Final Environmental Assessment For Listing Large Constrictor Snakes As Injurious Wildlife under the Lacey Act

Reticulated Python *(Python reticulatus)*, DeSchauensee's Anaconda *(Eunectes deschauenseei)*, Green Anaconda *(Eunectes murinus)*, and Beni Anaconda *(Eunectes beniensis)*

Prepared by:

U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

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Abstract

This document contains a Final Environmental Assessment (EA), which examines the potential environmental impacts of the Proposed Action to list as injurious five large constrictor snake species: reticulated python (*Python reticulatus)*, boa constrictor (*Boa constrictor*), DeSchauensee's anaconda (*Eunectes deschauenseei*), *g*reen anaconda (*Eunectes murinus*), and Beni anaconda (*Eunectes beniensis*). The draft environmental assessment was released to the public for review and comment on March 12, 2010, based on the nine species proposed for listing. All public comments received regarding the draft environmental assessment are presented in the Appendix of this document, along with the U.S. Fish and Wildlife Service's written response to each comment.

The alternatives we considered are based on the proposed rule to list nine species of large constrictor snakes as injurious (75 FR 11808; March 12, 2010), as well as peer review of the proposed rule and information and comments received from the public during the public comment periods. On January 23, 2012, we published a final rule to list four [Burmese python (*Python molurus*), Northern African python (*Python sebae*), Southern African python (*Python natalensis*), and yellow anaconda (*Eunectes notaeus*)] of the nine proposed species, leaving five still under consideration (77 FR 3330). We are now finalizing the listing as injurious of another subset of the proposed species (four more species). This means that there is a second final rule and thus a second final economic analysis. We have noted in the following alternatives, similar to those used in the 2012 final environmental assessment (Final Environmental Assessment; U.S. Fish and Wildlife Service 2012), that four species were listed in 2012.

In this environmental assessment, we considered four alternatives: (1) no action; (2A) list as injurious five large constrictor snake species: reticulated python, boa constrictor, DeSchauensee's anaconda, *g*reen anaconda, and Beni anaconda; (2B) list as injurious four large constrictor snake species: reticulated python, *g*reen anaconda, DeSchauensee's anaconda, and Beni anaconda; (3) list as injurious three large constrictor snake species: reticulated python, green anaconda, and boa constrictor; and (4) list as injurious one large constrictor snake (boa constrictor). Two alternatives considered (instead of adding nine or a subset of the nine large constrictor snakes) but dismissed from further analysis were a Federal permitting system (such as a private hobbyist permit system) and State and territorial (States) legislative initiatives (such as a State permitting program). These alternatives were dismissed from further consideration in the draft EA, the first because it was not feasible and not within the authorities of the injurious wildlife provisions of the Lacey Act or the U.S Fish and Wildlife Service (Service) and the second because it was not considered practical or feasible as presented. However, the second dismissed alternative has been reconsidered since issuance of the draft EA, and due to the unique domestic situation for the boa constrictor and the expressed interest by the Association of Fish and Wildlife Agencies (AFWA) and the Pet Industry Joint Advisory Council (PIJAC) in developing effective State and industry controls, a similar alternative was found appropriate for the boa constrictor. As a result, the Service is withdrawing the proposal to list the boa constrictor as injurious under the Lacey Act, which means that the Service is taking no action for this species.

This listing action is being implemented to protect native wildlife species, including threatened and endangered species, and to prevent harmful unalterable effects to natural ecosystem structure and function. This action seeks to reduce negative impacts of the nonnative large constrictor snakes by listing them as injurious and to prevent their importation and interstate movement which could result in further releases. In addition, consideration is being given to protection of human health and safety as well as preventing economic losses. The Service is selecting the alternative that lists reticulated python, DeSchauensee's anaconda, green anaconda, and Beni anaconda (live specimens, gametes, viable eggs, or hybrids) as injurious under the Lacey Act (Alternative 2B as described in this document) because the Service is withdrawing the boa constrictor from consideration under the current proposed rule for the reasons explained in the final rule.

The Secretary of the Interior is authorized under the Lacey Act (18 U.S.C. § 42, as amended) to prescribe by regulation those wild mammals, wild birds, fish, mollusks, crustaceans, amphibians, reptiles, and the offspring or eggs of any of the aforementioned, that are injurious to human beings, to the interests of agriculture, horticulture, or forestry, or to the wildlife or wildlife resources of the United States. The lists of injurious wildlife are at 50 CFR 16.11-15.

With the listing of the four species of the large constrictor snakes as injurious, their importation into the United States, and transportation between, States, District of Columbia, Commonwealth of Puerto Rico, or any territory or possession of the United States (hereafter referred to as States) by any means whatsoever is prohibited, except by permit for zoological, educational, medical, or scientific purposes (in accordance with permit regulations at 50 CFR 16.22), or by Federal agencies without a permit solely for their own use, upon filing a written declaration with the District Director of Customs and the U.S. Fish and Wildlife Service Inspector at the port of entry. The interstate transportation of any of the four species of large constrictor snakes (live specimens), gametes, viable eggs, or hybrids currently held in the United States for any purposes not permitted would be prohibited. An injurious wildlife listing would not prohibit intrastate transport or possession of the large constrictor snakes within States, where possession is not currently prohibited by the State. Any regulation pertaining to the use of large constrictor snakes within States is the responsibility of each State.

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1) Purpose

The purpose of the action to list reticulated python, boa constrictor, DeSchauensee's anaconda, green anaconda, and Beni anaconda as injurious species under the Lacey Act is to prevent their importation and interstate transport, thereby preventing their introduction into ecosystems of the United States and the spread beyond their current locations.

This action is being implemented to protect native wildlife species, including threatened and endangered species, and prevent changes in natural ecosystem function from the potential negative impacts of the nonnative large constrictor snakes by listing them as injurious and preventing their importation and interstate transport. In addition, consideration is being given to protecting human health and safety as well as preventing economic losses. This listing will not prohibit intrastate transport or the current possession of large constrictor snakes within a State.

2) Need for the Action

The need to add nonnative large constrictor snakes to the list of injurious wildlife under the Lacey Act developed as a result of the concern with Burmese pythons having established a breeding population in Everglades National Park (ENP) in south Florida. Other large nonnative snakes—such as the boa constrictor, green anaconda, yellow anaconda, and reticulated python—have been observed alive or found dead in the wild in south Florida. Breeding populations have been confirmed for Burmese pythons and boa constrictors. Burmese pythons are established over thousands of acres of southern Florida. Boa constrictors have been established and breeding since approximately 1970 in the Charles Deering Estate at Cutler, southern Miami-Dade County. Boas have also been reported elsewhere in south Florida, but without evidence of breeding, and they are confirmed to be breeding in the wild in Puerto Rico. In 2009, evidence pointed to the presence of a breeding population of Northern African pythons along the western border of Miami adjacent to the Everglades. The Florida Fish and Wildlife Commission has collected no evidence of Northern African pythons breeding (hatched eggs or juvenile snakes less than 1 meter long) since 2009 but is continuing to proceed with high priority control efforts as if this population could be breeding (J. Eckles, pers. comm. 2014).

The Secretary of the Interior is authorized under the Lacey Act (18 U.S.C. § 42, as amended) to prescribe by regulation those wild mammals, wild birds, fish, mollusks, crustaceans, amphibians, reptiles, and the offspring or eggs of any of the aforementioned, that are injurious to human beings, to the interests of agriculture, horticulture, or forestry, or to the wildlife or wildlife resources of the United States. The lists of injurious wildlife are at 50 CFR 16.11-15.

If all five large constrictor snakes or a subset of these snakes are determined to be injurious and listed under the Lacey Act, then their importation into the United States, or transportation between, States, District of Columbia, Commonwealth of Puerto Rico, or any territory or possession of the United States by any means whatsoever would be prohibited, except by permit for zoological, educational, medical, or scientific purposes (in accordance with permit regulations at 50 CFR 16.22), or by Federal agencies without a permit solely for their own use, upon filing a written declaration with the District Director of Customs and U.S. Fish and Wildlife Service (Service)

Inspector at the port of entry. In addition, no live large constrictor snakes (live specimens), gametes, viable eggs, or hybrids imported or transported under permit could be sold, donated, traded, loaned, or transferred to any other person or institution unless such person or institution has a permit issued by the Service. The interstate transportation of any live large constrictor snakes, gametes, viable eggs, or hybrids currently held in the United States for any purposes would be prohibited. An injurious wildlife listing would not prohibit intrastate transport or possession of large constrictor snakes within States, where possession is not currently prohibited by the State. Any regulation pertaining to the use of large constrictor snakes within States is the responsibility of each State.

3) Decisions Needed

The Service is the lead agency under the Department of the Interior for evaluating the proposed action. The decision facing the Department is whether some or all of the five large constrictor snakes (live specimens), gametes, their viable eggs, or hybrids are an injurious species and whether they should be added to the list of injurious wildlife under the Lacey Act. The Department of the Interior's Assistant Secretary will select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this Environmental Assessment (EA) is adequate to support a Finding of No Significant Impact (FONSI) or whether an Environmental Impact Statement (EIS) is required.

4) Background

In June 2006, the Service received a petition from the South Florida Water Management District (District) requesting that Burmese pythons be considered for inclusion in the injurious wildlife regulations pursuant to the Lacey Act (18 U.S.C. 42). The District was concerned about the number of Burmese pythons found in Florida, particularly in ENP.

In aggregate, the trade in constrictor snakes is significant. From 2004 to 2013, more than1.3 million live constrictor snakes of the genera *Python, Boa, Eunectes, Morelia,* and other genera were imported into the United States (Table 1), including the ball python (*Python regius*; U.S. Fish and Wildlife Service 2015a), which is not being considered for this large constrictor snake injurious wildlife evaluation due to its smaller size. According to the Service's Law Enforcement Management Information System (LEMIS) data, 208,473 large constrictor snakes of the nine species that were being considered for listing or were listed in 2012 as injurious were imported into the United States from 2004 to 2013 (Figure 1). From 2004 to 2013, of the five species evaluated in this assessment, a total of 179,998 boa constrictors, reticulated pythons, and green anacondas (no Beni or DeSchauensee's anacondas) were imported into the United States. The majority of large constrictor snakes of the genera *Python, Boa,* and *Eunectes* were imported into the country at the ports of Miami, Los Angeles, and Dallas-Fort Worth (Figure 2).

The best documented case of an invasive constrictor snake species in Florida is that of the Burmese python. Burmese pythons were first reported as established in ENP by Meshaka *et al.* (2000), based in part on specimens collected on the ENP main road in the mid-1990s. Since then, the number of Burmese pythons captured or found dead in and around the ENP has

increased dramatically (Figure 3). Although the size of the wild population is not known, it has been estimated to number in the thousands (D. Hallac, pers. comm. 2009). Burmese pythons

Table 1. Total Live Constrictor Snake Imports: 2004 – 2013.

[**Bold** = The five species considered in this final rule]

Genus	Species	Total Imports
Python	regius	1,046,315
Boa	**constrictor**	153,397
Python	molurus[1]	23,926
Morelia	viridis	22,907
Python	**reticulatus**	21,087
Python	brongersmai	13,732
Python	curtus	8,542
Eunectes	**murinus**	5,504
Python	sebae[1]	4,334
Calabaria	reinhardtii	2,502
Leiopython	albertisii	2,177
Morelia	spilota	2,136
Morelia	amethistina	1,659
Python	breitensteini	667
Morelia	boeleni	358
Liasis	mackloti	259
Apodora	papuana	181
Python	species	100
Eunectes	species	100
Python	timoriensis	85
Liasis	fuscus	74
Aspidites	ramsayi	35
Loxocemus	bicolor	33
Eunectes	notaeus[1]	25
Antaresia	perthensis	21
Aspidites	melanocephalus	21
Antaresia	stimsoni	19
Morelia	bredli	11
Liasis	olivaceus	10
Morelia	carinatai	7
Antaresia	children	4
Liasis	cpecies	2
Antaresia	maculosa	1
Python	natalensis[1]	0
Eunectes	**deschauenseei**	0
Eunectes	**beniensis**	0
Total:		**1,310,231**

[1]Species listed as injurious in 2012, with imports prohibited as of March 23, 2012.
[Source: USFWS 2015b, LEMIS]

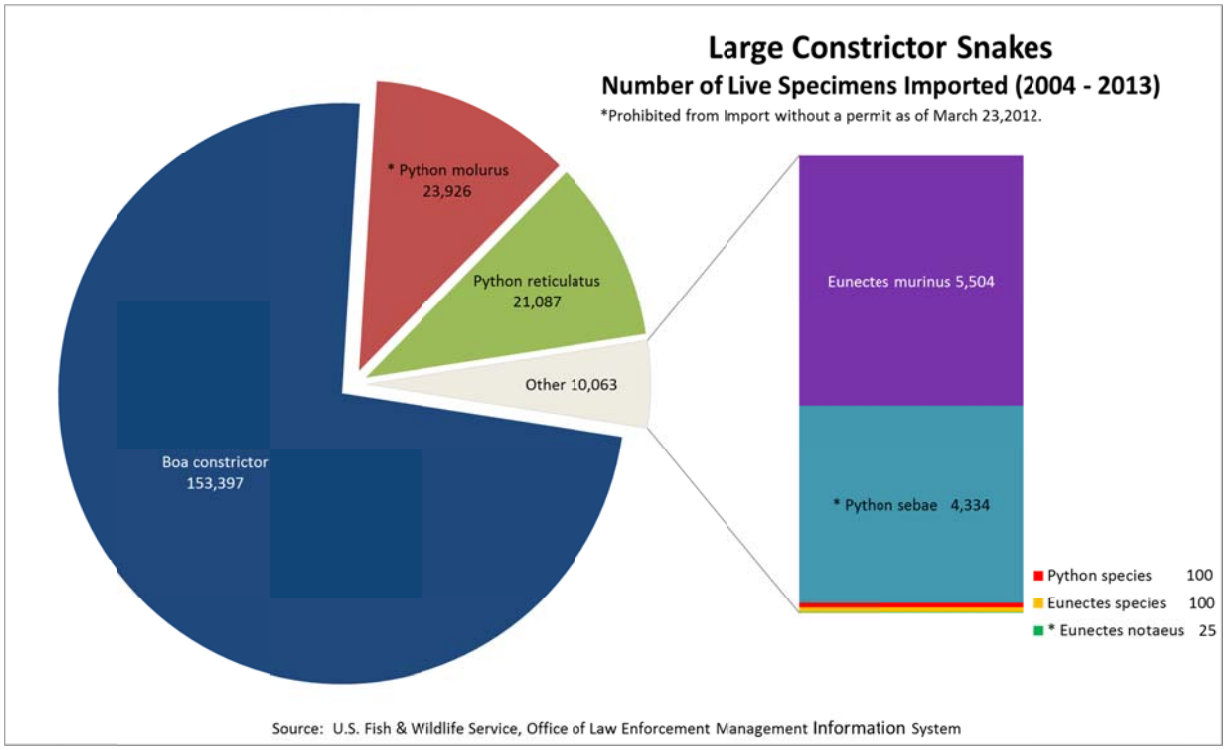


Figure 1. Large constrictor snakes (of the nine species proposed for listing in 2012) imported into the United States from 2004 to 2013.

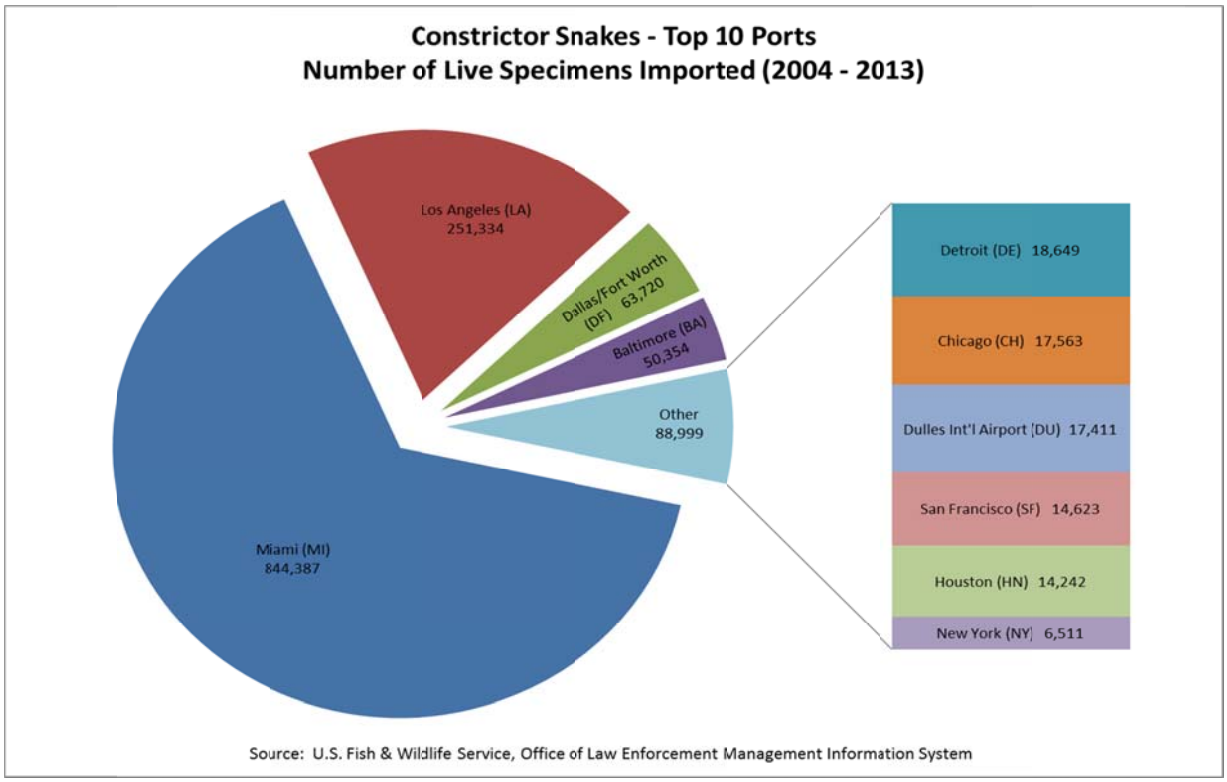


Figure 2. Top 10 ports of entry for constrictor snakes of all genera (*Boa*, *Python*, *Eunectes*, *Morelia*, *Liasis*, *Calabaria*, and others).

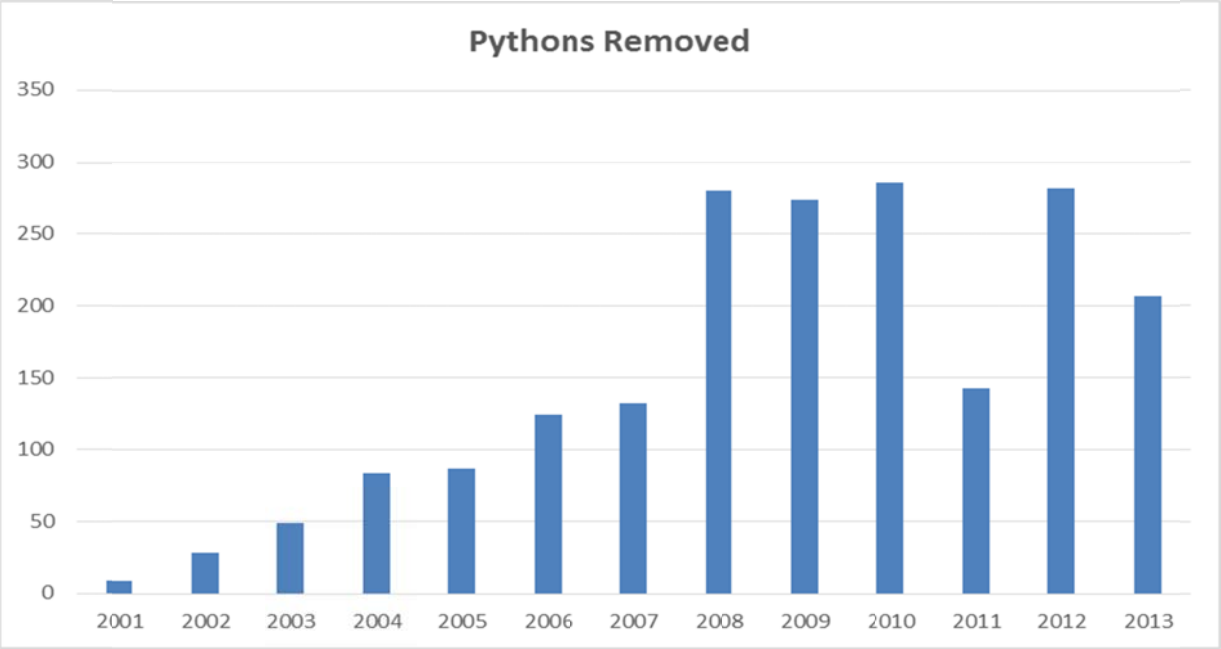


Figure 3. Annual number of Burmese pythons removed (captured or found dead) from the population in ENP and vicinity from 2001 to 2013 (U.S. National Park Service 2014)

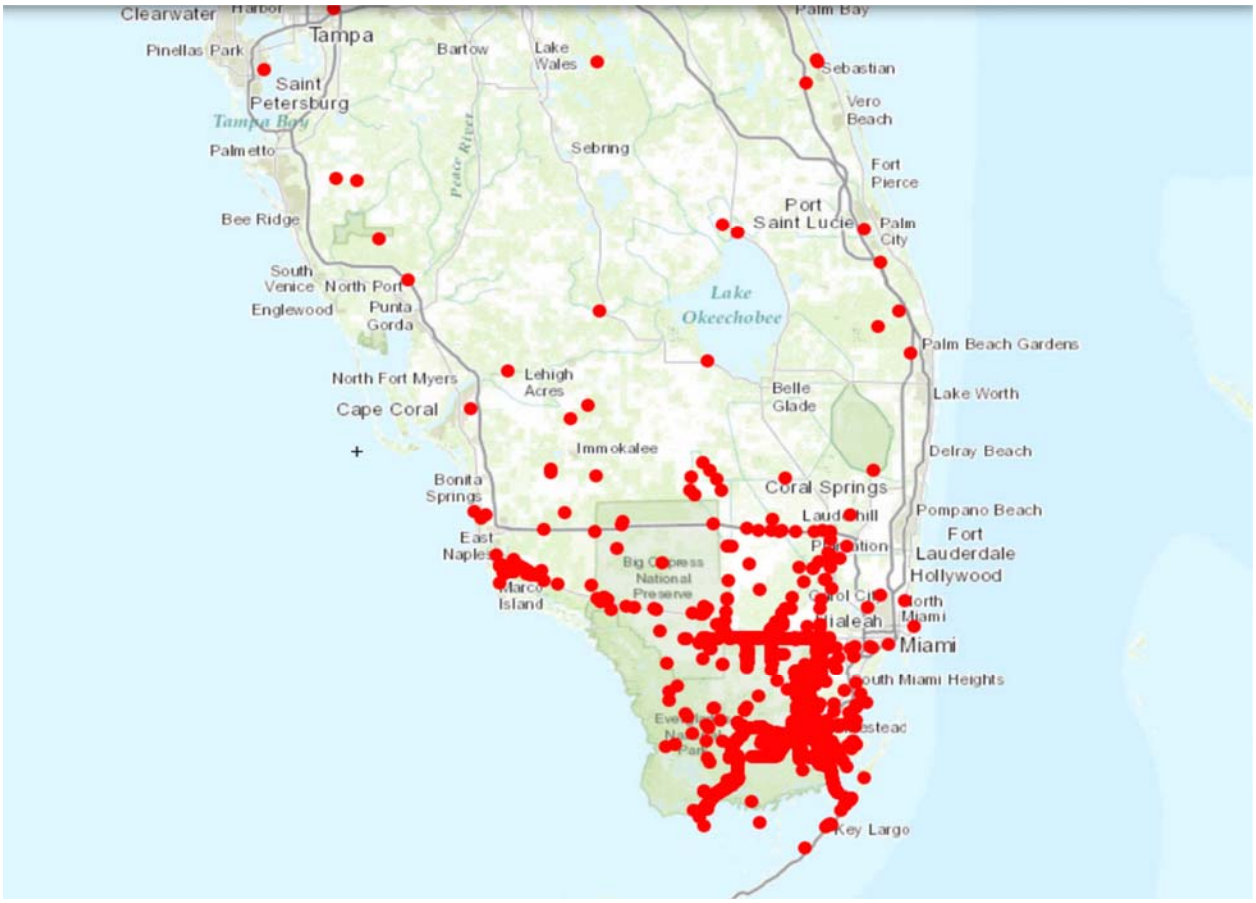


Figure 4. Burmese pythons removed or found dead within ENP and surrounding areas (EDDMaps 2014).

have been seen with increasing frequency in and around ENP and on lands managed by the District along the park's eastern boundary (Figure 4).

Based on observations and reports in Florida, feral Burmese pythons occur coast to coast (Snow et al. 2007; EDDMaps 2014) and north to Jacksonville and the Panhandle (EDDMaps 2014). A Burmese python was found in the wild in southern Georgia (EDDMaps 2015). Several Northern African pythons have also been captured and removed from or near Myakka River State Park in Sarasota County. Past evidence confirmed that Northern African pythons were reproducing in south Florida (Reed et al. 2010; Reed and Rodda 2009).

Boa constrictors have established a breeding population in one location in south Florida (Snow et al. 2007). A 95-pound boa constrictor was captured on No Name Key in the Florida Keys after being on the loose for several years. Boas constrictors are established in Puerto Rico (Reynolds et al. 2012).

Reticulated pythons have been observed or captured in the wild in 10 locations in Florida, including natural and urban areas (EDDMaps 2014). Although pythons presumed to be escaped

or released pets have been found in the wild, this species is not yet breeding in Florida. In their native range, reticulated pythons inhabit tropical rainforest and depend upon nearby water sources; therefore, urban canals and tropical landscaping could provide a hospitable environment for introduced pythons in Florida.

The Green anaconda (*Eunectes murinus*) is native to tropical South America. This species is not established in Florida, but escaped or released pets have been encountered in the wild. Green anacondas are semi-aquatic and prefer still waters; therefore, the habitats found in the Everglades could provide a hospitable environment for these snakes.

The Puerto Rico Department of Natural and Environmental Resources reports that Burmese pythons have been collected or reported (eight individuals collected, including a 10-foot (ft)(3-meter (m)) albino) on the island from Adjuntas, Arecibo, and Humacao; reticulated pythons have been collected in Aguadilla, Mayaguez, and Guayama (including an 18-ft (5-m) specimen); African pythons have been found in Mayaguez, the San Juan metro area, and Guayama; numerous boa constrictors (100 individuals) have been collected or reported in the wild, primarily on the west side of the island (particularly Mayaguez) but also throughout the island.

Free-ranging individuals of several additional species of nonnative large constrictors (which include anacondas, pythons, and boas) are commonly discovered in various parts of the United States, including a yellow anaconda from Big Cypress National Preserve in Florida, two yellow anacondas at Wapanocca National Wildlife Refuge in Arkansas (P. Fuller, pers. comm. 2011), and a green anaconda at East Lake Fish Park in Florida.

The Service uses the following criteria to evaluate whether a species does or does not qualify as injurious under the Lacey Act, 18 U.S.C. 42:

1. Factors that contribute to being considered injurious:
   - The likelihood of release or escape;
   - Potential to survive, become established, and spread;
   - Impacts on wildlife resources or ecosystems through hybridization and competition for food and habitats, habitat degradation and destruction, predation, and pathogen transfer;
   - Impact to threatened and endangered species and their habitats;
   - Impacts to human beings, forestry, horticulture, and agriculture; and
   - Wildlife or habitat damages that may occur from control measures.

2. Factors that reduce the likelihood of the species being considered as injurious:
   - Ability to prevent escape and establishment;
   - Potential to eradicate or manage established populations (for example, making organisms sterile);
   - Ability to rehabilitate disturbed ecosystems;
   - Ability to prevent or control the spread of pathogens or parasites; and
   - Any potential ecological benefits to introduction.

The U.S. Geological Survey's (USGS) biological and management profiles and risk assessment (Reed and Rodda 2009) provided much of the information used by the Service to evaluate the species under the listing criteria. The risk assessment details the probability and consequences of establishment of nine nonnative boa, anaconda, and python species that are invasive or potentially invasive in the United States. The primary factors considered in judging the probability of establishment were: (1) history of establishment in other countries; (2) number of each species in commerce; (3) suitability of U.S. climates for each species; and (4) natural history traits, such as reproductive rate and dispersal ability, that influence the probability of establishment, spread, and impact. "High" risk is the highest risk potential category, "medium" risk is still a serious risk, and "low" is the smallest risk. According to the USGS report, one large constrictor snake species in this environmental assessment would pose high risks to the health of ecosystems in the United States if it becomes established, and four pose a medium risk. Because all five species share characteristics associated with greater risks, none was found to be of low ecological risk. Based on the biology and known natural history of the large constrictors, individuals of some species may also pose a risk to people, although most snakes would not be large enough to consider a person as suitable prey. Mature individuals of reticulated pythons (the largest species) have been documented killing people in the wild in their native range, though such unprovoked attacks appear to be quite rare (Reed and Rodda 2009). The snake most associated with unprovoked human fatalities in the wild is the reticulated python. The situation with human risk is similar to that experienced with alligators: attacks in the wild are improbable but possible.

The State of Florida formerly considered the Burmese python, Northern African python, Southern African python, reticulated python, and green anaconda as "Reptiles of Concern," requiring a permit for possession (see Table 1). On July 1, 2010, the Florida Fish and Wildlife Conservation Commission (FWC) implemented regulations changing Reptiles of Concern to Conditional reptiles. Conditional snakes may be acquired by dealers, breeders, or exhibitors for commercial use; can only be sold or transferred to Floridians with a valid conditional species permit or exported out of State. Additionally, possession of a conditional reptile requires a Class III exhibition and sale license; a conditional species permit; and enclosure, recordkeeping, and transport requirements. There are also provisions for personal possession of grandfathered reptiles of concern; and "24/7" amnesty options for unwanted grandfathered reptiles of concern and conditional reptiles. The State of Florida did not designate the boa constrictor, yellow anaconda, DeSchauensee's anaconda, and Beni anaconda as reptiles of concern or conditional reptiles. Table 1 lists 11 States with nonnative large constrictor snake regulations (information primarily from Pet Industry Joint Advisory Council 2008).

Table 2. Available information on State regulations for pythons, boas, and anacondas, as well as other large constrictors (State regulations are subject to change and current regulations may not be reflected in this table).

State	Code/Regulations	Species	Summary
Florida	68A-6.007	*Python molurus* *Python reticulatus* *Python sebae* *Python natalensis* *Morelia amethistinus* (*=amethistina)* *Eunectes murinus* As of July 1, 2010, designated as Conditional Reptiles (formerly Reptiles of Concern)	**Possession, Transportation, Exhibition, and Caging Venomous reptiles and Conditional Reptiles:** Any person who possesses, keeps, exhibits or sells a conditional reptile must obtain an annual permit and comply with • Person must be at least 18 years of age with no prior violations of captive wildlife regulations, illegal commercialization of wildlife, animal cruelty, or violation of importation rules. • To qualify for a permit, must demonstrate knowledge of husbandry, nutritional, and behavioral characteristic of species. • Comply with facility standards to ensure "safe, secure and proper housing." • Document Disaster and Critical Incident Plans (Form FWCDLE_619 (02-06).
	68A-6.004		**Standard Caging Requirements for Constrictors:** Subpart (q) covers constrictors up to 5 ft, specimens 5 to 12 ft, specimens greater than 12 ft.
	68A-6.0071		**Record Keeping and Reporting Requirements:** • Inventory changes including births, deaths, acquisitions, sales, and transfers on Form FWCDLE_620IV-R (12-06). • Acquisition records include species, date, quantity, PIT tag data for each specimen and license identification number of recipient.
	68A-6.0072		**Identification, Escape:** • Permanently identified with unique passive integrated transponder (PIT tag). • Records (including species, specimen name, gender, age, ID number) must be maintained as long as specimen maintained. • For snakes with greater than 2 inch diameter, PIT tag implanted back 1/3 of same forward for anal plate. • Notification of escape required.

Table 2 (continued).

State	Code/Regulations	Species	Summary
Hawaii	HRS 150A-6.5 HI ADC Sec. 4-7-6, 4-7-10	All Squamata (snakes)	Importation and possession prohibited.
Illinois	720 ILCS 585/1 8 ILAC 8.25.110	*Python* spp. *Boa* spp. *Eunectes* spp.	Permit required for "any constrictor snake 6 ft or over in length, such as Boa, Python, and Anaconda."
Iowa	Iowa Admin. Code 21-77.1 22-77.7	*Python reticulatus* *Eunectes* spp. *Python* sebae	Classified as "dangerous wild animal" and possession prohibited. Permits ($100) allowed for specimens possessed prior to July 1, 2007, subject to detailed criteria, including an "electronic identification device, record-keeping, and disposition.
Louisiana	76 La. Admin Code Pt. XV. Sec 101.K	*Liasis olivacea (=olivaceus)* *Morelia spilota* *Morelia kinghorni* *Python natalensis* *Python sebae* *Python molurus* *Python reticulatus* *Boa spp.* *Eunectes* spp.	Importation and private possession of constrictors in excess of 12 ft by a permit issued by the Department of Wildlife and Fisheries.
Massachusetts	321 CMR 9.01	*Python sebae* *Python reticulatus* *Eunectes* spp.	Permit required.
Missouri	Title 38, Crimes and Punishment Chapter 578.023		Keeper of dangerous wild animals must register animals with the local law enforcement agency in the county in which the animal is kept. Specifically refers to "dangerous reptile over 8 ft long."
New Jersey	NJ ADC 7:25-4.3	Family *Pythonidae* Family *Boidae* (other than *Boa constrictor)* Anacondas (Green and Yellow)	Possession by permit provided applicant satisfies criteria within N.N.A.C. 7:25-4.7 (animal welfare, husbandry). Have been determined to be a potentially dangerous species [N.J.A.C. 7:25-4.8(a)], and are no longer allowed to be possessed or sold in New Jersey.

Table 2 (continued).

State	Code/Regulations	Species	Summary
New York	Chapter 43-B Article 11-0103	*Python molurus bivittatus* *Python reticulatus* *Python sebae* *Eunectes murinus* *Morelia amethistinus* (*=amethistina)*	Possession prohibited.
Puerto Rico (Commonwealth of)	Wildlife Law (240) ; 6765 and 6766	All Constrictor Snakes except *Python regius* (ball python)	Possession prohibited.
Rhode Island	RI Code R12 20 030 Sections 8.00	*Python reticulatus*	Import/Possession permit required. Permit criteria and conditions set forth in Section 3.00 – Section 5.00.

Texas	V.T.C.A.
	Parks & Wildlife
	Code Sec. 43.851 Texas
	Administrative Code
	Title 31 Part 2 Chapter
	55.651 *et seq.*
		Python sebae
		Python molurus
		Python reticulatus
		Python natalensis
		Eunectes murinus
			A person may not possess, sell or transport through Texas a covered species without a permit (Note: a bill of lading functions as temporary permit).
			• Annual permit (permits provided for both possession ($20) and commercial activities ($60)
			• Seller must notify purchaser at time of sale that
			  o Sales receipt is temporary permit valid for 21 days
			  o A controlled exotic snake permit must be obtained within a 21 day timeframe
			  o If convicted of violating requirements result in a 5-year ban from obtaining a permit.
			• Permit must be obtained for each permanent place where controlled species are sold or held for commercial purposes.
			• Commercial permit holder must maintain daily records of all activities involving acceptance, possession or transfer of a controlled species.

5) Public Involvement

The Service published a notice of inquiry in the *Federal Register* (73 FR 5784; January 31, 2008) as the first step in the rulemaking process. We solicited biological, economic, and other information and data on the *Python*, *Boa*, and *Eunectes* genera for possible addition to the list of injurious wildlife under the Lacey Act, and we provided a 90-day period to submit information. We reviewed all information received for substantive issues and information regarding the injurious nature of species in the *Python, Boa, and Eunectes* genera. The Service received 1,528 responses during the information period that closed April 30, 2008, of which 115 provided economic, ecological, and other data responsive to 10 specific questions in the notice of inquiry. Most individuals submitting comments responded to the notice of inquiry as though it was a proposed rule to list constrictor snakes in the *Python*, *Boa*, and *Eunectes* genera as injurious under the Lacey Act. During that comment period, the Service participated in a panel discussion arranged by the pet industry and also in several chatrooms with stakeholders. The Service was interviewed several times by the pet industry, which posted the interviews on the internet.

As a result, most responses expressed either opposition or support for listing the large constrictor snakes species. We considered all of the information provided, focusing primarily on the 115 substantive comments in the preparation of the draft environmental assessment, draft economic analysis, and the proposed rule.

The Secretary of the Interior announced the proposed rule and public comment period in a press release issued on January 20, 2010, prior to being published in the *Federal Register*. On March 12, 2010, we published a proposed rule (75 FR 11808) to list Burmese python, reticulated python, Northern African python, Southern African python, boa constrictor, yellow anaconda, DeSchauensee's anaconda, green anaconda, and Beni anaconda as injurious reptiles under the Lacey Act (18 U.S.C. 42). This proposed rule established a 60-day comment period, ending May 11, 2010, and announced the availability of the draft economic analysis, draft initial regulatory flexibility analysis, and the draft environmental assessment of the proposed rule. At the request of the public, we reopened the comment period for an additional 30 days and requested that all interested parties submit factual reports, information, and comments that might contribute to development of a final determination for the nine large constrictor snakes. That public comment period closed on August 2, 2010 (75 FR 38069; July 1, 2010). On June 24, 2014, we reopened the comment period on the 2010 proposed rule for an additional 30 days (79 FR 35719). This comment period was restricted to the five remaining proposed species: the reticulated python, DeSchauensee's anaconda, green anaconda, Beni anaconda, and boa constrictor.

During the public comment periods (120 days total) for the proposed rule and supplemental documents, we received more than 85,000 comments, including form letters, petitions, and post cards. We received comments from Federal agencies, State agencies, local governments, commercial and trade organizations, conservation organizations, nongovernmental organizations, and private citizens. The commenter's provided a range of opinions on the proposed listing, as follows: (1) unequivocal support for the listing with no additional information included; (2)

unequivocal support for the listing with additional information provided; (3) equivocal support for the listing with or without additional information included; (4) unequivocal opposition to the listing with no additional information included; and (5) unequivocal opposition to the listing with additional information included. The majority of comments received were in regard to the proposed rule and draft economic analysis. The final rule and economic analysis contains a broader description of comments received and our responses. The Appendix includes comments received only on the draft environmental assessment.

On January 23, 2012, we published a final rule in the *Federal Register* (77 FR 3330) to list Burmese and Indian pythons, Northern African python, Southern African python, and yellow anaconda as injurious wildlife under the Act. The remaining five species (reticulated python, boa constrictor, green anaconda, DeSchauensee's anaconda, and Beni anaconda) were not listed at the time and remained under consideration for listing. With this final rule, we are listing four of those species (reticulated python, green anaconda, DeSchauensee's anaconda, and Beni anaconda), and removing the fifth (boa constrictor) from consideration.

6) Alternatives

Alternatives were selected based on the overall consideration of risk posed by the individual snake species or subsets of snake species. High-risk species, if established in this country, put larger portions of the U.S. and insular territories at risk, constitute a greater ecological threat, and are more common in trade and commerce. High-risk species are Burmese pythons, Northern and Southern African pythons, boa constrictors, and yellow anacondas. Medium-risk species are reticulated pythons, DeSchauensee's anaconda, green anaconda, and Beni anaconda. These species constitute lesser threats in these areas, but still are considered injurious. Because all nine species share characteristics or traits associated with greater risks, none was found to be low-risk.

The alternatives we considered are based on the proposed rule to list nine species of large constrictor snakes as injurious (75 FR 11808; March 12, 2010), as well as peer review of the proposed rule and information and comments received from the public during the public comment periods. On January 23, 2012, we published a final rule to list four of the nine proposed species, leaving five still under consideration (77 FR 3330). We are now finalizing the listing as injurious of another subset of the proposed species (four more species, with one withdrawn from consideration). This means that there is a second final rule and thus a second final economic analysis. We have noted in the following alternatives used in the 2012 final environmental assessment (Final Environmental Assessment 2012) that four species are already listed.
Four alternatives are considered in this assessment: (1) **no action**; (2A) **list as injurious five large constrictor snake species** (reticulated python, boa constrictor, DeSchauensee's anaconda, green anaconda, and Beni anaconda); (2B) **list as injurious four large constrictor snake species** (reticulated python, DeSchauensee's anaconda, green anaconda, and Beni anaconda), (3) **list as injurious three large constrictor snake species** (reticulated python, boa constrictor, and green anaconda), and (4) **list as injurious one large constrictor snake species** (boa constrictor).

6.1.1) Alternative 1: No Action

The No Action Alternative refers to no action being taken to list any of the large constrictor snakes as an injurious species under the Lacey Act, which would allow the continued importation and interstate transport of the five large constrictors, eggs, and their hybrids. Introductions of the python and boa constrictor in natural and urban areas of the United States have occurred and are likely to occur again. Without effective action by States and industries that support breeders, pet owners, and others who keep large constrictor snakes, additional large constrictor snakes (e.g., pythons, boa constrictors, and anacondas) are likely to become established in the United States, threatening native wildlife, many of which are threatened or endangered under the Endangered Species Act (Act), and potentially impacting ecosystem form and structure.

If no action is taken, the Service would continue deferring to the States to regulate the subject large constrictor snakes (live specimens), gametes, viable eggs, or hybrids within State boundaries.

6.1.2A) Alternative 2A: List as injurious five large constrictor snake species (Reticulated Python, Boa Constrictor, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda [Proposed Action]

Under Alternative 2A, the Service would list five species of large constrictor snakes as injurious wildlife under the Lacey Act, which would prohibit importation, and interstate transport of all nine species (live specimens), gametes, viable eggs, or hybrids, except by permit for zoological, educational, medical, or scientific purposes. An injurious wildlife listing would not prohibit intrastate transport or possession of the five large constrictors within States, where possession is permitted by the State. Alternative 2A includes all five of the large constrictor snakes determined by the Service to be injurious. The USGS risk assessment (Reed and Rodda 2009) explains how the risk rankings were assessed. One species (boa constrictor) has a risk ranking of "High" and four species (reticulated python, DeSchauensee's anaconda, green anaconda, and Beni anaconda) are ranked as "Medium."

6.1.2B) Alternative 2B: List as injurious four large constrictor snake species (Reticulated Python, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda)

This Alternative is the same as Alternative 2A, except that the Service would not list the boa constrictor. The environmental consequences of this Alternative would be the same as those for Alternative 2A, except that importation and interstate transportation of boa constrictors could continue, and therefore the environmental consequences of such continued importation and interstate transportation would occur in the absence of effective State and industry action to prevent these consequences, including, but not limited to, regulatory action. If the Service lists these four species as injurious species, the environmental consequences of this Alternative would be as described in Part 8 of this Environmental Assessment.

6.1.3) Alternative 3: List as injurious three large constrictor snake species (Reticulated Python, Boa Constrictor, and Green Anaconda)

Under Alternative 3, the Service would list three species of large constrictor snakes as injurious wildlife under the Lacey Act, which would prohibit importation, and interstate transport of all three species (live specimens), gametes, viable eggs or hybrids, except by permit for zoological, educational, medical, or scientific purposes. An injurious wildlife listing would not prohibit intrastate transport or possession of the three large constrictors within States, where possession is permitted by the State.

The reticulated python and green anaconda are ranked as "Medium" risk according to the USGS risk assessment (Reed and Rodda 2009). The State of Florida has listed the reticulated python and green anaconda as Conditional Reptiles (former Reptiles of Concern). The FWC defined the former Reptiles of Concern as nonnative reptile species that have the potential to become established in Florida and can threaten native wildlife, cause economic damage or pose a threat to human safety.

Two species not considered in this alternative are the Beni and DeSchauensee's anacondas. These two species have not been reported in the import data for 1999 to 2010 (U.S. Fish and Wildlife Service 2011), although they may have been mislabeled as yellow and green anaconda. Therefore, for this alternative, we considered the effect of the three species most likely to be imported.

6.1.4) Alternative 4: List as injurious one large constrictor snake species (Boa Constrictor)

Under Alternative 4, the Service would list one species of large constrictor snakes as injurious wildlife under the Lacey Act, which would prohibit importation, and interstate transport of that species (live specimens) and its gametes, viable eggs or hybrids, except by permit for zoological, educational, medical, or scientific purposes. An injurious wildlife listing would not prohibit intrastate transport or possession of this one large constrictor within States, where possession is permitted by the State.

This is the only one of the five species of large constrictor snakes that have a ranking of "High Risk" according to the USGS risk assessment (Reed and Rodda 2009). High-risk species, if established in this country, put larger portions of the U.S. mainland at risk, constitute a greater ecological threat, and are more common in trade and commerce.

6.1) Summary Table of Alternative Actions

Actions	**Alternative 1:** No Action	**Alternative 2A: (Proposed Action)** (List as Injurious the Reticulated Python, Boa Constrictor, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda)	**Alternative 2B: (Subset of Alternative 2A)** (List as Injurious the Reticulated Python, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda)	**Alternative 3** (List as Injurious the Reticulated Python, Boa Constrictor, and Green Anaconda)	**Alternative 4** (List as Injurious the Boa Constrictor)
Prohibit the importation of large constrictor snakes	No	Yes—5 species	Yes—4 species	Yes—3 species	Yes—1species
Prohibit the interstate transport of large constrictor snakes	No	Yes—5 species	Yes—4 species	Yes—3species	Yes—1species
Reduce risk of escapement of large constrictors into the wild	No	Yes. However, for States where the species are already present, risk will be reduced but not be eliminated.	Yes. However, for States where the species are already present, risk will be reduced but not be eliminated.	Yes. However, for States where the species are already present, risk will be reduced but not be eliminated.	Yes. However, for States where the species is already present, risk will be reduced but not be eliminated.
Economic Impacts	No losses to retail sales. Potential costs to environment similar to recent years or increasing, due to continued introduction and spread risks.	The annual retail sales losses for Alternative 2A are estimated to range from $9.3 million to $20.1 million. Economic benefits from reduced potential costs to environment potentially greater than other alternatives.	The annual retail sales losses for Alternative 2B are estimated to range from $1.9 million to $4.1 million. Economic benefits from reduced potential costs to environment potentially greater than Alternative 1, less than Alternatives 2A and 4, but could be similar to 3.	The annual retail sales losses for Alternative 3 are estimated to range from $9.3 million to $20.1 million. Economic benefits from reduced potential costs to environment potentially greater than Alternatives 1, 2B and 4, less than Alternative 2A.	The annual retail sales losses for Alternative 4 are estimated to range from $7.4 million to $15.9 million. Economic benefits from reduced potential costs to environment potentially greater than Alternatives 1 and 2B, less than Alternatives 2A and 3.

6.2) Alternatives Not Considered For Detailed Analysis:

6.2.1) Federal Permitting System such as a Private Hobbyist Permit System Instead of Listing the Nine Large Constrictor Snakes

This alternative is not within the authorities of the injurious wildlife provisions of the Lacey Act (18 U.S.C. § 42, as amended). The Lacey Act allows for the issuance of permits for zoological, educational, medical, and scientific purposes. In addition, while the exact number of these large constrictor snakes that are held as pets or by hobbyists is unknown, there is strong evidence that they number in the hundreds of thousands. An alternative that relies on pet ownership permits would require an intricate and diverse system that would include importers, brokers, pet retail stores, and pet owners across the United States. In addition, the permitting system would need to be very responsive to activities that could occur on a daily basis, such as sales of animals at pet stores or death of pets. To adequately address the constantly changing situation and ensure that additional constrictors are not released into the wild, the Service might need to establish permitting offices across the United States. In addition, the cost of monitoring and enforcing the permitting system would require an increase in law enforcement officials. This would require a much greater level of resources than the Service currently has available. This type of permitting system would rely heavily on voluntary compliance to control the potential spread of these injurious species since it would be virtually impossible to monitor all transactions or interstate movement of specimens. An alternative that relies on monitoring and control by the Service once the snakes are brought into the country is not practical or feasible from an enforcement or economic standpoint to implement and these limitations present unacceptable risks for large constrictor snake introduction and spread.

6.2.2) State Legislative Initiatives, such as a State Permitting Program Instead of Listing the Nine Large Constrictor Snakes

An alternative similar to this, along with other measures, has been reconsidered since issuance of the draft EA, but the alternative was dismissed from further consideration for all but one species, the boa constrictor, because this alternative is generally not practical for the other four species. Few States address all introduction pathways and, because invasive species reproduce, spread, and are often moved by people, each State is hindered or helped by the quality of neighboring States' laws. As a result, State and local efforts depend on effective interstate collaboration. Despite amendments to State laws and regulations, States continue to apply different approaches to listing and prohibitions, generally making cooperative enforcement and management from State to State difficult (Environmental Law Institute 2010).

Nonetheless, the boa constrictor presents a unique situation because of the large number of animals already imported into the United States, the large number of animals in captivity in the United States, the variety of individuals and entities that own boa constrictors and their use of the species, how broadly in geographic terms the species is located in captivity within the United States, the amount of domestic breeding, the risk of escape and establishment of the species, if and where individual snakes have been recorded or populations have become established in the wild in the United States, and the expressed interest by the Association of Fish and Wildlife

Agencies (AFWA) and the Pet Industry Joint Advisory Council (PIJAC) in developing effective State and industry controls. The number of boa constrictors that have been imported and that are currently held in captivity, combined with reproduction from domestic breeding, likely comprise a significantly larger portion of the current trade than for any of the eight other constrictor species that were proposed for listing. In fact, captive boa constrictor numbers are likely higher than for all of the other eight large constrictor snake species combined. Thus, of the nine large constrictor snakes evaluated by the Service, risk management measures by States and private entities such as the pet industry are particularly needed for the boa constrictor, especially where the risk of establishment is high, since States can regulate possession, use, and intrastate movement.

Therefore the Service has decided to withdraw the proposal to list the boa constrictor and has removed the species from further consideration. This means that the Service is taking no action on this species and the anticipated effects would be the same as those discussed under the No Action alternative, as applied solely to the boa constrictor. Please see the final rule for the full explanation of the Service's decision to withdraw the boa constrictor from consideration for listing.

7) Affected Environment

Native Ranges

Reticulated Python

The reticulated python is native to Southeast Asia. Three scientific names are mainly associated with the reticulated python: *Python reticulatus*, *Broghammerus reticulatus*, and *Malayopython reticulatus*. Please see Reed and Rodda (2009) for a discussion of the taxonomy and nomenclature of the latter two names. Reynolds *et al.* (2014) considers the genus as *Malayopython*, which may have merit. Therefore, although we are using *Python* as the genus for the purposes of this assessment, we consider here *Malayopython* as synonym in addition to *Broghammerus*, so that if the genus does change, it is clear to which species we are referring. Reticulated pythons are found from sea level up to more than 4,265 ft (1,300 m). They inhabit lowland primary and secondary tropical wet forests, tropical open dry forests, tropical wet montane forests, rocky scrublands, swamps, marshes, plantations and cultivated areas, and suburban and urban areas (David and Vogel 1996). Reticulated pythons occur primarily in areas with a wet tropical climate. Though they also occur in areas that are seasonally dry, they do not occur in areas that are continuously dry or very cold at any time.

Boa Constrictor

There are nine recognized subspecies of *Boa constrictor*. Boa constrictors range widely across Mexico, Central America, and South America, including marine and lacustrine islands, and have one of the widest latitudinal distributions of any snake in the world. In their native range, boa constrictors inhabit environments from sea level to 3,280 ft (1,000 m), including wet and dry

tropical forest, savanna, very dry thorn scrub, and cultivated fields (Wilson and Meyer 1985; Reed and Rodda 2009).

DeSchauensee's Anaconda

As currently understood, the "yellow anacondas" comprise two species with entirely disjunct distributions (Reed and Rodda 2009). The northern form, DeSchauensee's anaconda (*Eunectes deschauenseei*), is known from a small number of specimens and has a limited range in northeast South America. The southern form, the yellow anaconda (*Eunectes notaeus*), has a larger distribution in subtropical and temperate areas of South America, and has received more scientific attention. The yellow and DeSchauensee's anacondas are native to South America. DeSchauensee's anaconda apparently prefers swampy habitats that may be seasonally flooded (Dirksen and Henderson 2002). The native range that the DeSchauensee's anaconda occupies exhibits moderate variation in precipitation across the year, and annual temperatures tend to range between 25 ^{o}C (77 ^{o}F) and 30 ^{o}C (86 ^{o}F). We do not know whether the species could tolerate greater climatic variation.

Green Anaconda

The native range of green anaconda includes aquatic habitats in much of South America below 2789 ft (850 m) elevation plus the insular population on Trinidad; encompassing the Amazon and Orinoco Basins; major Guianan rivers; the San Francisco, Parana and Paraguay Rivers in Brazil; and extending south as far as the Tropic of Capricorn in Northeast Paraguay. The habitat range of green anaconda is largely defined by availability of aquatic habitats. Depending on location within the wide distribution of the species, these appear to include deep, shallow, turbid, and clear waters, and both lacustrine and riverine habitats.

Beni Anaconda

The Beni anaconda is a recently described species (Dirksen 2002) from northern Bolivia, previously considered to be contained within the green anaconda species. The Beni anaconda is a recently discovered anaconda species from Beni Province, Bolivia. The native range of the Beni anaconda is the Itenez/Guapore River in Bolivia along the border with Brazil, as well as the Baures River drainage in Bolivia. The green and Beni anacondas are similar in size and the range of the Beni anaconda is within the range of the green anaconda (Bolivia).

Areas Potentially Suitable for Establishment

The USGS risk assessment (Reed and Rodda 2009) used a method called "climate matching" to estimate those areas of the United States exhibiting climates similar to those found in a species native range. Climate-matching set the broad parameters for determining if an area is suitable for a species to establish a population. However, climate matching is not a complete account, because such biotic factors as the absence of suitable food (or prey), lack of habitat for shelter and nest sites, or the presence of competitors and predators may exclude a species from an area with otherwise suitable climate. Considerable uncertainties exist about the native range limits of

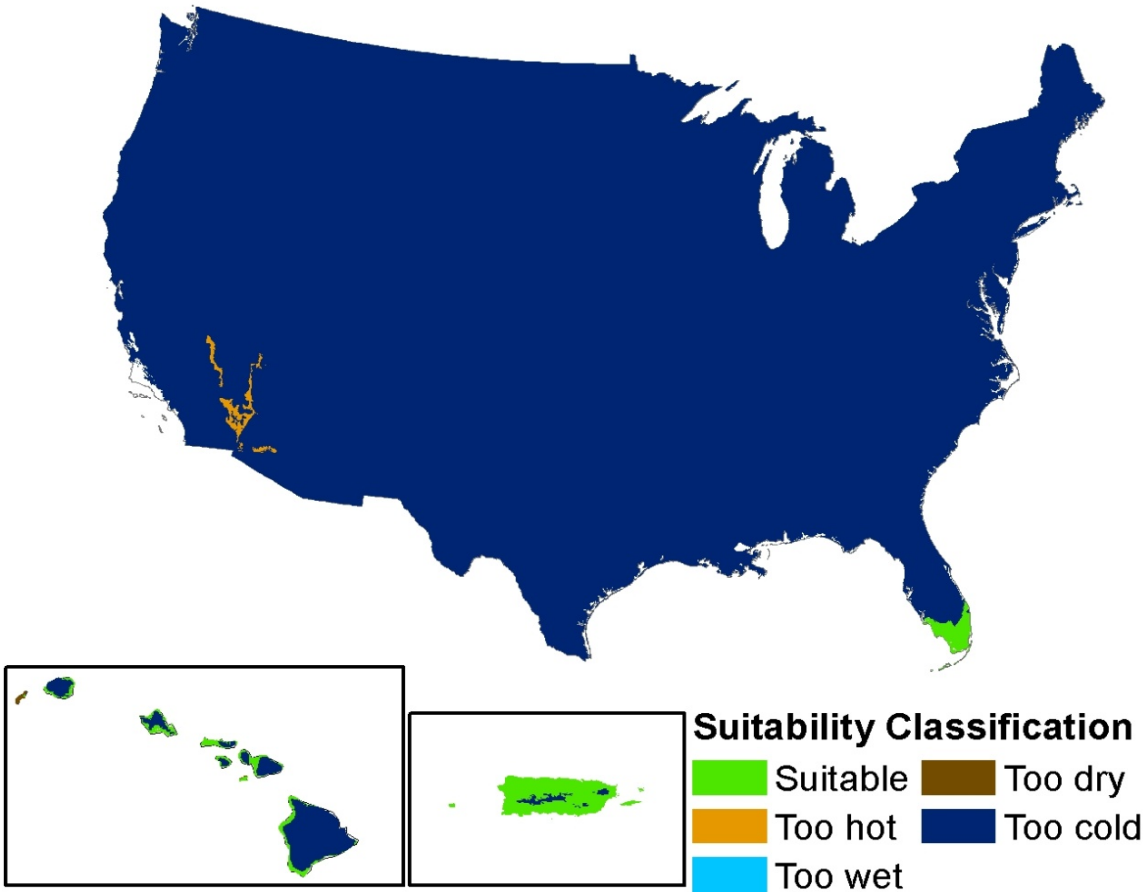
many of the large constrictors, and many factors other than climate alone can influence whether a species can establish a population in a particular location. Climate projections are therefore a useful benchmark to identify where climate alone may not be limiting a species from becoming established, but not a rigorous predictor of exactly where a species can establish a population. Based on climate alone, many of the species are likely to be limited to the warmest areas of the United States, including parts of Florida, extreme south Texas, Hawaii, and insular territories. For a few species, however, larger areas of the southern United States appear to exhibit suitable climatic conditions. Individual snake species are discussed in the following sections.

Reticulated Python

Reticulated pythons have a more tropical distribution in their native range than Burmese pythons. Accordingly, the area of the mainland United States showing a climate match of uncontested sites is smaller, exclusively tropical, and limited to southern Florida (Figure 5). However, according to Reed and Rodda (2009), if those portions of the mainland Asia range are judged by some but not all observers to be occupied (based on literature cited), one obtains the climate match shown in Figure 6, which also includes much of central Florida and the lower Rio Grande section of Texas. If the range limit of the Reticulated Python at the northern limit of the native range reflects competition with Burmese pythons, it is conceivable that additional portions of the United States would be invaded by reticulated pythons if they were not already occupied by Burmese pythons. Given the current distribution of Burmese pythons in Florida, and the ongoing spread of that species, such a scenario seems unlikely in Florida; though it is plausible it could happen in extreme southern Texas.

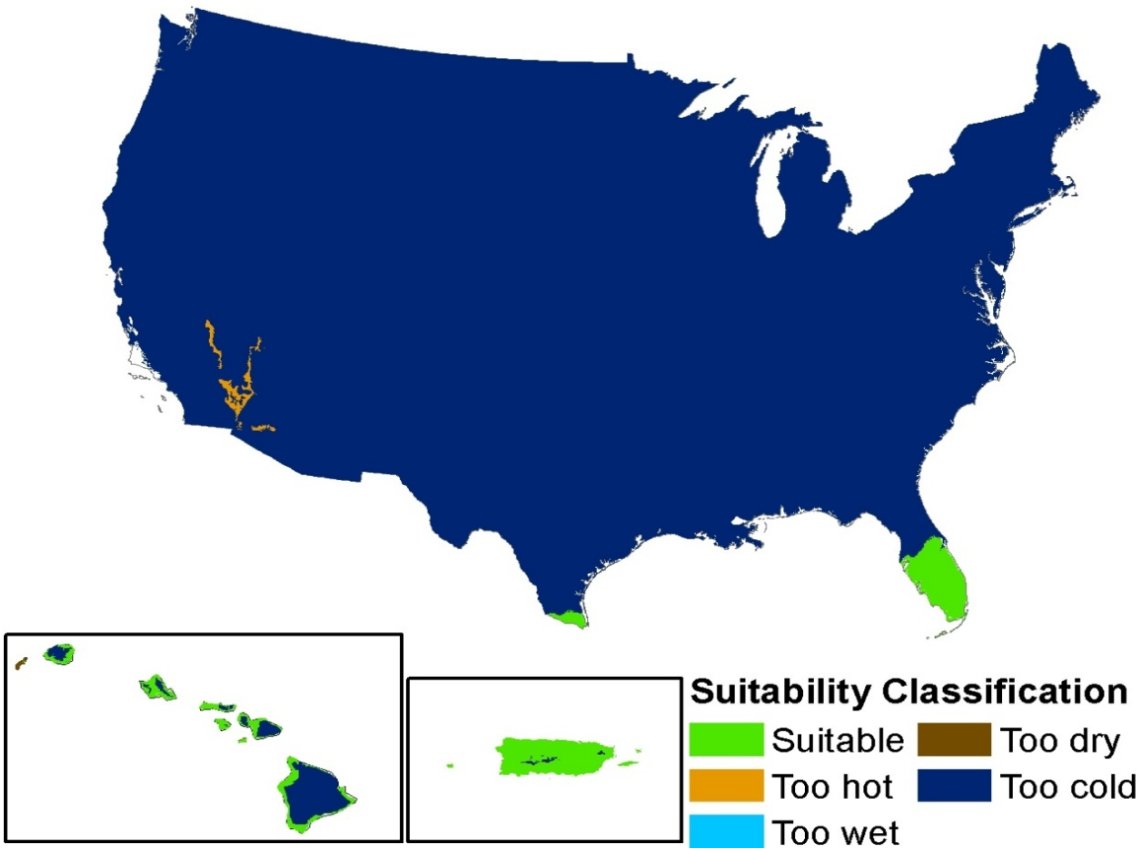
Low and mid-elevation sites in the United States' tropical territories (Guam, Northern Mariana Islands, American Samoa, Virgin Islands, Puerto Rico) and Hawaii also appear to have suitable climate for reticulated python, whether using all localities or the subset considered uncontested.

Figure 7 documents the most recent verified removals or observations of *Python reticulatus* in the State of Florida (EDDMapS 2014).



Reticulated Python (*Python reticulatus*)

Figure 5. Climate map for reticulated python: areas potentially suitable for invasion (Reed and Rodda 2009).



Reticulated Python (***Python reticulatus***)

Figure 6. Areas of the United States matching the climate envelope expressed by reticulated python using all portions of the native range deemed occupied by any of the observers (based on literature cited) (Reed and Rodda 2009).

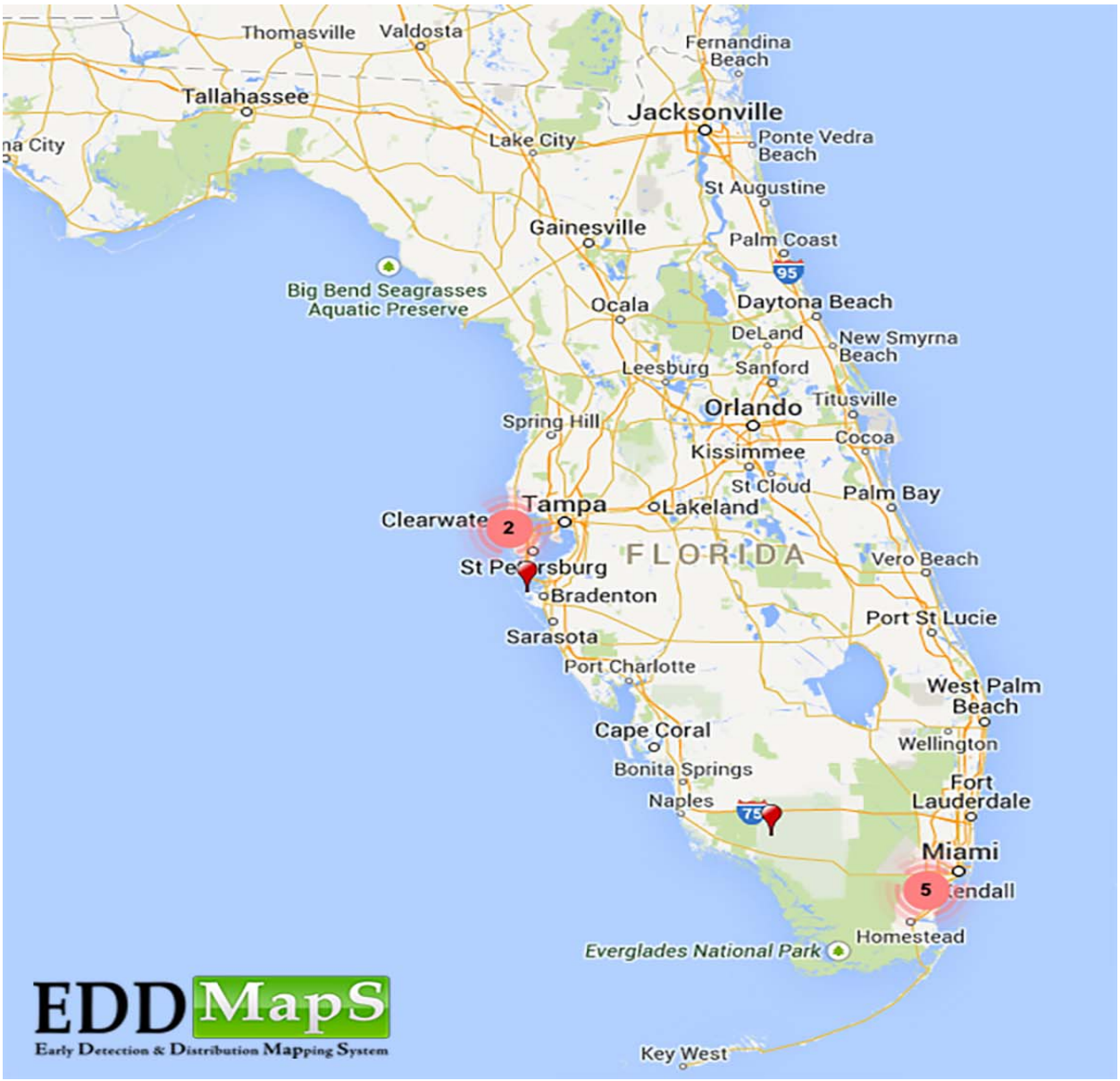
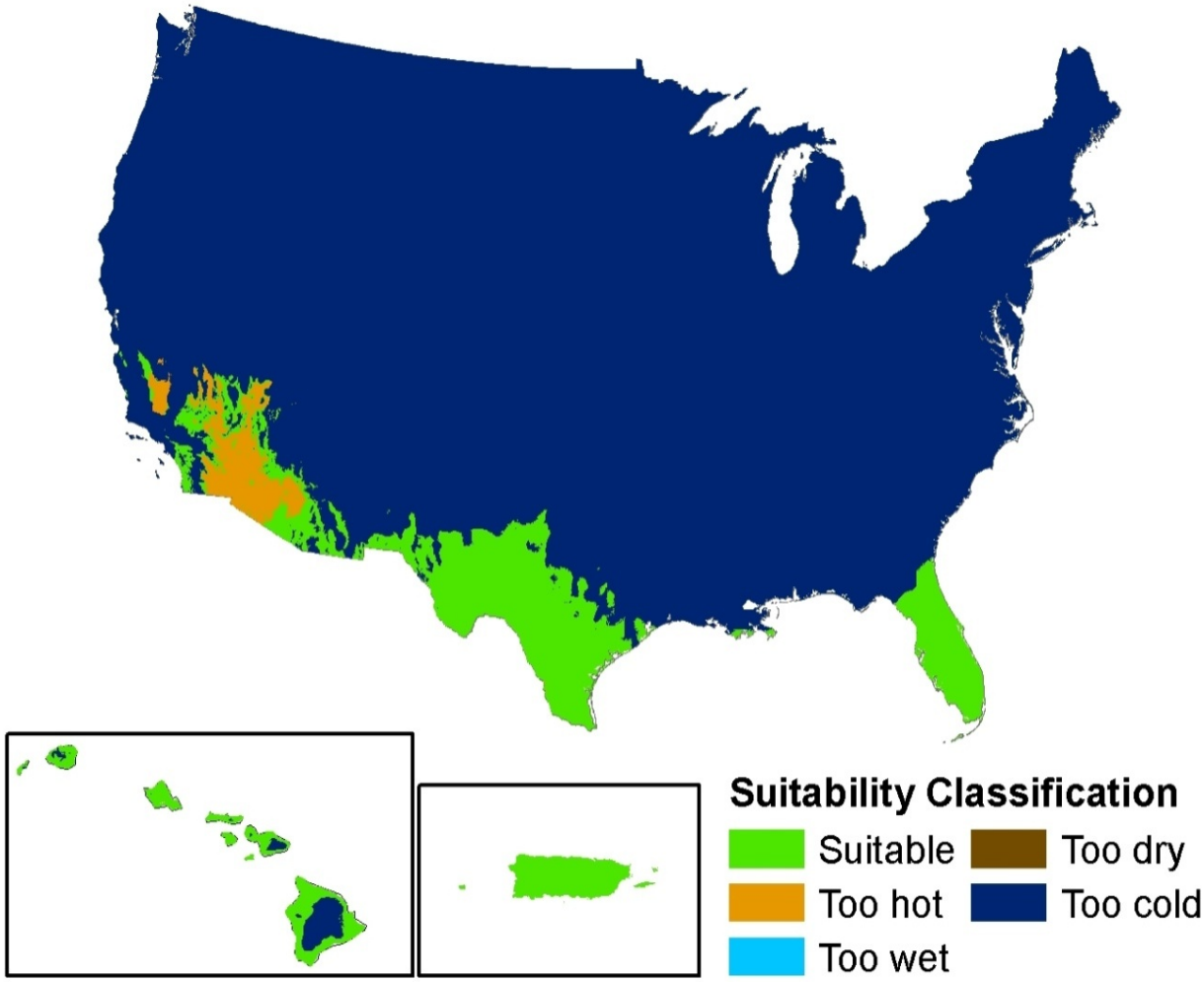


Figure 7. The localities in Florida where reticulated pythons have been observed or removed (pinpoints are single occurrences and circles are multiple occurrences; EDDMapS 2014).

Boa Constrictor (*Boa constrictor*)

Native-range climate space of the boa constrictor in the United States was derived using records from all localities (Figure 8). Because Figure 8 depicts the United States extrapolation using climate space from the entire known native range (that is, the limits to which the species is capable of dispersing on its own) using the more inclusive species definition (all boa constrictor subspecies) as used by a majority of current workers in the

field, this map is used for the overall risk assessment. Using all localities in the native range, suitable climate in the United States includes a large area of land in the southern United States. This area includes mesic (moderately moist) areas, such as peninsular Florida and a corner of southeast Georgia, but also includes more arid zones, including the southern half of Texas and portions of New Mexico and Arizona. Much of Hawaii and Puerto Rico also appear climatically suitable. Boa constrictors were reported to be established in Puerto Rico (Reynolds et al. 2013) prior to the development of the climate matching map in Figure 8, thus confirming the climate suitability in Puerto Rico. Boa constrictors are found in captivity widespread across the United States and are frequently captured outside of captivity (HSUS 2014), thus providing an opportunity for establishment in the wild. Figure 9 documents the most recent verified removals or observations of boa constrictors in the State of Florida (EDDMapS 2014).



Boa Constrictor (*Boa constrictor*)

Figure 8. Areas of the United States matching the climate envelope expressed by the boa constrictor in its native range, based on all known localities (Reed and Rodda 2009).

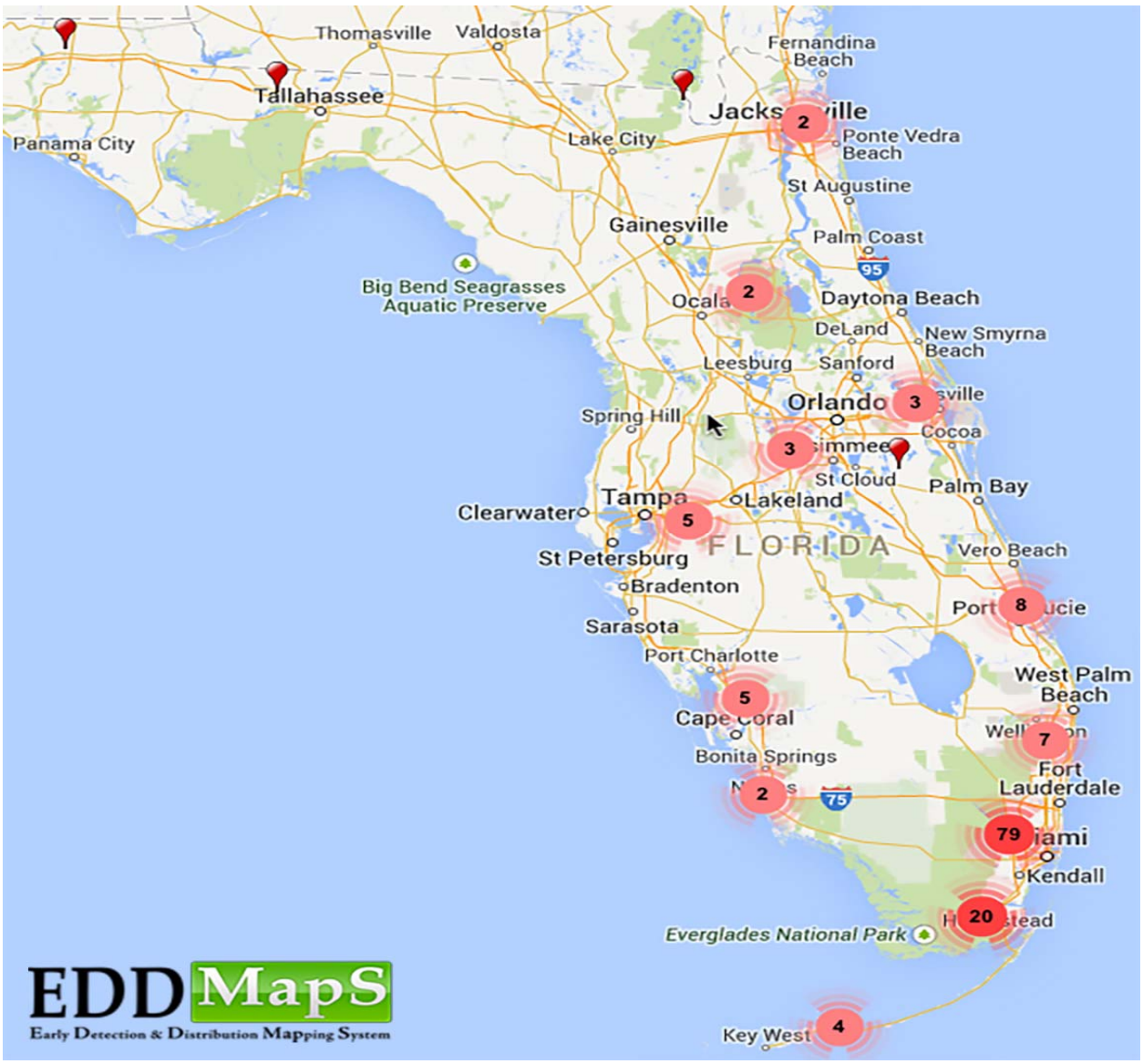
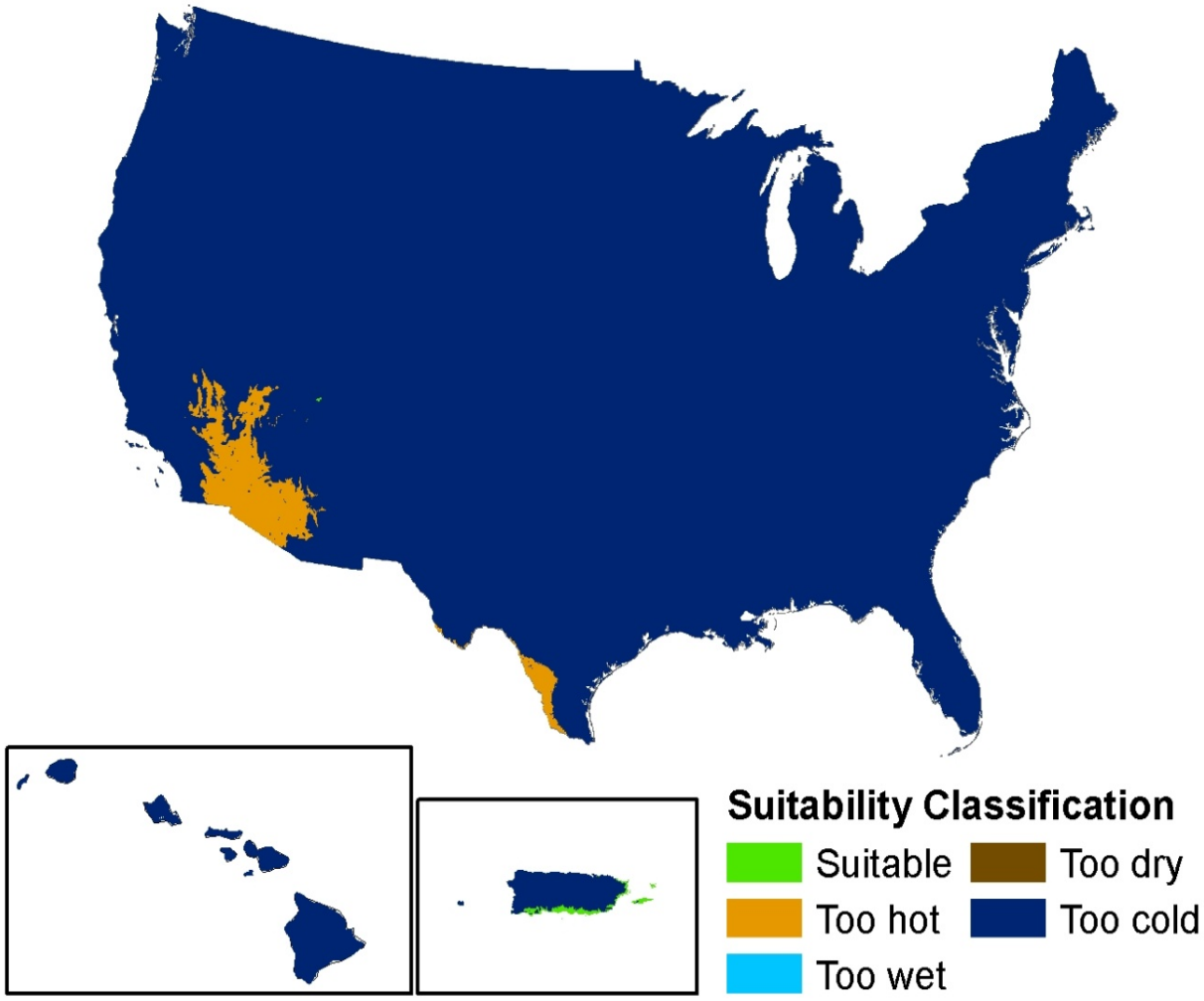


Figure 9. The localities in Florida where boa constrictors have been observed or removed (pinpoints are single occurrences and circles are multiple occurrences; EDDMapS 2014).

DeSchauensee's Anaconda (*Eunectes deschauenseei*)

DeSchauensee's anaconda appears to have a small climate match with the United States (Figure 10). There are no areas of the continental United States or Hawaii that appear to have precipitation and temperature profiles similar to those observed in the species' native range, although the southern margin of Puerto Rico and adjacent islands (for example, Vieques)

appear suitable. However, extending the climate match to the globe (not depicted) indicates that much of the Amazon Basin and some other tropical areas of the world appear to be climatically suitable. Such a result indicates that the native range of DeSchauensee's anaconda does not appear to be bounded by unsuitable climate, but may instead be due to other factors (e.g., biogeography, climate change, competition or other ecological factors). If the current range reflects historical or ecological limitations rather than climatic tolerances of the species, then Figure 10 could be an underestimate of actual suitable climate in the United States (Reed and Rodda 2009).



DeSchauensee's Anaconda (*Eunectes deschauenseei*)

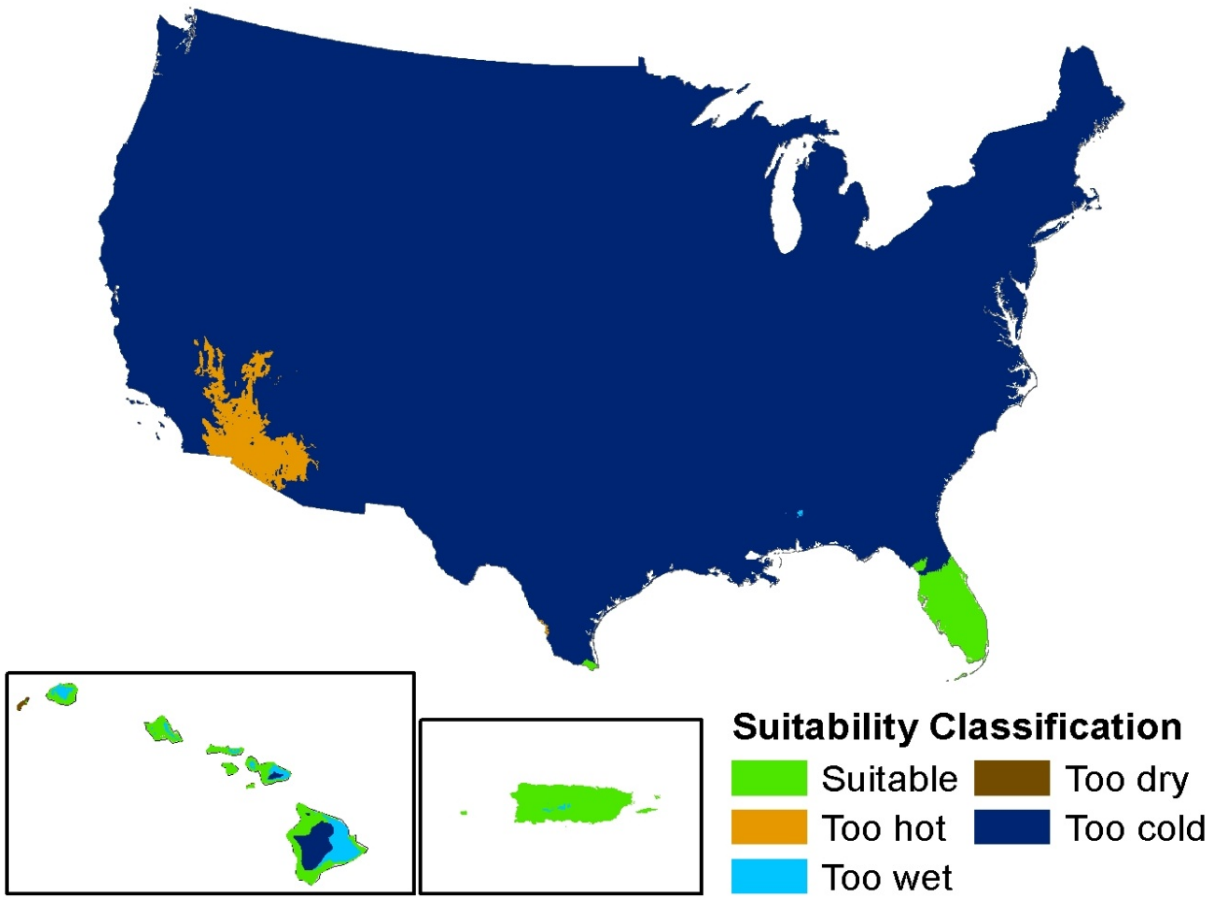
Figure 10. Areas of the United States matching the climate envelope expressed by DeSchauensee's anaconda in its native range (Reed and Rodda 2009).

Green Anaconda (*Eunectes murinus*) and Beni Anaconda (*Eunectes beniensis*)

Much of peninsular Florida (roughly south of Gainesville) and extreme south Texas exhibit climatic conditions similar to those experienced by green anacondas in their large South American native range. Lower elevations in Hawaii and all of Puerto Rico have apparently suitable climates, but the rest of the country appears to be too cool or arid or both (Figure 11). Within the climate-matched area, however, anacondas would not be at risk of establishment in sites lacking surface water. Conversely, the areas of the United States southwest that are deemed "too hot" could conceivably represent suitable climatic conditions if aquatic habitats with cooler water conditions are available as thermal refugia. However, such habitats are few and far between in much of this region. Climate suitability is just one factor in the establishment of an invasive species—a necessary but not sufficient condition. Regarding climate tolerance in southern Florida, herpetologist and anaconda scientist, L. Dirksen states "There is no environmental reason why anacondas could not survive in the Everglades" (Reed and Rodda 2009).

The Beni anaconda is known from only a few specimens in a small part of Bolivia, and the numbers of available localities were judged to be insufficient for an attempt to delineate its climate space or extrapolate this space to the United States. Beni anacondas are known from sites with fairly low seasonality (mean monthly temperatures approximately 22.5°C to 27.5°C, mean monthly precipitation about 50 to 300 mm; and as such very little of the continental United States appears to be climatically suitable (although insular States and territories are at risk). However, it is unknown whether the species' native distribution is limited by factors other than climate; if the small native range is attributable to ecological (such as competition with *E. murinus*) or anthropogenic (such as habitat destruction) factors, then an estimate of the climatically suitable areas of the United States based on its current native distribution would be an underprediction (Reed and Rodda 2009).

Figure 12 documents the most recent verified removals or observations of *Eunectes murinus* in the State of Florida (EDDMapS 2014).



Green Anaconda (*Eunectes murinus*)

Figure 11. Areas of the United States matching the climate envelope expressed by the green anaconda in its native range, based on 77 known localities in it native range (Reed and Rodda 2009).

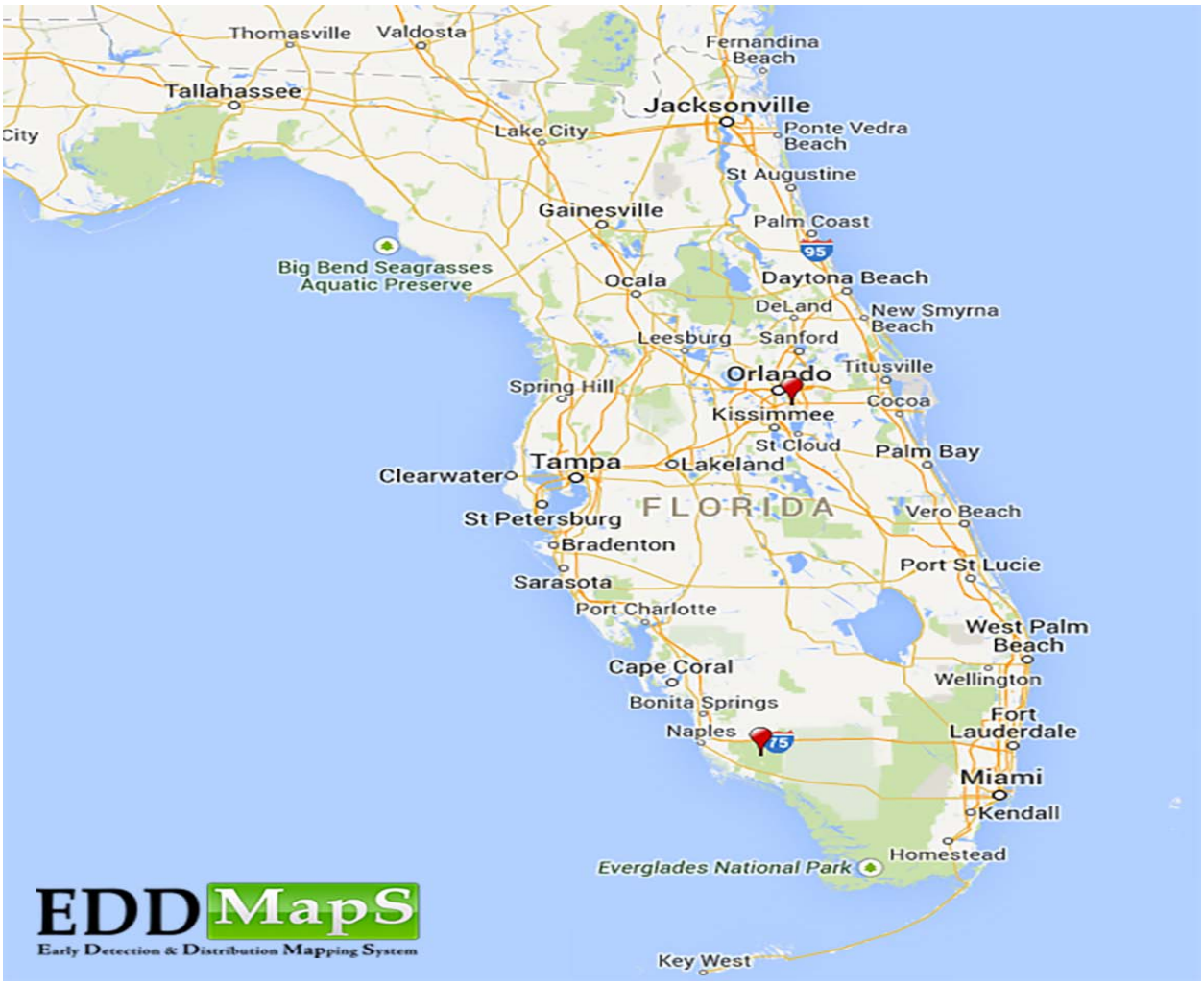


Figure 12. The pinpoints denote localities in Florida where green anacondas have been observed or removed (EDDMapS 2014).

8) Environmental Consequences

Alternative 1: No Action

Direct Effects

Ecological Impacts

If no nonnative large constrictor snakes are added to the list of injurious wildlife, ownership of large constrictor snakes could possibly be expanded to States where they are not already found or not regulated by the States. This would increase the risk of the snakes' introduction and

establishment in the ecosystem in the absence of effective State control measures, resulting in threats to native wildlife and ecosystems.

Increased numbers of established populations of the nonnative large constrictors would likely result in substantial reduction of native wildlife abundance. All five species are 2 to 3 times larger than the largest native snakes in the United States. Even a small established population of a nonnative, large constrictor snake in an ecologically sensitive area could cause unacceptable population effects to a species like the federally endangered Key Largo woodrat. These snakes have been shown to be effective at hunting and eating wildlife where they have been established. They have broad diets that consist of mammals, birds, reptiles, amphibians, and even fish. Established populations of large constrictors should be expected to affect native wildlife communities and may constrain efforts to recover threatened and endangered species or perhaps lead to species extinctions (Clavero and Garcia-Berthou 2005). Wildlife managers' ability to eradicate or control large constrictor snake populations depends on where the snakes are found and in what stage of establishment. Early detection of incipient invasions and quickly coordinated responses are needed to eradicate or contain invasive species before they become too widespread and control becomes technically or financially impossible. If established in large natural areas or ecosystems, such as national parks, eradication or control of large constrictor snakes is practically impossible and large constrictors would likely become permanent members of the native wildlife community and top predators.

All of the large constrictors are extremely cryptic in coloration. They are silent hunters that lie in wait along pathways used by their prey and then ambush them. They blend so well into their surroundings that observers have released radio-telemetered snakes for research purposes and lost sight of them 5 ft (1.52 m) away in mixed ground cover vegetation (A. Roybal, pers. comm. 2010). Therefore, effective and feasible tools are currently very limited to manage large constrictor snake species if they become introduced into ecosystems. The currently available tools for control and management of invasive reptiles include traps and toxicants. Trapping is the best available option at this time, but its use on a large scale is prohibitively expensive and inefficient. Given the current state of knowledge and funding, it would be unlikely that any colonization of a giant constrictor could be eliminated through the use of toxicants, or even that an appropriate toxicant could be discovered and registered in time. Many tools have the potential to benefit from additional research, but none is ready for landscape-level control or eradication of giant constrictor snake populations (Reed and Rodda 2009).

Impacts on Native Species

Failure to list the large constrictors as injurious will increase the risk of introduction and establishment of populations in new ecosystems of the United States where there is a lack of effective State control measures, including regulatory measures. Already-established boas will continue to prey on a wide variety of vertebrate wildlife, including birds and mammals. Because these snake species are novel, top predators within food webs where there is suitable climate in the U.S. and its territories, they have the potential to cause extensive and irreversible changes to form and structure of ecosystems and may jeopardize the long-term sustainability of affected populations of native species.

Impacts to Threatened and Endangered Species

The large constrictor snakes have the potential to negatively affect federally threatened and endangered wildlife species in the absence of effective State control measures. This Final Environmental Assessment contains tables of species that are federally threatened or endangered in climate-suitable States and territories, such as Florida, Hawaii, Guam, Puerto Rico, and the U.S. Virgin Islands. In Florida, introduced large constrictor snakes could severely impact and further imperil 30 species designated as threatened and endangered under the Federal or State laws, along with 27 State of Florida species of special concern (Table 3). These lists include only the size and types of species that would be expected to be directly affected by predation by the five snake species. For example, plants and marine species were excluded. Puerto Rico has nine bird species and 10 reptile species (Table 4). Hawaii has 34 bird species and 1 mammal (Table 5). The U.S. Virgin Islands have one bird species and three reptiles (Table 6). Guam has seven bird species and two mammals (Table 7).

Constrictor snakes measure about 22 inches (56 centimeters) when they hatch, and they feed on small prey, such as small mammals and reptiles. As they grow, the size of their prey increases, and all federally threatened and endangered species would be appropriate size at some stage of the snakes' life.

Table 3. State-listed species of special concern (SSC), and Federal- or State-listed threatened (T) and endangered (E) wildlife species that are vulnerable to some growth stage of giant constrictors in Florida (Reed and Rodda 2009; U.S. Fish and Wildlife Service 2014). These species are potential prey of the five constrictor snakes.

Class	Common Name	Scientific Name	Florida	Federal (ESA)
Amphibians	Gopher Frog	*Rana capito*	SSC	
Birds	Cape Sable Seaside Sparrow	*Ammodramus maritimus mirabilis*	E	E
	Scott's Seaside Sparrow	*Ammodramus maritimus peninsulae*	SSC	
	Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	E	E
	Florida Scrub Jay	*Aphelocoma coerulescens*	T	T
	Limpkin	*Aramus guarauna*	SSC	
	Florida Burrowing Owl	*Athene cunicularia floridana*	SSC	
	Audubon's Crested Caracara	*Polyborus plancus*	T	T
	Snowy Plover	*Charadrius nivosus*	T	
	Piping Plover	*Charadrius melodus*	T	T
	Worthington's Marsh Wren	*Cistothorus palustris griseus*	SSC	
	Marian's Marsh Wren	*Cistothorus palustris marianae*	SSC	
	Kirtland's Warbler	*Dendroica kirtlandii*	E	E
	Little Blue Heron	*Egretta caerulea*	SSC	
	Reddish Egret	*Egretta rufescens*	SSC	
	Snowy Egret	*Egretta thula*	SSC	

	Tricolored Heron	*Egretta tricolor*	SSC	

Table 3. (continued)

Class	Common Name	Scientific Name	Florida	Federal (ESA)
Birds	White Ibis	*Eudocimus albus*	SSC	
	Peregrine Falcon	*Falco peregrinus*	E	
	Southeastern American Kestrel	*Falco sparverius paulus*	T	
	Key West Quail-dove	*Geotrygon chrysie*	T	T
	Whooping Crane	*Grus Americana*	SSC	E
	Florida Sandhill Crane	*Grus canadensis pratensis*	T	
	American Oystercatcher	*Haematopus palliates*	SSC	
	Wood Stork	*Mycteria americana*	E	E
	Osprey	*Pandion haliaetus*	SSC	
	White-crowned Pigeon	*Patagioenas leucocephala*	T	
	Brown Pelican	*Pelecanus occidentalis*	SSC	
	Red-cockaded Woodpecker	*Picoides borealis*	SSC	E
	Roseate Spoonbill	*Platalea ajaja*	SSC	
	Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*		E
	Black Skimmer	*Rynchops niger*	SSC	
	Least Tern	*Sterna antillarum*	T	
	Roseate Tern	*Sterna dougallii*	T	T
	Bachman's Warbler	*Vermivora bachmanii*	E	E
Mammals	Sherman's Short-tailed Shrew	*Blarina carolinensis shermani*	SSC	
	Red Wolf	*Canis rufus*		E
	Florida Bonneted Bat	*Eumops floridanus*	E	
	Salt Marsh Vole	*Microtus pennsylvanicus dukecampbelli*	E	E
	Gray Bat	*Myotis grisescens*	E	E
	Indiana Bat	*Myotis sodalist*	E	E
	Key Largo Woodrat	*Neotoma floridana smalli*	E	E
	Southern Mink, So. FL pop	*Neovison vison pop 1*	T	
	Key Deer	*Odocoileus virginianus clavium*	E	E
	Sanibel Island Rice Rat	*Oryzomys palustris pop 2*	SSC	
	Lower Keys Rice Rat	*Oryzomys palustris pop 3*	E	E
	Key Largo Cotton Mouse	*Peromyscus gossypinus pop 1*	E	E
	Choctawhatchee Beach Mouse	*Peromyscus polionotus allophrys*	E	E
	Southeastern Beach Mouse	*Peromyscus polionotus niveiventris*	T	T
	St. Andrews Beach Mouse	*Peromyscus polionotus peninsularis*	E	E
	Anastasia Beach Mouse	*Peromyscus polionotus phasma*	E	E
	Perdido Key Beach Mouse	*Peromyscus polionotus trissyllepsis*	E	E
	Florida Mouse	*Podomys floridanus*	SSC	
	Florida Panther	*Puma concolor coryi*	E	E
	Mangrove Fox Squirrel	*Sciurus niger avicennia*	T	

Table 3. (continued)

Class	Common Name	Scientific Name	Florida	Federal (ESA)
	Sherman's Fox Squirrel	*Sciurus niger shermani*	SSC	
Mammals	Lower Keys Marsh Rabbit	*Sylvilagus palustris hefneri*	E	E
	Eastern Chipmunk	*Tamias striatus*	SSC	
	Florida Black Bear	*Ursus americanus floridanus*	T	
Reptiles	American Alligator	*Alligator mississippiensis*	SSC	
	American Crocodile	*Crocodylus acutus*	E	T
	Eastern Indigo Snake	*Drymarchon couperi*	T	T
	Red Rat Snake, Lower Keys pop	*Elaphe guttata, pop 1*	SSC	
	Gopher Tortoise	*Gopherus polyphemus*	T	
	Barbour's Map Turtle	*Graptemys barbouri*	SSC	
	Alligator Snapping Turtle	*Macrochelys temminckii*	SSC	

Table 4. Federally listed (ESA) threatened (T) and endangered (E) wildlife species that are vulnerable to some growth stage of the giant constrictors in Puerto Rico (U.S. Fish and Wildlife Service 2014). These species are potential prey of the five constrictor snakes.

Class	Common Name	Scientific Name	Status
Birds	Piping plover, except Great Lakes watershed	*Charadrius melodus*	T
	Puerto Rican broad-winged hawk	*Buteo platypterus brunnescens*	E
	Puerto Rican nightjar	*Caprimulgus noctitherus*	E
	Puerto Rican parrot	*Amazona vittata*	E
	Puerto Rican plain pigeon	*Columba inornata wetmorei*	E
	Puerto Rican sharp-shinned hawk	*Accipiter striatus venator*	E
	Roseate Tern, Western Hemisphere except NE U.S.	*Sterna dougallii dougallii*	T
	White-necked Crow	*Corvus leucognaphalus*	E
	Yellow-shouldered blackbird	*Agelaius xanthomus*	E
Reptiles	Culebra Island giant anole	*Anolis roosevelti*	E
	Golden coqui	*Eleutherodactylus jasperi*	T
	Guajon	*Eleutherodactylus cooki*	T
	Llanero coqui	*Eleutherodactylus juanariveroi*	E
	Mona boa	*Epicrates monensis monensis*	T
	Mona ground iguana	*Cyclura cornuta stejnegeri*	T
	Monito gecko	*Sphaerodactylus micropithecus*	E
	Puerto Rican crested toad	*Peltophryne lemur*	T
	Puerto Rican boa	*Epicrates inornatus*	E
	Virgin Islands tree boa	*Epicrates monensis granti*	E

Table 5. **Federally listed (ESA) threatened (T) and endangered (E) wildlife species that are vulnerable to some growth stage of the giant constrictors in Hawaii (U.S. Fish and Wildlife Service 2014). These species are potential prey of the five constrictor snakes.**

Class	Common Name	Scientific Name	Status
Birds	Akiapola`au (honeycreeper)	*Hemignathus munroi*	E
	Akikiki	*Oreomystis bairdi*	E
	Akekee	*Loxops caeruleirostris*	E
	Crested Honeycreeper	*Palmeria dolei*	E
	Hawaii (honeycreeper) akepa	*Loxops coccineus coccineus*	E
	Hawaiian common moorhen	*Gallinula chloropus sandvicensis*	E
	Hawaiian coot	*Fulica americana alai*	E
	Hawaii creeper	*Oreomystis mana*	E
	Hawaiian (alala) crow	*Corvus hawaiiensis*	E
	Hawaiian (koloa) duck	*Anas wyvilliana*	E
	Hawaiian goose	*Branta (=Nesochen) sandvicensis*	E
	Hawaiian (lo) hawk	*Buteo solitarius*	E
	Hawaiian dark-rumped petrel	*Pterodroma phaeopygia sandwichensis*	E
	Hawaiian stilt	*Himantopus mexicanus knudseni*	E
	Maui (honeycreeper) akepa	*Loxops coccineus ochraceus*	E
	Kauai (honeycreeper) akialoa	*Hemignathus procerus*	E
	Kauai (honeyeater) `O`o	*Moho braccatus*	E
	Large Kauai (kamao)	*Myadestes myadestinus*	E
	Laysan duck	*Anas laysanensis*	E
	Laysan (honeycreeper) finch	*Telespyza cantans*	E
	Maui parrotbill (honeycreeper)	*Pseudonestor xanthophrys*	E
	Molokai creeper	*Paroreomyza flammea*	E
	Molokai thrush	*Myadestes lanaiensis rutha*	E
	Nihoa (honeycreeper) finch	*Telespyza ultima*	E
	Nihoa (old world warbler) millerbird	*Acrocephalus familiaris kingi*	E
	Nukupu`u (honeycreeper)	*Hemignathus lucidus*	E
	Oahu elepaio	*Chasiempis sandwichensis ibidis*	E
	Oahu creeper	*Paroreomyza maculata*	E
	`O`u (honeycreeper)	*Psittirostra psittacea*	E
	Palila (honeycreeper)	*Loxioides bailleui*	E
	Po`ouli (honeycreeper)	*Melamprosops phaeosoma*	E
	Shearwater Newell's townsend's	*Puffinus auricularis newelli*	E
	Short-tailed albatross	*Phoebastria (=Diomedea) albatrus*)	T
	Small Kauai (puaiohi) thrush	*Myadestes palmeri*	E
Mammals	Hawaiian hoary bat	*Lasiurus cinereus semotus*	E

Table 6. Federally listed (ESA) threatened (T) and endangered (E) wildlife species that are vulnerable to some growth stage of the giant constrictors in the U.S. Virgin Islands (U.S. Fish and Wildlife Service 2014). These species are potential prey of the five constrictor snakes.

Class	Common Name	Scientific Name	Status
Birds	Roseate Tern, Western Hemisphere except NE U.S.	*Sterna dougallii dougallii*	T
Reptiles	Culebra Island giant anole	*Anolis roosevelti*	E
	St. Croix ground lizard	*Ameiva polops*	E
	Virgin Islands tree boa	*Epicrates monensis granti*	E

Table 7. Federally listed threatened (T) and endangered (E) species that are imperiled wildlife vulnerable to some growth stage of the giant constrictors in Guam (U.S. Fish and Wildlife Service 2014). These species are potential prey of the five constrictor snakes.

Class	Common Name	Scientific Name	Status
Birds	Bridled white-eye	*Zosterops conspicillatus*	E
	Guam rail	*Rallus owstoni*	E
	Guam Micronesian kingfisher	*Halcyon cinnamomina cinnamomina*	E
	Mariana common moorhen	*Gallinula chloropus guami*	E
	Mariana (=aga) crow	*Corvus kubaryi*	E
	Mariana gray swiftlet	*Aerodramus vanikorensis bartschi*	E
	Nightingale reed warbler (Old World warbler)	*Acrocephalus luscinia*	E
Mammals	Little Mariana fruit bat	*Pteropus tokudae*	E
	Mariana fruit bat (=Mariana flying fox) bat	*Pteropus mariannus mariannus*	T

Impacts to Humans

Nonnative large constrictor snakes pose a small but perceptible risk to human safety in the natural environment. Human fatalities from non-venomous snakes in the wild are rare, at most only a few per year worldwide. Although attacks on people are rare, they may occur and deaths are possible given the large size that some individual snakes can reach. Human fatalities from nonnative large constrictor snakes in captivity have occurred in the past in the United States (HSUS 2014) and would be expected to continue under all alternatives analyzed in this Environmental Assessment since the proposed action and alternatives 2B, 3, and 4 would prohibit importation and interstate transport but not possession.

Economic Impacts

Under this Alternative, there would be no loss of retail sales. Potential costs to the environment would be increasing from year to year.

Indirect Effects

An indirect effect of not listing nonnative large constrictor snakes and in the absence of effective State control measures would be the cascading effects that emerge from increased predation on prey. Over time, a reduction in prey densities could reduce food resources of native predator species. Further, a reduction in herbivore density could potentially alter existing habitat structure.

It is plausible that owners of large constrictor snakes may intentionally release their snakes in reaction to Federal regulation. This outcome would be contrary to the agency's intent of stopping spread through interstate transport and importation. Possession and transport within States would remain under the purview of each State and remain lawful under Federal law. Intentionally releasing any unwanted nonnative large constrictor snake would violate State law in most, if not all, cases; however, if this does not dissuade pet owners from releasing animals into the wild, these actions could result in a greater likelihood that new populations of nonnative large constrictor snakes would become established. Alternative 1, the no action alternative, would minimize the unintended consequence of pet owners unlawfully releasing snakes in reaction to the Federal regulation.

Large constrictor snakes have also been found to carry harmful pathogens and may act as vectors of disease transmission to native wildlife and livestock. There is a risk of pathogens being introduced by large constrictors in the absence of effective State control measures into new areas of the country, and new pathogens could be carried in with new importations. It is probable that ticks and other ectoparasites (external parasites) could be transmitted to native reptiles in the United States, which could then also be transmitted to other types of wildlife and livestock. Diseases borne by such parasites could potentially impact United States industries such as agriculture.

Cumulative Effects

Large constrictor snakes have been found in the United States in the wild (including Florida, Puerto Rico, and California). Risk of accidental or intentional releases from pet owners and reptile breeders would continue in States currently allowing possession of large constrictor snakes. At least 11 States either prohibit the possession of certain large constrictor snakes or require a permit for their import, possession, or distribution: Florida, Hawaii, Illinois, Iowa, Louisiana, Massachusetts, Missouri, New Jersey, New York, Rhode Island, and Texas. Since most States allow large constrictor snakes, a reproducing population could become established in the United States in the absence of effective State control measures, thereby imperiling recovery of native threatened or endangered species. The establishment of additional large constrictor

snakes in an area already degraded by other species of non-native constrictor snakes could pose a serious threat to many of the remaining populations of endangered, threatened, and other native species. For example, the populations of small mammals in Everglades National Park that are already believed to be significantly reduced by Burmese python predation (Dorcas et al. 2012) could be further reduced by the establishment of any of the five large constrictor species.

Nonnative large constrictor snake invasions are usually irreversible due to the lack of effective methods of eradication or control. Since effective measures to control or eradicate large constrictor snake populations are not available, the ability to rehabilitate or recover ecosystems disturbed by the species is low. Considerable risks are associated with the establishment of large constrictor snakes in the wild related to endangerment and extinction of native wildlife populations. Re-establishment of extirpated populations of native wildlife, if biologically possible, would be labor and cost-intensive and would depend on eradication of large constrictor snakes within invaded habitats.

The Service continues to work with partners to research control technologies and snake life histories, increase public awareness, develop capacity to rapidly respond to sightings of snakes in the wild, and assist with Nonnative Pet Amnesty days led by our State partners, which provide an important alternative to release of pet snakes into the wild. If no action is taken to prohibit the importation and interstate transportation of large constrictor snakes and in the absence of effective State control measures, introduction of the snakes into the ecosystems of the United States will likely add to the stresses already experienced by native wildlife and ecosystems, such as habitat degradation from development, agriculture, and contaminants, that have already adversely affected native wildlife resources.

The Service also considers the environmental effects of a U.S. regulatory action outside the United States, although not required under NEPA. Under Executive Order 12114 ("Environmental Effects Abroad of Major Federal Actions"), the Service considers "major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action." Here we consider the effect of not listing the species on the countries where the species are native. Not listing any large constrictor snakes as injurious would not result in a decreased demand for these nonnative snakes in the United States. There would not likely be a decrease in harvesting pressure in their native ranges. All species in the family *Pythonidae* (except *Python molurus*) are listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Appendix II, which "includes species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival." The subspecies *Boa constrictor occidentalis* is listed by CITES under Appendix I, which includes "species threatened with extinction which are or may be affected by trade." All other species in the family *Boidae*¸ which includes all anacondas, are listed in CITES Appendix II. Species listed under CITES Appendix II can be taken from the wild for commercial international trade provided certain findings are made and all appropriate CITES documents are issued and presented upon export and import. Trade in these species is strictly regulated to prevent unsustainable use of the species. Actions that may result in decreased demand for these species in trade are likely to provide benefits for the species in the

wild in their native range by reducing the pressure of collection from wild populations. Because not listing any of the pythons and boas under this scenario would not decrease demand for those snakes in the United States, it is not likely to benefit wild populations in their native countries.

Alternative 2A: List as Injurious the Reticulated Python, Boa Constrictor, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda [Proposed Action]

Direct Effects

Ecological Impacts

Listing all five large constrictor snakes as injurious will help protect fauna in ecosystems and watersheds of the United States. No negative impacts to habitats will result from listing large constrictor snakes. Because of the wide variety of mammals, birds, reptiles, amphibians, and fish that most of these hunt and eat, these giant snakes are likely to negatively affect threatened and endangered wildlife biodiversity, distribution, and abundance, as well as any ecosystem and societal benefits derived from those species. This alternative would reduce but not eliminate the risks to the environment in those States where the large constrictors are already present.

Under this alternative, however, large constrictor snakes could still become established in the wild within States where the snakes already occur. Listing would not prevent possible escapes and releases from existing pet ownership that could result in new wild populations. Ownership of any of the five large constrictor snakes in the absence of effective State control measures increases the risk of introduction and establishment of these large snakes in the wild. Because the Department of the Interior regulates importation and interstate transport of injurious wildlife under the Lacey Act, listing the five species of large snakes as injurious should decrease the risk of these snakes from becoming established in the United States. However, the States independently may regulate possession, transport, breeding, and other activities with large constrictor snakes within State boundaries. If a State allows the use or ownership of one or more of the five species, regardless of the Federal injurious listing status, this could undermine the potential benefits of a listing action. Conversely, State controls that effectively reduce the risk of escape and establishment, such as prohibiting possession, would significantly bolster and could provide even stronger protection than Federal listing under the Lacey Act.

Impacts on Native Species

Prohibiting the importation and interstate transportation of the five species of large constrictor snakes would be expected to reduce predatory stress on native species. The absence of an additional predator would eliminate one threat toward endangerment and help protect native vertebrate species of all classes in natural and developed areas. No negative impacts to native species will result from listing all five large constrictor snakes. The alternative will not eliminate the environmental threats in those States where the large constrictor snakes are already present; however, some threats will be reduced because some States may not have all three species currently in trade. Alternative 2A, by prohibiting the importation and interstate transportation of five large constrictor snakes, may do the most to protect native species from negative impacts

due to large constrictor snake introduction, in the absence of State action to effectively regulate ownership, possession, and use of these large constrictor snakes.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of large constrictor snakes will help protect native threatened and endangered wildlife populations. No negative impacts to native species will result from listing the large constrictor snakes as injurious. This alternative will not eliminate the environmental threats in those States where large constrictor snakes are currently present. However, some threats will be reduced because some States may not have all three species currently in trade. By prohibiting the importation and interstate transportation of all five large constrictor snakes, Alternative 2A may do the most to protect threatened and endangered species from predation by large constrictor snakes. As described under Alternative 1, not listing five species of large constrictor snakes as injurious is expected to increase the risk of impacts to threatened and endangered species, especially if States fail to regulate ownership, possession, and use of large constrictor snakes. Tables 3 through 7 list imperiled species that would likely have reduced threats of predation in several States by listing all five species of the large constrictor snakes.

In other words, not listing is expected to have a harmful impact because re-establishment of extirpated wildlife populations that were rendered threatened or endangered by the presence of boa constrictors, reticulated pythons, Beni anacondas, DeSchauensee's anacondas, or green anacondas, if biologically possible, would be labor and cost intensive and would depend on eradication of the nonnative large constrictor snakes that were causing harm to the habitat of native wildlife species. If no effective action is taken by States, resource managers would likely be unable to re-establish wildlife populations and rehabilitate natural ecosystems of the United States, damaged by further introduction of additional constrictors of these five species. Listing these five species should greatly decrease the probability of this type of effect.

Impacts to Humans

In the natural environment, none of these snakes poses more than a minimally perceptible risk to human safety. Human fatalities from non-venomous snakes in the wild are rare, probably only a few per year worldwide. However, they are possible given the large size that some individual snakes can reach.

Economic Impacts

The Service prepared an economic analysis (U.S. Fish and Wildlife Service 2015a) to describe the estimated effects of the alternatives in this environmental assessment. Using information available on imports (U.S. Fish and Wildlife Service 2015b) and sales provided during the public comment periods and by other sources, the Service used an approach of having three scenarios: Scenario A (low end estimate), Scenario B (high end estimate), and Scenario C (adjusted estimate based on an independent analysis by industry that were slightly higher than Scenario B).

For Scenarios A, B, and C, retail value impacts range from $9.3 to $20.1 million; output impacts from $26.5 to $57.1 million, employment from 236 to 509 jobs; employment income from $9.5

to $20.5 million; and total tax revenue from $3.6 to $7.8 million. Please see Final Economic Analysis (U.S. Fish and Wildlife Service 2015a) for more information on the potential economic costs and benefits of Alternative 2A.

Indirect Effects

An indirect effect of listing five large constrictor snakes as injurious will be the reduced disruption of ecological trophic levels as the potential for range expansion and population increase of nonnative large constrictor snakes is reduced. Further, due to transport and importation restrictions of nonnative constrictor snakes, potential introduction of harmful pathogens or disease will be reduced. See the discussion on indirect effects under Alternative 1, which would be prevented under Alternative 2A.

Another indirect effect, as stated in some public comments, could be the unintended consequence of the intentional release into the wild of individual snakes of the newly listed species by their owners. This could be because owners are moving to another State and are prohibited by the Lacey Act from taking the snake across State lines, because they mistakenly believe that they can no longer possess their snake under this regulation, or some other reason related to the listing action. While it is possible that subsequent intentional releases will occur, the situation was occurring well before the injurious listing was considered in 2006, and the Service has been taking actions to prevent such releases (such as assisting Florida Fish and Wildlife Conservation Commission with Pet Amnesty Days for the surrender of live animals). We emphasize that it will be lawful for pet owners to keep their pets under this Federal regulation. Therefore, we have no reason to believe that responsible owners will release their snakes into the wild. Snake owners who no longer want their snake may consider surrendering their animals to a zoo, animal rescue group, school, nature center, or pet retailer within their State, or contacting a local herpetology club or a national reptile organization to find someone in their State to adopt those constrictor snakes. Breeders may still be able to export through a designated port in their own State (see response to Comment 68 of the final rule for exporting explanation). For breeders who can no longer export, they may find buyers in their own State. And finally, for people who live in Florida, "Anyone who possesses a [regulated] snake or lizard but cannot keep it can surrender the animal to a licensed recipient (adopter) at any time with no penalties" (FWC 2014). Many States, including Florida (FWC 2014b), have laws making it illegal to release nonnative animals into the wild.

Other indirect effects of listing the species in this alternative may include impediments to researchers and to conservation efforts because the listed species could not be imported or transported across State lines without a permit provided by the Service. Some types of research that constrictor snakes are used for include biomedical research, studies of the life histories of constrictor snakes, and studies for controlling and eradicating constrictor snakes. The permit process could slow the start of research projects (such as biomedical and biological) because the application process could take 30 or more days. Permits may be obtained for scientific, educational, medical, and zoological purposes, and therefore, these activities may continue with a permit. Intrastate conservation and research efforts will not need a permit by the Service.

Cumulative Effects

Listing five species of nonnative large constrictors as injurious species will help protect the wildlife resources of the United States in areas that are not occupied by these snakes or where they have not yet been introduced. This alternative would reduce the potential for five large constrictor snake species to be released into additional areas where they are not yet found, through importation and other pathways. With the action taken to prohibit their importation and interstate transport, releases or escapes of large constrictor snakes into an ecosystem are less likely to continue. Therefore, this listing would ensure that certain potential effects associated with introduction of species that have been found to be injurious do not occur. The listing action preserves the environmental status quo by maintaining the baseline population of the injurious species. This action is the same action as that of the final rule to list four large other constrictor snakes as injurious in 2012 (Burmese python, Northern African python, Southern African python, and yellow anaconda), which the Service found to have no significant impact. The amendment of these five species to the list of injurious wildlife, in addition to the four large constrictor snakes listed as injurious in 2012, should not have a cumulative effect.

The Service also considers the environmental effects of a U.S. regulatory action outside of the United States, although not required under NEPA. Under Executive Order 12114 ("Environmental Effects Abroad of Major Federal Actions"), the Service considers "major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action." Here we consider the effect of listing the five species on the countries where the species are native. Listing the large constrictor snakes as injurious could result in the decrease of harvesting from the wild in their native ranges, and thus would be more protective. Under EO 12114, the Service believes that listing these species is not a major Federal action significantly affecting the environment of a foreign nation. The listing of five large constrictor snakes as injurious could result in a decreased demand for these nonnative snakes in the United States (because it would be illegal to import them) and thus a decrease in harvesting pressure in their native ranges. All species in the family *Pythonidae* (except *Python molurus*) are listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Appendix II, which "includes species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival." The subspecies *Boa constrictor occidentalis* is listed by CITES under Appendix I, which includes "species threatened with extinction which may or may not be affected by trade." All other species in the family *Boidae*, which includes all anacondas, are listed in CITES Appendix II. Species listed under CITES Appendix II can be taken from the wild for commercial international trade provided certain findings are made and all appropriate CITES documents are issued and presented upon export and import. Trade in these species is strictly regulated to prevent unsustainable use of the species. Actions that may result in decreased demand for these species in trade are likely to provide benefits for the species in the wild in their native range by reducing the pressure of collection from wild populations. Therefore, the listing of the pythons, anacondas, and boas would be expected to have a beneficial effect on the native populations. Beneficial impacts to wild populations of five species in their native countries are expected under Alternative 2A.

Alternative 2B: List as injurious the Reticulated Python, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda

This alternative is the same as alternative 2A, except that the Service would not list the boa constrictor.

Direct Effects

Ecological Impacts

Listing four nonnative large constrictor snakes as injurious will help protect fauna in ecosystems and watersheds of the United States. No negative impacts to habitats will result from listing large constrictor snakes. These giant snakes have the potential to negatively affect threatened and endangered wildlife species biodiversity, distribution and abundance if established in the wild. This alternative would not eliminate the risk to the environment from the boa constrictor or in those States where the other species of large constrictor snakes are already present. Listing the four species would reduce impacts from these species, but negative impacts to ecological systems, native species, threatened and endangered species, and human safety would continue from the boa constrictor.

Under this alternative, there could be reproduction and spread of large constrictor snakes within States where the snakes occur. Ownership of the four large constrictor snakes in the absence of effective State control measures increases the risk of introduction and establishment of these large snakes in the wild. Because the Department of the Interior regulates importation and interstate transport of injurious wildlife under the Lacey Act, listing the four species of large snakes as injurious should decrease the risk of these snakes becoming established in the United States. However, the States independently may regulate possession, transport, breeding, and other activities with large constrictor snakes within State boundaries. If a State allows the use or ownership of one or more of the four species, regardless of the Federal injurious listing status, this could undermine the potential benefits of a listing action. Conversely, State controls that effectively reduce the risk of escape and establishment, such as prohibiting possession, would significantly bolster and could provide even stronger protection than Federal listing under the Lacey Act.

Impacts on Native Species

Predation of native vertebrate species of all classes in natural and urban areas by these four species in States where they are not already located would be expected to be prevented or reduced by prohibiting the importation and interstate transportation of four species of nonnative large constrictor snakes. No negative impacts to native species are expected from listing the four large constrictor snakes. This alternative will not eliminate the environmental risks in those States where any of the four species of large constrictor snakes are already present. For more detail, see the discussion on direct effects under Alternative 2A.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of these four species of large constrictor snakes will reduce predation of native threatened and endangered wildlife populations. No negative impacts to native species are expected from listing the four species of the large constrictor snakes. This alternative will not eliminate the environmental risks in those States where these large constrictor snakes are currently owned and used. As described under Alternative 1, not listing the four species of large constrictor snakes as injurious increases the risk of impacts to threatened and endangered species if States fail to regulate possession and other activities with large constrictor snakes. Tables 3 through 7 list imperiled species that would have reduced threats of predation in several States by listing the four species of large constrictor snakes.

In other words, not listing is expected to have a harmful impact because re-establishment of extirpated wildlife populations that were rendered threatened or endangered by the presence of reticulated pythons, Beni anacondas, DeSchauensee's anacondas, or green anacondas, if biologically possible, would be labor and cost intensive and would depend on eradication of the nonnative large constrictor snakes that were causing harm to the habitat of native wildlife species. If no effective action is taken by States, resource managers would likely be unable to re-establish wildlife populations and rehabilitate natural ecosystems of the United States, damaged by further introduction of additional constrictors of these four species. Listing these four species should greatly decrease the probability of this type of effect.

Impacts to Humans

None of these snakes poses more than a minimally perceptible risk to human safety. Human fatalities from non-venomous snakes in the wild are rare, probably only a few per year worldwide. However, they are possible given the large size that some individual snakes can reach.

Economic Impacts

For Scenarios A, B, and C, retail value impacts (decrease from Alternative 1) range from $1.9 to $4.1 million; output impacts from $5.3 to $11.4 million, employment from 49 to 105 jobs; employment income from $1.9 to $4.1 million; and total tax revenue from $0.7 to $1.6 million. Please see Final Economic Analysis (U.S. Fish and Wildlife Service 2015a) for more information on the potential economic costs and benefits of Alternative 2B.

Indirect Effects

An indirect effect of listing the four large constrictor snakes as injurious will be the reduced disruption of ecological trophic levels as the potential for range expansion and population increase of nonnative large constrictor snakes is reduced, although this effect would not be as great as under Alternative 2A with the continued risk of ecological disruption from the boa constrictor in the absence of effective State control measures. Further, due to transport and

importation restrictions of nonnative constrictor snakes, potential introduction of harmful pathogens or disease will be reduced, although also not as much as under Alternative 2A with the continued introduction of boa constrictors in the absence of effective State control measures. See the discussion on indirect effects under Alternative 1, which would be reduced under Alternative 2B.

Another indirect effect, as stated in some public comments, could be the unintended consequence of intentional release into the wild of individual snakes of the newly listed species by their owners. This could be because owners are moving to another State and are prohibited by the Lacey Act from taking the snake across State lines, because they mistakenly believe that they can no longer possess their snake under this regulation, or some other reason related to the listing action. While it is possible that subsequent intentional releases will occur, the situation was occurring well before the injurious listing was considered in 2006, and the Service has been taking actions to prevent such releases (such as assisting Florida Fish and Wildlife Conservation Commission with Pet Amnesty Days for the surrender of live animals). We emphasize that it will be lawful for pet owners to keep their pets under this Federal regulation. Therefore, we have no reason to believe that responsible owners will release their snakes into the wild. Snake owners who no longer want their snake may consider surrendering their animals to a zoo, animal rescue group, school, nature center, or pet retailer within their State, or contacting a local herpetology club or a national reptile organization to find someone in their State to adopt those constrictor snakes. Breeders may still be able to export through a designated port in their own State (see response to Comment 68 of the final rule for exporting explanation). For breeders who can no longer export, they may find buyers in their own State. And finally, for people who live in Florida, "Anyone who possesses a [regulated] snake or lizard but cannot keep it can surrender the animal to a licensed recipient (adopter) at any time with no penalties" (FWC 2014a). Many States, including Florida (FWC 2014b), have laws making it illegal to release nonnative animals into the wild.

Other indirect effects of listing the species in this alternative may include impediments to researchers and to conservation efforts because the listed species could not be imported or transported across State lines without a permit provided by the Service. Some types of research that constrictor snakes are used for include biomedical research, studies of the life histories of constrictor snakes, and studies for controlling and eradicating constrictor snakes. The permit process could slow the start of research projects (such as biomedical and biological) because the application process could take 30 or more days. Permits may be obtained for scientific, educational, medical, and zoological purposes, and therefore, these activities may continue with a permit. Intrastate conservation and research efforts will not need a permit by the Service.

Cumulative Effects

With the action taken to prohibit the importation and interstate transport of the four species, releases or escapes of the four species into an ecosystem are less likely to continue. Therefore, this listing would ensure that certain potential effects associated with introduction of species that have been found to be injurious do not occur. The listing action preserves the environmental status quo by maintaining the baseline population of the injurious species. This action is the

same action as that of the final rule to list four large other constrictor snakes as injurious in 2012 (Burmese python, Northern African python, Southern African python, and yellow anaconda), which the Service found to have no significant impact. The amendment of these four species to the list of injurious wildlife in addition to the four large constrictor snakes listed as injurious in 2012 should not have a cumulative effect.

For States where the species that would be listed under Alternative 2B already occur, no effective and feasible tools are currently available to manage large constrictor snakes. Trapping is the best available option at this time, but trapping on a large scale is prohibitively expensive and ineffective. Since effective measures to control or eradicate large constrictor snake populations are not available, the ability to rehabilitate or recover ecosystems impacted by these species is low. Because large constrictor snakes are capable of living 20 or more years and would consume a substantial amount of native vertebrates during their lifespan, native wildlife, especially endangered and threatened species, face considerable risk of further endangerment and extinction if additional large constrictor snakes are released or escape even after listing under the Lacey Act and become established in U.S. environments. Entire populations of native wildlife may be extremely vulnerable to heavy predation by these large constrictor snakes by the additional release or escape of snakes in States where the species already occur and in the absence of effective State controls.

Re-establishment of extirpated threatened and endangered wildlife populations, if biologically possible, would be labor and cost intensive and would depend on eradication of large constrictor snakes within the habitat of native wildlife species. If no effective action is taken by States, the inability to re-establish wildlife populations and rehabilitate natural ecosystems of the United States damaged by further introductions of boa constrictors as well as introductions of the other four species in States where they are already present, will likely add to the impacts that have already affected native wildlife species as discussed under Alternative 1.

The Service also considers the environmental effects of a U.S. regulatory action outside of the United States, although not required under NEPA. Under Executive Order 12114 ("Environmental Effects Abroad of Major Federal Actions"), the Service considers "major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action." Here we consider the effect of listing the four species on the countries where the species are native. Listing the large constrictor snakes as injurious could result in the decrease of harvesting from the wild in their native ranges, and thus would be more protective. Under EO 12114, the Service believes that listing these species is not a major Federal action significantly affecting the environment of a foreign nation. The listing of four large constrictor snakes as injurious could result in a decreased demand for these nonnative snakes in the United States (because it would be illegal to import them) and thus a decrease in harvesting pressure in their native ranges. All species in the family *Pythonidae* (except *Python molurus*) are listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Appendix II, which "includes species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival." The subspecies *Boa constrictor occidentalis* is listed by CITES under

Appendix I, which includes "species threatened with extinction which may or may not be affected by trade." Species listed under CITES Appendix II, which includes all anacondas, can be taken from the wild for commercial international trade provided certain findings are made and all appropriate CITES documents are issued and presented upon export and import. Trade in these species is strictly regulated to prevent unsustainable use of the species. Actions that may result in decreased demand for these species in trade are likely to provide benefits for the species in the wild in their native range by reducing the pressure of collection from wild populations. Therefore, the listing of the pythons and anacondas would be expected to have a beneficial effect on the native populations. Beneficial impacts to wild populations of four species in their native countries are expected under Alternative 2B.

Alternative 3: **List as Injurious Reticulated Python, Boa Constrictor, and Green Anaconda.**

Direct Effects

Ecological Impacts

Listing these three nonnative large constrictor snakes as injurious will help protect fauna in ecosystems and watersheds of the United States. No negative impacts to habitats will result from listing three large constrictor snakes. These giant snakes have the potential to negatively affect threatened and endangered wildlife species biodiversity, distribution, and abundance. This alternative would not eliminate the risk to the environment in those States where the large constrictor snakes are already present.

Listing the three species would reduce impacts from these three species, but negative impacts to ecological systems, native species, threatened and endangered species, and human safety would continue from the other two species if they are imported into the United States. The most effective way to prevent negative impacts on native wildlife and natural ecosystems is to prevent the introduction of injurious species in the first place, while Lacey Act restrictions are least effective for species that have been imported in large numbers and are already widely distributed and owned by a wide variety of individuals throughout the United States. The positive environmental effect of preventing negative impacts to native wildlife and wildlife resources from the import of Beni and DeSchauensee's anacondas would be lost under this alternative and the negative impacts discussed under Alternative 1 for these two species would be expected to still occur if they are imported into the United States.

Under this alternative, there could be reproduction and range extension of large constrictor snakes within States where the snakes already occur but are not yet established in the wild. Listing would not prevent possible escapes and releases from existing pet ownership that could result in new wild populations. Ownership of any of these three large constrictor snakes in the absence of effective State control measures increases the risk of their introduction and establishment in the wild. Because the Department of the Interior regulates importation and interstate transport of injurious wildlife under the Lacey Act, listing the three species of large

snakes as injurious should decrease the risk of these snakes becoming established in the United States. However, the States independently may regulate possession, transport, breeding, and other activities with large constrictor snakes within State boundaries. If a State allows the use or ownership of one or more of the three species, regardless of the Federal injurious listing status, this could undermine the potential benefits of a Federal listing action. Conversely, State controls that effectively reduce the risk of escape and establishment, such as prohibiting possession, would significantly bolster and could provide even stronger protection than Federal listing under the Lacey Act.

Impacts on Native Species

Prohibiting the importation and interstate transportation of the three species of large constrictor snakes will reduce predation of native vertebrate species of all classes in natural and urban areas. No negative impacts to native species will result from listing all three large constrictor snakes. This alternative would not eliminate the environmental risks in those States where the three species of large constrictor snakes are already present. For more details, see the discussion on direct effects under Alternative 2A.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of these three species of large constrictor snakes will help protect native threatened and endangered wildlife populations. Only positive impacts to threatened and endangered species will result from listing these three species of the large constrictor snakes. This alternative will not eliminate the environmental risks in those States where these large constrictor snakes already occur. As described under Alternative 1, not listing the three species of large constrictor snakes as injurious could increase the risk of impacts to threatened and endangered species, especially if States fail to regulate possession and other activities with large constrictor snakes. Tables 3 through 7 list imperiled species that would have reduced threats of predation in several States by listing the three species of the large constrictor snakes.

In other words, not listing is expected to have a harmful impact because re-establishment of extirpated wildlife populations that were rendered threatened or endangered by the presence of boas, reticulated pythons, or green anacondas, if biologically possible, would be labor and cost intensive and would depend on eradication of the nonnative large constrictor snakes that were causing harm to the habitat of native wildlife species. If no effective action is taken by States, resource managers would likely be unable to re-establish wildlife populations and rehabilitate natural ecosystems of the United States, damaged by further introduction of additional boas, reticulated pythons, or green anacondas. Listing these three species should greatly decrease the probability of this type of effect.

Impacts to Humans

None of these snakes poses more than a minimally perceptible risk to human safety. Human fatalities from non-venomous snakes in the wild are rare, probably only a few per year worldwide. However, they are possible given the large size that some individual snakes can reach.

Economic Impact

For Scenarios A, B, and C, retail value impacts range from $9.3 to $20.1 million; output impacts from $26.5 to $57.1 million, employment from 236 to 509 jobs; employment income from $9.5 to $20.5 million; and total tax revenue from $3.6 to $7.8 million. Please see Final Economic Analysis (U.S. Fish and Wildlife Service 2015a) for more information on the potential economic costs and benefits of Alternative 3.

Indirect Effects

An indirect effect of listing the three large constrictor snakes as injurious will be the reduced disruption of ecological trophic levels as the potential for range expansion and population increase of nonnative large constrictor snakes is reduced, although this effect would not be as great as under Alternative 2A with the continued risk of ecological disruption from the two species of anacondas in the event they are introduced into the United States and in the absence of effective State control measures. Further, due to transport and importation restrictions of nonnative constrictor snakes, potential introduction of harmful pathogens or disease will be reduced, although also not as much as under Alternative 2A with the potential introduction of the other two species of anacondas and in the absence of effective State control measures. See the discussion on indirect effects under Alternative 1, which would be prevented under Alternative 3.

Another indirect effect, as stated in some public comments, could be the unintended consequence of the intentional release into the wild of individual snakes of the newly listed species by their owners. This could be because the owners are moving to another State and are prohibited by the Lacey Act from taking the snake across State lines, because they mistakenly believe that they can no longer possess their snake under this regulation, or some other reason related to the listing action. While it is possible that subsequent intentional releases will occur, the situation was occurring well before the injurious listing was considered in 2006, and the Service has been taking actions to prevent such releases (such as assisting Florida Fish and Wildlife Conservation Commission with Pet Amnesty Days for the surrender of live animals). We emphasize that it will be lawful for pet owners to keep their pets under this Federal regulation. Therefore, we have no reason to believe that responsible owners will release their snakes into the wild. Snake owners who no longer want their snake may consider surrendering their animals to a zoo, animal rescue group, school, nature center, or pet retailer within their State, or contacting a local herpetology club or a national reptile organization to find someone within their State to adopt those constrictor snakes. Breeders may still be able to export through a designated port in their own State (see response to Comment 68 of the final rule for exporting explanation). For breeders who can no longer export, they may find buyers in their own State. And finally, for people who live in Florida, "Anyone who possesses a [regulated] snake or lizard but cannot keep it can

surrender the animal to a licensed recipient (adopter) at any time with no penalties" (FWC 2014a). Many States, including Florida (FWC 2014b), have laws making it illegal to release nonnative animals into the wild.

Other indirect effects of listing the species in this alternative may include impediments to researchers and to conservation efforts because the listed species could not be imported or transported across State lines without a permit provided by the Service. Some types of research that constrictor snakes are used for include biomedical research, studies of the life histories of constrictor snakes, and studies for controlling and eradicating constrictor snakes. The permit process could slow the start of research projects (such as biomedical and biological) because the application process could take 30 or more days. Permits may be obtained for scientific, educational, medical, and zoological purposes, and therefore, these activities may continue with a permit. Intrastate conservation and research efforts will not need a permit by the Service.

Cumulative Effects

With the action taken to prohibit the importation and interstate transport of the three species, releases or escapes of the three species into an ecosystem are less likely to continue. Therefore, this listing would ensure that certain potential effects associated with introduction of species that have been found to be injurious do not occur. The listing action preserves the environmental status quo by maintaining the baseline population of the injurious species. This action is the same action as that of the final rule to list four large other constrictor snakes as injurious in 2012 (Burmese python, Northern African python, Southern African python, and yellow anaconda), which the Service found to have no significant impact. The amendment of these three species to the list of injurious wildlife in addition to the four large constrictor snakes listed as injurious in 2012 should not have a cumulative effect.

The Service also considers the environmental effects of a U.S. regulatory action outside of the United States, although not required under NEPA. Under Executive Order 12114 ("Environmental Effects Abroad of Major Federal Actions"), the Service considers "major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action." Here we consider the effect of listing the three species on the countries where the species are native. Listing the large constrictor snakes as injurious could result in the decrease of harvesting from the wild in their native ranges, and thus would be more protective. Under EO 12114, the Service believes that listing these species is not a major Federal action significantly affecting the environment of a foreign nation. The listing of three large constrictor snakes as injurious could result in a decreased demand for these nonnative snakes in the United States (because it would be illegal to import them) and thus a decrease in harvesting pressure in their native ranges. All species in the family *Pythonidae* (except *Python molurus*) are listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Appendix II, which "includes species which although not necessarily now threatened with extinction may become so unless

trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival." The subspecies *Boa constrictor occidentalis* is listed by CITES under Appendix I, which includes "species threatened with extinction which may or may not be affected by trade." All other species in the family *Boidae*, which includes all anacondas, are listed in CITES Appendix II. Species listed under CITES Appendix II can be taken from the wild for commercial international trade provided certain findings are made and all appropriate CITES documents are issued and presented upon export and import. Trade in these species is strictly regulated to prevent unsustainable use of the species. Actions that may result in decreased demand for these species in trade are likely to provide benefits for the species in the wild in their native range by reducing the pressure of collection from wild populations. Therefore, the listing of the pythons and anacondas would be expected to have a beneficial effect on the native populations. Beneficial impacts to wild populations of four species in their native countries are expected under Alternative 3.

Alternative 4: List as Injurious Boa Constrictor.

Direct Effects

Ecological Impacts

Listing one nonnative large constrictor snakes as injurious will help protect fauna in ecosystems and watersheds of the United States from this species. No negative impacts to habitats will result from listing this large constrictor snake. The boa constrictor has the potential to negatively affect threatened and endangered wildlife species biodiversity, distribution, and abundance. This alternative would not eliminate the risk to the environment in those States where the boa constrictor is already present. Listing the one species would reduce impacts from this one species, but negative impacts to ecological systems, native species, threatened and endangered species, and human safety would continue from the other four species. The negative impacts discussed under Alternative 1 for these four species would be expected to still occur.

Under this alternative, there could be reproduction and spread of the boa constrictor within States where the snakes occur. Listing would not prevent possible escapes and releases from existing pet ownership that could result in new wild populations. Boa constrictors are found in captivity widespread across the United States and are frequently captured after escaping captivity (HSUS 2014). Because the Department of the Interior regulates importation and interstate transport of injurious wildlife under the Lacey Act, listing the boa constrictor as injurious should decrease the risk of this snake becoming established in the United States. However, the States independently may regulate possession, transport, breeding, and other activities with the boa constrictor within State boundaries. If a State allows the use or ownership of the boa constrictor, regardless of the Federal injurious listing status, this could undermine the potential benefits of a listing action. Conversely, State controls that effectively reduce the risk of escape and establishment, such as prohibiting possession, would significantly bolster and could provide stronger protection than Federal listing under the Lacey Act.

Impacts on Native Species

Prohibiting the importation and interstate transportation of the boa constrictor will reduce predation of native vertebrate species of all classes by this species in natural and urban areas. No negative impacts to native species will result from listing this one large constrictor snake. This alternative would not eliminate the environmental risks in those States where the boa constrictor is already present. For more detail, see the discussion on direct effects under Alternative 2A.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of this large constrictor snake will reduce predation of native threatened and endangered wildlife populations. No negative impacts to native species will result from listing this one species of the large constrictor snakes. This alternative will not eliminate the environmental risks in those States where this large constrictor snakes is currently owned and used. As described under Alternative 1, not listing the boa constrictor as injurious increases the risk of impacts to threatened and endangered species, especially if States fail to regulate possession and other activities with boa constrictors. Tables 3 through 7 list imperiled species that would have reduced threats of predation in several States by listing the boa constrictor.

In other words, not listing is expected to have a harmful impact because re-establishment of extirpated wildlife populations that were rendered threatened or endangered by the presence of boa constrictors, if biologically possible, would be labor and cost intensive and would depend on eradication of the nonnative large constrictor snakes that were causing harm to the habitat of native wildlife species. If no effective action is taken by States, resource managers would likely be unable to re-establish wildlife populations and rehabilitate natural ecosystems of the United States, damaged by further introduction of additional boa constrictors. Listing this species should greatly decrease the probability of this type of effect.

Impacts to Humans

Boa constrictors pose no more than a minimally perceptible risk to human safety. Human fatalities from non-venomous snakes in the wild are rare, probably only a few per year worldwide. However, they are possible given the large size that some individual snakes can reach.

Economic Impacts

For Scenarios A, B, and C, retail value impacts range from $7.4 to $15.9 million; output impacts from $21.1 to $45.4 million, employment from 180 to 405 jobs; employment income from $7.7 to $16.5 million; and total tax revenue from $2.9 to $6.2 million. Please see Final Economic Analysis (U.S. Fish and Wildlife Service 2015a) for more information on the potential economic costs and benefits of Alternative 4.

Indirect Effects

An indirect effect of listing the boa constrictor as injurious will be the reduced disruption of ecological trophic levels as the potential for range expansion and population increase of this species is reduced, although this effect would not be as great as under Alternative 2A with the continued risk of ecological disruption from the other four species in the absence of effective State control measures. Further, due to transport and importation restrictions of nonnative constrictor snakes, potential introduction of harmful pathogens or disease will be reduced, although also not as much as under Alternative 2A with the continued introduction of the other four species and in the absence of effective State control measures. See the discussion on indirect effects under Alternative 1, which would be reduced under Alternative 4.

Another indirect effect, as stated in some public comments, could be the unintended consequence of the intentional release into the wild of individual snakes of the newly listed species by their 2owners. This could be because the owners are moving to another State and are prohibited by the Lacey Act from taking the snake across State lines, because they mistakenly believe that they can no longer possess their snake under this regulation, or some other reason related to the listing action. While it is possible that subsequent intentional releases will occur, the situation was occurring well before the injurious listing was considered in 2006, and the Service has been taking actions to prevent such releases (such as assisting Florida Fish and Wildlife Conservation Commission with Pet Amnesty Days for the surrender of live animals). We emphasize that it will be lawful for pet owners to keep their pets under this Federal regulation. Therefore, we have no reason to believe that responsible, caring owners will release their snakes into the wild. Snake owners who no longer want their snake may consider surrendering their animals to a zoo, animal rescue group, school, nature center, or pet retailer with-State, or contacting a local herpetology club or a national reptile organization with in-State members to find someone to adopt those constrictor snakes. Breeders may still be able to export through a designated port in their own State (see response to Comment 68 of the final rule for exporting explanation). For breeders who can no longer export, they may find buyers in their own State. And finally, for people who live in Florida, "Anyone who possesses a [regulated] snake or lizard but cannot keep it can surrender the animal to a licensed recipient (adopter) at any time with no penalties" (FWC 2014a). Many States, including Florida (FWC 2014b), have laws making it illegal to release nonnative animals into the wild.

Other indirect effects of listing the species in this alternative may include impediments to researchers and to conservation efforts because the listed species could not be imported or transported across State lines without a permit provided by the Service. Some types of research that constrictor snakes are used for include biomedical research, studies of the life histories of constrictor snakes, and studies for controlling and eradicating constrictor snakes. The permit process could slow the start of research projects (such as biomedical and biological) because the application process could take 30 or more days. Permits may be obtained for scientific, educational, medical, and zoological purposes, and therefore, these activities may continue with a permit. Intrastate conservation and research efforts will not need a permit by the Service.

Cumulative Effects

With the action taken to prohibit the importation and interstate transport of the boa constrictor, releases or escapes of this species into an ecosystem is less likely to continue. Therefore, this listing would ensure that certain potential effects associated with introduction of species that have been found to be injurious do not occur. The listing action preserves the environmental status quo by maintaining the baseline population of the injurious species. This action is the same action as that of the final rule to list four large other constrictor snakes as injurious in 2012 (Burmese python, Northern African python, Southern African python, and yellow anaconda), which the Service found to have no significant impact. The amendment of this species to the list of injurious wildlife in addition to the four large constrictor snakes listed as injurious in 2012 should not have a cumulative effect.

For States where the boa constrictor already occurs, no effective and feasible tools are currently available to manage them. Trapping is the best available option at this time, but their use on a large scale is prohibitively expensive and ineffective. Since effective measures to control or eradicate large constrictor snake populations are not available, the ability to rehabilitate or recover ecosystems impacted by these species is low. Because large constrictor snakes are capable of living 20 or more years and would consume a substantial amount of native vertebrates during their lifespan, native wildlife, especially threatened and endangered species, face considerable risk of further endangerment and extinction if additional large constrictor snakes are released or escape even after listing under the Lacey Act and become established in U.S. populations. Entire populations of native wildlife may be very vulnerable to heavy predation by this large constrictor snake by the additional release or escape of snakes in States where the species already occurs and in the absence of effective State controls.

The Service also considers the environmental effects of a U.S. regulatory action outside of the United States, although not required under NEPA. Under Executive Order 12114 ("Environmental Effects Abroad of Major Federal Actions"), the Service considers "major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action." Here we consider the effect of listing the three species on the countries where the species are native. Listing the large constrictor snakes as injurious could result in the decrease of harvesting from the wild in their native ranges, and thus would be more protective. Under EO 12114, the Service believes that listing this one species is not a major Federal action significantly affecting the environment of a foreign nation. The listing of the boa constrictor as injurious could result in a decreased demand for these nonnative snakes in the United States (because it would be illegal to import them) and thus a decrease in harvesting pressure in their native ranges. The subspecies *Boa constrictor occidentalis* is listed by Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) under Appendix I, which includes "species threatened with extinction which may or may not be affected by trade." All other species in the family *Boidae* are listed in CITES Appendix II, which "includes species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival." Species listed under CITES

Appendix II can be taken from the wild for commercial international trade provided certain findings are made and all appropriate CITES documents are issued and presented upon export and import. Trade in these species is strictly regulated to prevent unsustainable use of the species. Actions that may result in decreased demand for these species in trade are likely to provide benefits for the species in the wild in their native range by reducing the pressure of collection from wild populations. Therefore, the listing of the boas would be expected to have a beneficial effect on the native populations. Beneficial impacts to wild populations of the one species in its native countries are expected under Alternative 4.

Selected Alternative

While Alternative 2A will likely do the most to protect wildlife and wildlife resources from negative impacts due to large constrictor snake introductions in the absence of effective State controls, the Service is listing four snake species as injurious species, while removing from consideration the boa constrictor (Alternative 2B). See the discussion in the preamble of the final rule for the reasons for the Service's decision to withdraw the proposal for the boa constrictor.

Alternative 2B will reduce the risk of establishment of these four species of large constrictor snakes in the wild, and will reduce the likelihood that the individuals of species already present will spread beyond their current locations into other ecosystems of the United States. These four large constrictor snakes have been imported or could be imported into the United States. Two species have escaped or been released into the wild. If released, all four species are likely to become established and expand their ranges, which would result in increased predatory pressure on native wildlife species and direct competition with native species for food. It will be difficult to prevent, eradicate, manage, or control the spread of these large constrictor snakes, and it will be difficult to rehabilitate or recover ecosystems disturbed by these species. Furthermore, because of the predatory behavior of these species, the negative effects to threatened and endangered species could be permanent. This alternative provides an opportunity to prevent the importation of two injurious species not yet known to be imported into or established in the United States.

The risk assessment conducted by USGS (Reed and Rodda 2009) concluded that the organism risk potential, which is calculated based on the probability and consequences of establishment, was "Medium" for all four species (reticulated python, DeSchauensee's anaconda , green anaconda, and Beni anaconda). The Service has determined that listing these species as injurious is necessary to protect wildlife and wildlife resources of the United States under the Lacey Act.

Table 8. Summary Table of Environmental Consequences by Alternative

Action	Alternative 1: No Action	Alternative 2A: Proposed Action List as Injurious the Reticulated Python, Boa Constrictor, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda	Alternative 2B: Subset of Alternative 2A List as Injurious the Reticulated Python, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda	Alternative 3 List as Injurious the Reticulated Python, Boa Constrictor, and Green Anaconda	Alternative 4 List as Injurious the Boa Constrictor
Introduction of large constrictor snakes	Has occurred and will likely continue to occur	Greatest reduced risk. Prevent potential introduction of one "High" and four "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors) Importation and interstate transport would be prohibited. There may be reduced risk in States where they are already found.	Reduced risk. Prevent potential introduction of four "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors) Importation and interstate transport would be prohibited. There may be reduced risk in States where they are already found.	Reduced risk (but greater risk than Alternative 2A and 2B). Prevent potential introduction of one "High" and two "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors.) Importation and interstate transport would be prohibited. There may be reduced risk in States where they are already found.	Reduced risk (but greater risk than Alternative 3). Prevent potential introduction of one "High" risk large constrictor snake. (Note: Some States may continue to allow possession of large constrictors.) Importation and interstate transport would be prohibited. There may be reduced risk in States where they are already found.
Establishment of populations of large constrictors	Likely establishment	Greatest reduced risk. Reduce potential establishment of one "High" and four "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors.) There may be reduced risk in States where they are already found	Reduced risk. Reduce potential establishment of four "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors.) There may be reduced risk in States where they are already found.	Reduced risk (but greater risk than Alternative 2A and 2B) in States where they are not already found. Reduce potential establishment of one "High" and two "Medium" risk large constrictor snakes. (Note: Some States may continue to allow possession of large constrictors.) There may be reduced risk in States where they are already found.	Reduced risk (but greater risk than Alternative 3) in States where they are not already found. Reduce potential establishment of one "High" risk large constrictor snake. (Note: Some States may continue to allow possession of large constrictors.) There may be reduced risk in States where they are already found.
Effect on natural ecosystems	Likely negative	Greatest reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater risk than Alternative 2A and 2B) other than States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater than Alternative 3) other than States where they are already found. There may be reduced risk in States where they are already found.
Impacts to native species	Likely negative	Greatest reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater risk than Alternative 2A and 2B) other than States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater than Alternative 3) other than States where they are already found. There may be reduced risk in States where they are already found.

Summary Table of Environmental Consequences by Alternative (continued)

Action	Alternative 1: No Action	Alternative 2A: Proposed Action List as Injurious the Reticulated Python, Boa Constrictor, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda	Alternative 2B: Subset of Alternative 2A List as Injurious the Reticulated Python, DeSchauensee's Anaconda, Green Anaconda, and Beni Anaconda	Alternative 3 List as Injurious the Reticulated Python, Boa Constrictor, and Green Anaconda	Alternative 4 List as Injurious the Boa Constrictor
Impacts to Threatened and Endangered Species	Likely reductions in threatened and endangered species	Greatest reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States other than those States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater than Alternative 2A and possibly 2B) other than States where they are already found. There may be reduced risk in States where they are already found.	Reduced risk in States (but greater than Alternative 3) other than States where they are already found. There may be reduced risk in States where they are already found.
Economic Impacts	No losses to retail sales. Potential costs to environment similar to recent years	The annual retail sales losses for Alternative 2A are estimated to range from $9.3 million to $20.1 million. Economic benefits from reduced potential costs to environment potentially greater than other alternatives.	The annual retail sales losses for Alternative 2B are estimated to range from $1.9 million to $4.1 million. Economic benefits from reduced potential costs to environment potentially greater than Alternative 1, and less than Alternatives 2A and 3.	The annual retail sales losses for Alternative 3 are estimated to range from $9.3 million to $20.1 million. Economic benefits from reduced potential costs to environment potentially greater than Alternatives 1, 2B, and 4, and less than Alternative 2A.	The annual retail sales losses for Alternative 4 are estimated to range from $7.4 million to $15.9 million. Economic benefits from reduced potential costs to environment potentially greater than Alternative 1, and less than Alternatives 2A and 3.
Cumulative Impacts	Risk of additional adverse impacts to threatened and endangered species, native wildlife, and natural ecosystems. Continued native range harvesting	Greatest reduced risk of additional impacts to threatened and endangered species, native wildlife, and natural ecosystems in States other than those where large constrictors are already found. There may be reduced risk in States where they are already found. Beneficial impacts to wild populations of five species in their native countries will advance for all five species.	Reduced risk of additional impacts to threatened and endangered species, native wildlife, and natural ecosystems in States other than those where large constrictors are already found. There may be reduced risk in States where they are already found. Beneficial impacts to wild populations of four species in their native countries will advance for four species while not accruing for one species.	Reduced risk (but greater than Alternative 2A and 2B) of additional impacts to threatened and endangered wildlife species, native wildlife, and natural ecosystems in States other than those where large constrictors are already found. There may be reduced risk in States where they are already found. Beneficial impacts to wild populations of three species in their native countries will not accrue for two of the species.	Reduced risk (but greater than Alternative 3) of additional impacts to threatened and endangered wildlife species, native wildlife, and natural ecosystems in States other than those where boa constrictor is already found. There may be reduced risk in States where boa constrictors are already found. Beneficial impacts to wild populations of one species in its native country will not accrue for four of the species.

9) List of Preparers

Art Roybal, Senior Fish and Wildlife Biologist – Everglades Restoration, U.S. Fish and Wildlife Service; South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960.

Susan Jewell, Fish and Wildlife Biologist; Fish and Aquatic Conservation, U.S. Fish and Wildlife Service, 5275 Leesburg Pike, Falls Church, Virginia 22041.

Anne Philip, Office Automation Assistant; Everglades Restoration, U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960.

Shawn Christopherson, Fish and Wildlife Biologist; U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 1339 20th Street, Vero Beach, Florida 32960.

10) References

The following references were utilized in the preparation of this environmental assessment.

Atienza, A. 2010. Personal communication. Sergeant. Puerto Rico Department of Natural and Environmental Resources, Commonwealth of Puerto Rico.

Clavero, M. and E. Garcia-Berthou. 2005. Invasive species are a leading cause of animal extinctions. Trends in Ecology and Evolution, v. 20/3, page 110.

David, P. and G. Vogel. 1996. The snakes of Sumatra: an annotated checklist and key with natural history notes: Frankfurt am Main, Edition Chimaira, page 26.

Dirksen, L. 2002. Anakondas: Monographische Revision der Gattung *Eunectes* Wagler, 1830 (Serpentes, Boidae): Münster, Germany, Natur-und-Tier-Verl., page 189.

Dirksen, L. and R.W. Henderson. 2002. *Eunectes deschauenseei* Dunn and Conant: de Schauensee's Anaconda: Catalogue of American Amphibians and Reptiles, Volume 755, pages 1-3.

EDDMapS. 2014. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Online at http://www.eddmaps.org/; accessed November 17, 2014.

Ekles, J. 2014. Personal communication. Nonnative Fish and Wildlife Program; Florida Fish and Wildlife Conservation Commission. Boyton Beach, Florida.

Environmental Law Institute. 2010. Status and Trends in State Invasive Species Policy: 2002-2009; Research Report; Washington, D.C.

Executive Order 1979. E.O. 12114. Environmental Effects Abroad of Major Federal Actions.

FWC. 2014a. Regulations for Conditional Snakes and Lizards. Website accessed Sept. 25, 2014.

FWC. 2014b. Burmese pythons in Florida. Fact Sheet 5/2014. 5 pp.

Fuller, P. 2011. Personal communication. United States Geological Service, Nonindigenous Aquatic Species Program, Southeast Ecological Science Center, Gainesville, Florida.

Hallac, D. 2009. Personal communication. Chief, Biological Resources Branch, National Park Service, Everglades National Park; Homestead, Florida.

HSUS. 2014. Constrictor snake incidents. From Humane Society of the United States public comment. 79 pp.

Meshaka, W.E., W.F. Loftus, and T. Steiner. 2000. The herpetofauna of Everglades National Park. *Florida Scientist* 63(2):84-102.

Pet Industry Joint Advisory Council. 2008. Table submitted for the U.S. Fish and Wildlife Service's Notice of Inquiry in the Federal Register (73 *FR* 5784; January 31, 2008).

Reed, R.N. and G.H. Rodda. 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 pages.

Reed, R.N., K.L. Krysko, R.W. Snow, and G.H. Rodda. 2010. Is the Northern African Python (Python sebae) Established in Southern Florida? IRCF Reptiles and Amphibians, 17(1): 52-54.

Reynolds, R.G., A.R. Puente-Rolon, R.N. Reed, L.J. Revell. 2013. Genetic analysis of a novel invasion of Puerto Rico by an exotic constricting snake. *Biol Invasions* 15:953–959.

Reynolds, R. G., M. L. Niemiller, & L. J. Revell. 2014. Toward a Tree-of-Life for the boas and pythons: Multilocus species-level phylogeny with unprecedented taxon sampling. *Molecular Phylogenetics and Evolution* 71: 201-213.

Roybal, A. 2010. Personal communication. Senior Fish and Wildlife Biologist. U.S. Fish and Wildlife Service, South Florida Ecological Services Office, Vero Beach, FL.

Snow, R.W., K.L. Krysko, K.M. Enge, L. Oberhofer, A. Warren-Bradley, and L. Wilkins. 2007. Introduced populations of *Boa constrictor* (Boidae) and *Python molurus bivittatus* (Pythonidae) in southern Florida. Pages 416–438 *in The Biology of Boas and Pythons*, edited by R. W. Henderson and R. Powell. Eagle Mountain, Utah: Eagle Mountain Publishing.

Strüssmann, C. and I. Sazima. 1993. The snake assemblage of the Pantanal at Poconé, Western Brazil: Faunal composition and ecological summary: Studies on Neotropical Fauna and Environment, Volume 28, pages 157-168.

U.S. Fish and Wildlife Service. 2012. Final Environmental Assessment for Listing Large Constrictor Snakes as Injurious Wildlife under the Lacey Act.

U.S. Fish and Wildlife Service. 2015a. Final Economic Analysis; Rulemaking to List Four Constrictor Snake Species Under the Lacey Act [Reticulated Python *(Python reticulatus)*, DeSchauensee's Anaconda *(Eunectes deschauenseei)*, Green Anaconda *(Eunectes murinus)*, and Beni Anaconda *(Eunectes beniensis)*].

U.S. Fish and Wildlife Service. 2015b. Office of Law Enforcement, Law Enforcement Management Information System. Constrictor Snakes Live Specimens Imported from 2004 through 2013.

U.S. Fish and Wildlife Service. 2014. Endangered and Threatened Animal Species; Florida, Puerto Rico, Hawaii, Virgin Islands, Guam. Available online: http://www.fws.gov/endangered. Accessed July 24, 2014.

U.S. Geological Survey. 2014. Large Constrictor Snakes. USGS Non-indigenous Aquatic Species Database Information – emailed from Pam Fuller, Database Coordinator, Gainesville, Florida.

U.S. National Park Service. 2014. Burmese python species profile: Everglades National Park Burmese python data. Everglades National Park, Homestead, Florida. Available online: http://www.nps.gov/ever/naturescience/npspythonmanagement.htm.

Waller, T., P.A. Micucci, and E. Alvarenga. 2007. Conservation biology of the Yellow Anaconda (*Eunectes notaeus*) in northeastern Argentina, *in* R.W. Henderson and R. Powell, eds., Biology of the boas and pythons: Eagle Mountain, Utah; Eagle Mountain Publisher, pages 340-362.

Wilson, L.D. and J.R. Meyer. 1985. The snakes of Honduras. 2nd Edition Milwaukee Public Museum; Milwaukee, Wisconsin.

Appendix: Comments and Responses on the Draft Environmental Assessment for Listing Nine Large Constrictor Snakes As Injurious Wildlife under the Lacey Act

Comment: Several commenters stated that the environmental assessment should consider the impacts of harvesting of the nine large constrictor snake species in their native ranges.

Response: We consider this issue as relevant under Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions," (1979) but it is not required under NEPA. To address EO 12114, we have included a discussion in this final environmental assessment of the impacts of harvesting of the five constrictor snakes not yet listed in their native ranges.

Comment: Several commenters stated that the environmental assessment should assess a larger scope of alternatives.

Response: Several alternatives were reviewed from public comments received with two alternatives considered but dismissed – one alternative was not within the authorities of the injurious wildlife provisions of the Lacey Act (Federal Permitting System, such as a Private Hobbyist Permit System Instead of Listing the Nine Large Constrictor Snake), and another alternative was not generally practical (State Legislative Initiatives, such as a State Permitting Program Instead of Listing the Nine Large Constrictor Snake) as presented. An alternative similar to the second suggestion was considered, however, the anticipated effects of which would be the same as those discussed under the No Action alternative for one species.

Comment: Several commenters mentioned that the Service failed to develop the required environmental impact statement under the National Environmental Policy Act (NEPA).

Response: Under NEPA, Federal agencies are required to consider the potential environmental impact of an agency action along with alternatives to that action prior to implementation of the action. If there may be a significant effect on the natural or human environment, agencies are then generally required to prepare either an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). An agency may first prepare an EA, and the result of that EA determines whether an EIS is required; if there is a finding of no significant impact (FONSI), then an EIS is not required. For the large constrictor snake proposed listing rule, the Service prepared an EA and determined that the action would have no significant effect on the human or natural environment.

Comment: One commenter mentioned that the Service did not consider any of the adverse environmental impacts that could result from listing the snakes, such as the potential for release of listed snakes, hindrance of conservation eradication efforts, and placing impediments to research.

Response: In our draft environmental assessment, we addressed the potential for release after listing of the large constrictors by explaining that the Service continues to work with partners to research control technologies and snake life histories; increase public awareness, develop capacity to rapidly respond to sightings of snakes in the wild; and assist with Nonnative Pet Amnesty days led by our State partners, which provide an important alternative to release of pet snakes into the wild. In this final environmental assessment, we also addressed the unintended consequences of release of constrictor snakes after listing under "Indirect Effects" for each of the alternatives. Under that same heading in this document, we explained that conservation efforts and research that involve importation and interstate transportation can still occur after being permitted by the Service. Intrastate conservation and research efforts will not need a permit by the Service.

Comment: A commenter states that the EA overlooks the scientific controversy surrounding the USGS risk assessment analysis and the use of climate matching, as well as the novel use of the Lacey Act to list species widely held as pets.

Response: The controversy mentioned by the commenter is discussed in the proposed and final rules and is appropriate for consideration in those documents. The EA used information from the final rule, which explained the controversies about the climate match and the risk assessment. The relevance of listing species widely held as pets is also considered in the final rule. See the Service's decision regarding the boa constrictor.