html](http://highendherps.com/wst_page13.html))  
<http://bobclark.com/animals.asp> (see the Hybrids link - note that at least some hybrids are fertile, as they can be backcrossed with a parental species)  
<http://www.hybridhaven.net/viewforum.php?f=2> (online forum dedicated to hybrid pythons)  
<http://www.newenglandreptile.com/nerd/index.php/reticulated-pythons/bateater.html> (Burmese x reticulated produce 'Bateater pythons', which are fertile)  
[http://web.mac.com/anaconda\\_guy/iWeb/News/Hybrid%20Anaconda.html](http://web.mac.com/anaconda_guy/iWeb/News/Hybrid%20Anaconda.html)

Citations:

- Everglades National Park. 2010. <http://www.nps.gov/ever/naturescience/burmesepython.htm>; accessed May 11, 2010.
- GAO. 2006. U.S. Government Accountability Office. GAO-06-463R Endangered Species Recovery. [http://www.environmental-auditing.org/Portals/0/AuditFiles/us272eng06ar\\_ft\\_endangeredspecies.pdf](http://www.environmental-auditing.org/Portals/0/AuditFiles/us272eng06ar_ft_endangeredspecies.pdf); accessed May 11, 2010.
- Greene, D. U., J. M. Potts, J. G. Duquesnel, and R. W. Snow. 2007. *Python molurus bivittatus* (Burmese Python). USA: Florida. Herpetological Review 38:355.
- Heacker, M. 2010. Testimony of March Haecker, Smithsonian Institution, National Museum of Natural History, Feather Identification Lab before the House Subcommittee on National Parks, Forests and Public Lands and the Subcommittee on Insular Affairs, Oceans and Wildlife of the House Natural Resources Committee for the Joint Oversight hearing on "How to Manage Large Snakes and Other Invasive Species. March 23, 2010. [http://resourcescommittee.house.gov/images/Documents/20100323/testimony\\_heacker.pdf](http://resourcescommittee.house.gov/images/Documents/20100323/testimony_heacker.pdf)
- Jenkins, P. 2007. Broken Screens: The Regulation of Live Animal Imports in the United States. [http://www.defenders.org/programs\\_and\\_policy/international\\_conservation/u.s\\_imports\\_of\\_live\\_animals/broken\\_screens.php](http://www.defenders.org/programs_and_policy/international_conservation/u.s_imports_of_live_animals/broken_screens.php)
- Krysko, K.L., Nifong, J.C., Snow, R.W., and Enge, K.M. 2008. Reproduction of the Burmese Python (*Python molurus bivittatus*) (Burmese Python) in southern Florida. Applied Herpetology.
- Lodge, D.M., S. Williams, H. MacIsaac, K. Hayes, B. Leung, L. Loope, S. Reichard, R.N. Mack, P.B. Moyle, M. Smith, D.A. Andow, J.T. Carlton, and A. McMichael. 2006. Biological invasions: recommendations for policy and management [Position Paper for the Ecological Society of America]. Ecological Applications 16:2035-2054.
- Mazzotti, F.J. 2010. Testimony to Subcommittee on National Parks, Forests and Public Lands and the Subcommittee on Insular Affairs, Oceans and Wildlife of the House Natural Resources Committee joint oversight hearing on How to Constrict Snakes and Other Invasive Species. March 23, 2010. [http://resourcescommittee.house.gov/images/Documents/20100323/testimony\\_mazzotti.pdf](http://resourcescommittee.house.gov/images/Documents/20100323/testimony_mazzotti.pdf)
- Reed, R.N., and Rodda, G.H. 2009. Giant constrictors: Biological and management profiles and an establishment risk assessment for nine large species of pythons, anacondas, and the boa constrictor: U.S. Geological Survey Open-File Report 2009-1202, 302 p.
- Rodda, G.H., Jarnevich, C.S. and Reed, R.N. 2008. What parts of the US mainland are climatically suitable for invasive alien pythons spreading from Everglades National Park? Biological Invasions. Online.
- Simmons, R.T. and Frost, K. 2004. Accounting for Species, the True Costs of the Endangered Species Act. Property and Environment Research Center. Online.



- Snow, R. W., Brien, M. L., Cherkiss, M. S., Wilkins, L., and Mazzotti, F.J. 2007. Dietary habits of Burmese python, *Python molurus bivittatus*, from Everglades National Park, Florida. Herpetological Bulletin 101:5-7.
- Snow, R.W. Everglades National Park. Personal communication May 2010.
- Wilcove, D.S., Rothstein, D., Dubow, J., Phillips, A. and Losos E. 1998. Quantifying Threats to Imperiled Species in the United States. BioScience.
- Wilcove, D.S. and Chen, L.Y. 1998. Management Costs for Endangered Species. Conservation Biology.