New research suggests Burmese pythons will find little suitable habitat outside South Florida

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Burmese Pythons – one of the largest snakes in the world – may have chosen Florida as a vacation destination, but are unlikely to expand further, according to a study released August 13 by researchers at the City University of New York (CUNY), published in the online, open access journal *PLoS ONE*. Although the United States Geological Survey (USGS) earlier this year released 'climate maps' indicating that the pythons could potentially inhabit up to thirty two states in the continental U.S., new research indicates that the snakes are unlikely to expand out of south Florida.

In addition to large predators like alligators, crocodiles and panthers, visitors to Everglades National Park can now view another conspicuous giant predator – the Burmese python. The snakes may have a potentially catastrophic effect on the ecosystem in the Everglades, and have even been found with critically endangered species in their stomachs. This raises two questions. First, what is the potential for further expansion of the snakes in the U.S.? Second, how will global climate change affect these alien invaders?

Alex Pyron and Tim Guiher, graduate students at the City University of New York (CUNY) working with Dr. Frank Burbrink at the College of Staten Island/CUNY, used records on the distribution of pythons in their native range along with high resolution global climate databases to predict the potential extent of the python's distribution in the U.S. and

model the possible effects of global warming on the snakes. Although the USGS maps were intended to model areas where the climate of the U.S. matched the climate of the native range of the Burmese python (India and southeast Asia), their models only took into account two variables measuring mean monthly rainfall and temperature.

"By using more complete climate data, in this case 19 variables measuring climatic extremes, averages and seasonal variation, we can make more accurate predictions of species distributions," said Alex Pyron. "Combining this climatic data with localities for the Burmese python allows us to create powerful models for predicting suitable habitat for the snakes."

The results of the models suggest that the pythons are restricted to the vicinity of the Everglades in extreme south Florida, so while wildlife authorities will have their hands full dealing with established populations of these snakes, people outside of Florida should not fear an inexorable northward expansion.

"When modeling species distributions, it is important to consider a large amount of climatic data and evaluate the methods used, especially when dealing with important issues such as invasive species whose ecological limitations may not be immediately obvious," said Tim Guiher.

Perhaps the most surprising results of the study are the forecast results of global warming. While the USGS maps indicated that a doubling of CO_2 levels would result in even more suitable habitat in the U.S., those same scenarios of global warming produce drastically different results using the CUNY researcher's model. Their results indicate that suitable habitat will contract significantly in the U.S., and will be decimated in the native range of the python. Such a scenario is likely not unique to the Burmese python, and highlights areas of potential study for climate change biology.

Ultimately, while the pythons are proving to be far more than a nuisance in the Everglades, the climate of the continental U.S. will likely keep them there. Far from flourishing under potential scenarios of global warming, the snakes are predicted to be seriously impacted by models of global climate change, a fate which is likely not unique to the pythons.

According to Dr. Burbrink, "Snakes already get an unwarranted bad reputation and the last thing needed in our current biodiversity crisis is to drum up more hatred of these animals by suggesting an impending full scale North American invasion by pythons when properly constructed climate models suggest the opposite."

Citation: Pyron RA, Burbrink FT, Guiher TJ (2008) Claims of Potential Expansion throughout the U.S. by Invasive Python Species Are Contradicted by Ecological Niche Models. PLoS ONE 3(8): e2931. doi:10.1371/journal.pone.0002931
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