Burmese pythons are giant constricting snakes, native to Asia, that have established extensive populations in southern Florida. Adult pythons are large predators with little risk of predation themselves, and the Florida population has the potential to negatively impact a multitude of native wildlife species. This issue spans a vast area across south Florida and crosses geopolitical boundaries. Interagency collaboration and continued research and tool development are critical for successful management of this invasive exotic species.

Interagency Coordination

In 2016, the Florida Fish and Wildlife Conservation Commission (FWC) developed an Interagency Python Management Coordinator position with support from Everglades National Park to develop an Interagency Python Management Plan (IPMP). The first three years were spent sharing information from researchers and managers, determining which land managing agencies, tribes, and organizations would be included in the written plan development, and creating goals and strategies pertaining to python management. In 2019, the first interagency team meeting, including 15 partner agencies, tribes, and organizations, was held in Fort Lauderdale and an outline for what would be included in the IPMP was developed. The IPMP will center around identifying goals and management strategies among agencies and Cooperative Invasive Species Management Areas (CISMAs) to optimize resources, prioritize, and align management strategies and actions for Burmese pythons. To date, four meetings have been held with this interagency team and a full draft is expected to be finished by the end of 2020.

This interagency team uses a multi-faceted approach to control this invasive constrictor:

Prevention through Regulation
- The FWC listed the Burmese python as a Conditional species as of August 23, 2010, meaning that an individual can no longer acquire a Burmese python in the state for personal use.
- In 2012, the U.S. Fish and Wildlife Service (FWS) placed Burmese pythons on the injurious species list, which prohibits the importation of this species from outside the continental United States without a federal permit.
- Since 2006, 114 Burmese pythons have been surrendered to the Exotic Pet Amnesty Program.
- The FWC signed Executive Order (EO) 20-17 in 20 that authorizes the lethal take of nonnative reptiles without a permit or hunting license requirement, including pythons, on 25 Commission-managed properties in south Florida. The FWC continues to look for opportunities to expand upon this EO and remove regulatory barriers for invasive species removal efforts.

Early Detection/Rapid Response to New Sightings
- FWC's Exotic Species Hotline receives reports from the public regarding nonnative wildlife.
- From 2015 to April 2020, this hotline received 469 calls about pythons. An additional 537 reports were submitted online and through the IveGot1 smartphone app.

Control Tools
- Expert human searchers: Visual searches by local experts continues to be the most effective means of detecting and removing pythons from the wild. The FWC and South Florida Water Management District (SFWMD) contractor programs have removed over 5,000 pythons from public lands since 2017. The National Park Service (NPS) has 69 authorized agents that remove pythons from NPS properties.
- Detection dogs
- eDNA
- Python specific traps
- Pheromone and other attractants
- Sentinel or scout snakes (telemetered animals)

Research
- Development and refinement of innovative tools and techniques to improve our ability to detect and remove pythons from the wild.

Public Engagement
- Python Patrol – Participants learn how to identify and safely capture pythons. To date, over 3,000 people have been trained at 215 workshops.
- Annual Python Challenge™ – The FWC and SFWMD conduct events that provide awards for the most and largest pythons captured. The 2020 Python Bowl removed 80 pythons in just 10 days.

The Role of Science in Long-term Management: The Burmese Python Structured Decision Making (SDM) Workshop

In June 2014, in response to the growing Burmese python threat to the Arthur R. Marshall Loxahatchee NWR (Refuge), the FWS and key stakeholders participated in a U.S. Geological Survey (USGS)-funded python Structured Decision Making (SDM) workshop at the FWS National Conservation Training Center (NCTC). Other agencies represented included the FWC, NPS, University of Florida, and USGS. The purpose of the SDM workshop was "to determine the most efficient allocation of resources for surveillance (detection with intent to eliminate the threat) and control (removal) activities in order to minimize ecological damage from pythons once they become established on the Refuge (Gibble et al. 2014)".

A specific outcome from the workshop included the development of a predictive model that would determine the current location and expected arrival of the northward-moving python front to the southern end of the Refuge. The model predicted that the northward-moving python front was less than 20 kilometers from the Refuge and that pythons were expected to be established and breeding by 2020 (Bonneau et. al. 2016). In addition, numerous control actions and research tools were discussed or further refined. These included expanding the Everglades Invasive Reptile and Amphibian Monitoring Program (EIRAMP) survey coverage, utilizing detection dogs and sentinel snakes, trap modifications with real-time monitoring capabilities, implementing additional mammal studies to monitor trends, and enhancing capture and monitoring training for agency staff.

In the end, a USGS-funded eDNA study (2014) confirmed the presence of python DNA in water samples collected on the Refuge. Subsequently, in 2016, a refuge law enforcement officer on routine night patrol ran over and killed a 10-foot Burmese python on the L-40 levee. It was the first documented Burmese python recovered on the Refuge following several unconfirmed reports.

Predicting the Python: Modeling its Northward Expansion towards Loxahatchee NWR
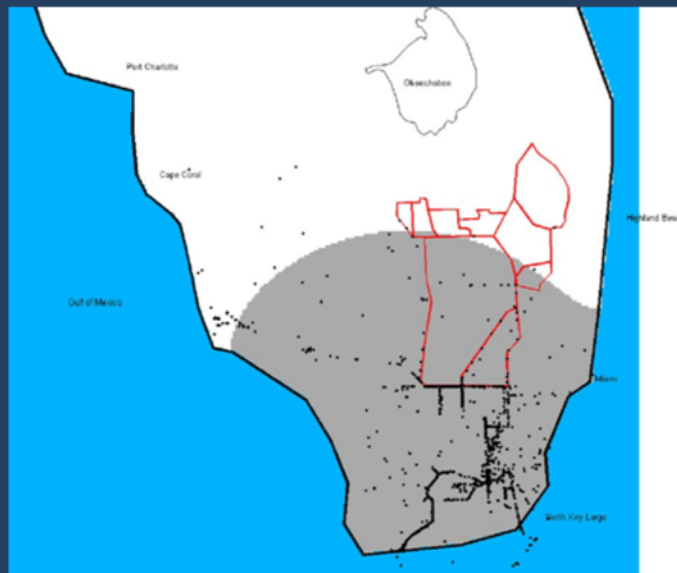
Burmese python invasion front and proximity to the Refuge as generated by a reaction-diffusion model developed by Bonneau, Johnson, and Romagosa (2016) – an end product of the NCTC Inter-agency Loxahatchee Python SDM Workshop held in June 2014.

Source (s):

Bonneau, M., Johnson, F., and C.M. Romagosa. 2016. Spatially explicit control of an invasive species using a reaction-diffusion model. Ecological Modeling 337: 15-24.

Gibble, R., Kapsch, M., Bonneau, M., Brandt, L., Hart, K., Irik, K., Ketterlin-Eckles, J., Klug, P., Mitchell, C., Olson, R., Romagosa, C., Waddle, H., Adams, A.Y., Hauser, C., Johnson, F., Brewer, D., and S. Converse. 2014. Management response to the threat of Burmese pythons in Arthur R. Marshall Loxahatchee National Wildlife Refuge: A case study from the Structured Decision Making Workshop, June 2 – 6, 2014, National Conservation Training Center, Shepherdstown, WV, 27 pp.

South Florida Ecosystem Restoration Task Force

EvergladesRestoration.gov

This document is part of a series of case studies developed for the Invasive Exotic Species (IES) Strategic Action Framework. This particular case study highlights issues within the Long-term Management Phase of the IES Invasion Curve. 9/10/20