



Division of Policy and Directive Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, Suite 222
Arlington, VA 22203

Dear Officials,

I am writing to request that the proposal to list the boa constrictor, four python species, and four anaconda species as injurious reptiles be ruled against.

I speak as a scientist with nearly 20 years of experience in study the physiology and energetics of large constrictor snakes. I have published 27 scientific articles on the physiology of these snakes in such journals as *Nature*, *Proceedings of the National Academy of Sciences*, *American Journal of Physiology*, and *Journal of Experimental Biology*. I have given over 100 presentations on the biology of these snakes at scientific conferences and public speaking engagements. My work with pythons has been highlighted in popular magazines, textbooks, and documentaries (*Nature*, *National Geographic*, *BBC*, & *History Channel*).

This proposed ruling states "The best available information indicates that this action is necessary to protect the interests of humans, wildlife, and wildlife resources from the purposeful or accidental introduction and subsequent establishment of these large constrictor snake populations into ecosystems of the United States." There are several faults with this statement that stems from a lack of knowledge and an incorrect evaluation of the potential risks of these snakes. The two most pertinent are:

1) The potential invasion of large constrictor snakes across the southern United States.

This concern stems from the Rodda et al. (2008) publication and a USGS report (Reed and Rodda, 2009) that employed climate-based modeling and known natural distribution of *Python molurus* to illustrate the regions of the United States that could support populations of the Burmese python (*P. molurus*). Immediately following the initial publication, Pyron et al. (2008) published a paper where they used ecological niche modeling and an expanded set of variables to illustrate that the only regions within the United States that can ecologically support populations of *Python molurus* are extreme southern Texas and extreme southern Florida. While these papers and reports are controversial, their discussions may fail to recognize several pertinent facts regarding the spread of these snakes through the southern United States. First, the boa constrictor (*Boa constrictor*) is native to central Mexico and has not, over known history, spread its distribution any further northward into the southern United States. Therefore, expectations are that this species will not rapidly spread through southeast from an establishment in south Florida. Second, south Florida is not unique in having boas, pythons, and anacondas released into the wild. Accidental and intentional release of these snakes has occurred throughout the country as evident of the many reports of these snakes being found loose in rural and urban areas in many states. The reason why they have not become established in other areas of the country is that they cannot survive the climate, especially anywhere that experiences even short bouts of freezing temperatures. This point was dully demonstrated this winter when many adult free-ranging *Python molurus* in the Everglades died due to exposure to cold temperatures.

Climatic and ecological modeling can provide relevant predictions of species habitation, but in this case, no attention was given to the thermal ecology, physiology, or temperature tolerance of these species. In summary, these snakes are unable to expand their populations beyond that of southern Florida and will undoubtedly experience periodic population die-offs resulting from the occasional episodes of freezing temperatures.

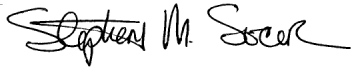
2) These species present a risk to natural populations of vertebrates. True, boas, pythons, and anacondas are carnivores and can consume a wide array of reptilian (e.g., alligator), avian, and mammalian prey. The biologists within the park have assembled a list of prey species identified from gut contents of *Python molurus* that range from small rodents and birds to larger herons, egrets, rabbits and raccoons. Unfortunately what is lacking to develop valid assessments of the impact of these snakes on native animals are data on the frequency of their feeding and the yearly amount of prey consumed. Whereas the USGS report does acknowledge the lack of such crucial information, no attempt was made in that report to generate models of yearly energy consumption. Available data on temperature effects on python metabolism, field metabolic rates of free-ranging snakes, digestion and assimilation efficiencies for pythons, and daily air temperature of the Everglades can be integrated into predicted models of daily energy expenditure and food consumption. Using this information, the calculated daily energy expenditure (averaged over a full year) for a 5 kg (11 lb) python is 20 kcal which is balanced by an average daily intake of 25 kcal (the energy of 2 Doritos chips). Translating that to prey, that is only half of an adult field mouse. Over the full year, the python consumes a little more than its body mass in food, an amount that is trivial compared to the yearly intake of a similar size carnivore (e.g., feral cat). Pound for pound, the cat consumed roughly 30-40 times more food than the python. If the concern is the potential impact of invasive species on native fauna (e.g., the Key Largo woodrat), then the attention is being misdirected. Feral cats alone undoubtedly outnumber pythons in southern Florida and consume tremendously more native wildlife. Whereas any impact of these snakes on wildlife is restricted to south Florida, the documented impact of feral cats is nationwide. In summary, due to their potential large size, pythons can consume a large variety of vertebrate prey, though the amount they consume is a small fraction of that taken by similar-sized mammalian predators.

Much of the argument on why these snakes should not be listed as injurious is that they are part of a thriving industry in the importation and captive breeding of snakes. Large pythons, boas, and less-so anacondas have been imported, bred, and sold to hobbyists for decades. Small commercial businesses are dependent on the never ending interest of these snakes as pets. Granted, if these snakes did pose continue risks to their owners, this industry or interest would not exist (you don't see black mambas being bred and sold by the thousands). Missing from this argument and as well as from the USGS Risk Assessment is the value of these snakes for scientific and biomedical research. The Burmese python, the snake which is the center of much of this controversy, has been identified as an emerging new research model in studies of metabolism, digestive physiology, and cardiovascular response. In short, the python possess numerous unique and dramatic physiological and morphological responses that will allow many unanswered questions to be better explored in the study of metabolic, digestive, and cardiac diseases. This snake has been used by scientists across the country, as well as in other countries (e.g., Denmark, France, Canada, and Germany) to explore the regulation and magnitude of their physiological performances. In the U.S. alone, the National Science Foundation, the National Institutes of Health, and the American Heart Association had funded (~ \$2,000,000) scientific and biomedical research using the Burmese python. Scientists depend on the availability of hatchling pythons from captive breeders and importers for their research programs. In summary, while interest in these snakes will continue to support a portion of the pet industry, their use in biomedical research will have a much broader societal impact in scientific studies and potential clinical applications.

The authors of the USGS report are to be commended for their exhaustive review of the historic literature on these snakes. Though, the Department of the Interior and the Fish and Wildlife Service needs to be very cautious in passing any ruling based on the perception from this report that these snakes present risks to the ecosystem of the United States. First, the projected inhabitation of these species through the southern U.S. is grossly inaccurate. Second, there is no data on the impact of these snakes on native fauna. And, third, the Burmese python (at least) has a pivotal role in biomedical discoveries. I do not defend the existence of these snakes in the Everglades nor feel that they are deserving of protection. I agree with the management decisions

of the park's biologists to remove them from the park. But this is a problem only confined to south Florida. It should not be used to implement policy that will impact negatively the rest of the country.

Thank you for your time .

A handwritten signature in black ink that reads "Stephen M. Secor". The signature is written in a cursive style with a large, stylized 'S' at the beginning.

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