

2023 Implementation Plan

Florida Python Control Plan



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Implementation Plan for 2023

December 2022

Florida Python Control Plan

Contributing Florida Python Control Plan Workgroup Organizations:

- Collier County
- Conservancy of Southwest Florida
- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- Florida Forest Service
- Miami-Dade County
- Miccosukee Tribe of Indians of Florida
- Monroe County
- National Park Service
- Rookery Bay National Estuarine Research Reserve
- Seminole Tribe of Florida
- South Florida Water Management District
- United States Army Corps of Engineers
- US Fish and Wildlife Service



Executive Summary

The Florida Python Control Plan Implementation Plan (IP) 2023 is a description of recommendations, prepared by the Florida Python Control Plan Workgroup (FPCPW), to support the interorganizational control of invasive Burmese pythons (*Python molurus bivittatus*) in Florida.

The Florida Python Control Plan (FPCP, 2021) and IP are complimentary documents. The FPCP is a reference document that provides descriptions of items described by the IP. The IP considers the most current science on pythons to advance the goals outlined in the four themes of the FPCP— Policy and Regulations, Control and Monitoring, Research, and Communication. The IP recommends actions that organizations can employ to control pythons and includes a list of strategic topics to consider focusing efforts over the next few years.

The projects recommended in this report further the overall goals outlined in the FPCP with respect to each organization's available authorities and resources. The FPCPW will continue to use an adaptive management approach to python control using the most updated science to refine new control tools and management approaches.



List of Acronyms

Catch per unit effort	CPUE
Close-Kin Mark-Recapture	CKMR
Early Detection and Rapid Response	EDRR
Environmental DNA	eDNA
Everglades Cooperative Invasive Species Management Area	ECISMA
Everglades Invasive Reptile and Amphibian Monitoring Program	EIRAMP
Executive Order	EO
Exotic Pet Amnesty Program	EPAP
Florida Department of Environmental Protection	FDEP
Florida Fish and Wildlife Conservation Commission	FWC
Florida Forest Service	FFS
Florida Python Control Plan	FPCP
FPCP Python Website Subgroup	FPCP PWS
FPCP Workgroup	FPCPW
Greater Everglades Ecosystem Restoration Implementation Plan	GEER IP
Law Enforcement	LE
National Park Service	NPS
Rookery Bay National Estuarine Research Reserve	RBNERR
Science, Technology, Engineering, and Mathematics	STEM
South Florida Water Management District	SFWMD
University of Central Florida	UCF
University of Florida	UF
US Fish and Wildlife Service	USFWS
United States Geological Survey	USGS

Strategic Topics for Python Control



The FPCP describes Goals, Strategies, and Recommendations for python control. The FPCPW identifies a few strategic topics to focus efforts over the next few years that are supported in multiple sections of the FPCP.

- Staffing and Related Resources
- Population Estimates
- Efficacy of Control
- Innovative Tools and Technologies
- Targeted Location Monitoring and Control
- Information Sharing
- Training
- FPCP Distribution and Updates

Staffing and Related Resources

Current Status

Most recommendations in the FPCP require an increase in existing control efforts. Substantial progress towards achieving FPCP goals is not possible with existing staffing, equipment, and other related resources.

Benefits

Increasing staff, available equipment, and related resources will enable participating organizations to implement more aspects of the plan, thereby improving control of Burmese pythons in Florida.

FPCP Sections

(1) FPCP All; (2) Control and Monitoring-Goal 3-Strategy 3.1-Recommendations 3.1.2

Population Estimates

Current Status

There are not any well supported population estimates for pythons due, in part, to their low detectability and the inability to use standard catch and release methodologies to determine realistic estimates. Vital rate information is necessary to achieve defensible python population estimates within a specific landscape, given differences in terrain and predictive behavior. As work is being conducted to fill in these gaps, the best available current science should be used to characterize python population using tools such as catch per unit effort (CPUE) and stoplight indicators. Stoplight indicators are a visual metric showing progress made towards a target goal.

Benefits

Without accurate population estimates it is not possible to evaluate the efficacy of different control methods. Once control methods are evaluated, control methods can be tailored to increase removal efficiency and better estimate future budgetary requirements.

FPCP Sections

(1) Control and Monitoring-Goal 1-Strategy 1.1-Recommendation 1.1.1; (2) Research-Goal 1-Strategy 1.1-Recommendations 1.1.6, 1.2.1 through 1.3.3, 1.4.1; (3) Communication-Goal 1-Strategy 1.2-Recommendation 1.2.3

Efficacy of Control

Current Status

A multi-pronged approach to python control is being employed using tactics including scout snakes, contractors, detector dogs, wildlife cameras, staff, volunteers, and other sponsored initiatives. Currently it is difficult to know which technique has the most efficacy within different habitats and landscapes. However, specific control methods have demonstrated to be more effective at removing pythons than others in some areas. Once tenable population estimates are available, evaluations of control methodology will be more accurate. In the interim, we can use tools, such as CPUE and local knowledge to adjust approaches to be more effective and direct resources

to approaches that have a higher efficiency of removing pythons. It is understood that employing CPUE is not comparable across different habitat types, unless data is normalized for logistics, terrain, etc., which is not appropriate at this time.

Benefits

Determination of what control method yields better results can aid in the development of a tabular matrix or a flow chart to advise land managers on which method is likely to work best given their land characteristics season, spatial and temporal components, environmental variables, and resources. These aids can assist in creating performance metrics to measure the effectiveness of individual control programs. Increased efficacy in removal efforts will result in more pythons removed from the environment.

FPCP Sections

(1) Control and Monitoring-Goal 2-Strategy 2.1-Recommendation 2.1.1, 2.1.1.1, 2.1.2.1; (2) Research-Goal 1-Strategy 1.1; (3) Research-Goal 1-Strategy 1.2

Innovative Tools and Technologies

Current Status

Organizations currently assess innovative tools and technologies such as python near-infrared cameras, eDNA, mammalian lures, pheromones, and trap designs.

Benefits

Continuing to explore innovative tools and technologies for python control will increase the likelihood that we find more effective, efficient, and less costly approaches to monitoring and controlling python populations in Florida.

FPCP Sections

(1) Control and Monitoring-Goal 1-Strategy 1.1-Recommendation 1.1.2, 1.1.3.2; (2) Research-Goal 1-Strategy 1.3-Recommendation 1.3.4; (3) Research-Goal 2-Strategy 2.1-Recommendation 2.1.2

Targeted Location Monitoring and Control

Current Status

Organizations are focusing monitoring and control efforts across multiple land areas in south Florida. A few organizations have started focusing control efforts in specific locations to slow expansion. These efforts are generally focused on the edge of the known python range, and in sensitive habitats, such as the nesting locations of federally endangered Key Largo wood rats. Further information regarding geographic range, population size and the effects of pythons within specific habitats is essential to creating a site prioritization tool for land managers.

Benefits

Selecting locations for prioritization and directed control and monitoring efforts in areas that do not currently have pythons, have a low number of pythons, are suspected to be at the prevention phase on the Invasion Curve, and/or have habitats that are especially vulnerable to irreparable effects from pythons will help conserve these areas from negative python effects.

FPCP Sections

(1) Control and Monitoring-Goal 1-Strategy 1.1-Recommendations 1.1.1, 1.1.2; (2) Control and Monitoring-Goal 2-Strategy 2.1-Recommendation 2.1.5; (3) Research-Goal 1- Strategy 1.1-Recommendation 1.1.3

Information Sharing

Current Status

Organizations have different methods and locations for sharing information regarding pythons. There is a lot of diversity in levels of data sharing among organizations, as each organization has a different set of requirements to be able to share data.

Benefits

Creating and maintaining a single source location, such as an FPCP website, for the public, land managers, and/or researchers to acquire information and even share information would likely streamline interorganizational cooperation and reduce duplicate

efforts. Expanding the available privacy settings of shared data on current websites, such as EDDMaps, could allow for more data sharing and analysis on a larger landscape scale.

FPCP Sections

(1) Rules and Regulations-Goal 3-Strategy 3.1-Recommendation 3.1.2; (2) Research-Goal 2-Strategy 2.1-Recommendations 2.1.1, 2.1.1.3, 2.1.1.4, 2.1.2.2; (3) Research-Goal 2-Strategy 2.2-Recommendations 2.2.1.1, 2.2.3; (4) Research-Goal 2-Strategy 2.3-Recommendations 2.3.1, 2.3.3.3; (5) Communication-Goal 1-Strategy 1.2-Recommendation 1.2.2; (6) Communication-Goal 2-Strategy 2.2-Recommendation 2.2.1

Training

Current Status

The FWC currently has a Python Patrol Program that educates and trains staff, organizations, and the public on proper identification, safe handling, safe capture, humane euthanasia, and how to report python sightings. This program currently includes a training component to identify research animals, such as scout snakes, to prevent loss of valuable research and removal tools. The SFWMD has a contract with University of Florida (UF) to expand awareness through education and training to targeted audiences that have a reasonable chance of encountering a python in the wild.

Benefits

Continuously updating and increasing the number and types of available trainings, such as trainings on any new python regulations, will likely increase the number of pythons properly removed and decrease the effect removal has on research projects.

FPCP Section

(1) Research-Goal 2-Strategy 2.3-Recommendation 2.3.6; (2) Communication-Goal 1-Strategy 1.1-Recommendation 1.1; (3) Communication-Goal 1-Strategy 1.2-Recommendation 1.2.3

FPCP Distribution and Updates

Current Status

The FPCP was completed in August 2021. The Workgroup initiated quarterly meetings in September 2021. The 2021 FPCP was

distributed in 2021 through participating organizations.

Benefits

The FPCPW updating and re-distributing the FPCP every 3 to 5 years, based on the most current available science, will be important to streamline initiatives, eliminate actions or efforts that no longer support the FPCP, and include new information for python control.

FPCP Sections

(1) Policy and Regulations-Goal 2-Strategy 2.4-Recommendation 2.4.2; (2) Communication-Goal 3-Strategy 3.1-Recommendation 3.1.1



A live Burmese python viewed on a computer screen using a 850nm near-infrared camera.

A python detector dog team riding an airboat to tree islands to survey for Burmese pythons.



Overview of Recommended Implementation Actions for 2023



This section provides a short overview of some of the recommended projects, programs, and suggestions to support the FPCP's goals in 2023.

Policy and Regulations

Goal 1: Implement or enhance existing policies and regulations that reduce the likelihood of future python release or introduction to limit population size and spread.

- The Exotic Pet Amnesty Program (EPAP)
 - Continue supporting this program where owners of nonnative pet species face no legal penalties, regardless of the regulatory status of their pet, and do not pay any fees to surrender their pet.
- Annual meeting with Law Enforcement (LE)
 - An annual meeting hosted by FWC where organizations can foster better coordination among law enforcement and management agencies.
- Continue supporting other established programs
 - Example: Wildlife Alert, an anonymous reporting website for suspected illegal wildlife activity.

Goal 2: Encourage and facilitate python removal and reporting to advance python control efforts.

- Executive Order (EO) 20-17
 - Continue supporting EO 20-17 which allows for the take of non-native reptiles on 25 specified Commission-Managed Areas in the South Region and allows for non-native reptiles to be taken any time of the year on private lands without a hunting license or permit.
- Python mercury levels project
 - A study evaluating mercury levels in pythons to determine if python meat is safe for human consumption and if so, how

much is safe to consume.

- Additional contracted python control
 - In addition to the current python contractor programs, support new contracts that target specific locations for python control.
- Evaluate current control methods

Goal 3: Align python removal policies and regulations to be consistent across jurisdictions, where possible, and clearly communicate to other stakeholders and the public to limit confusion and maximize efficiency.

- Interorganizational agreements
 - Renew and expand current interorganizational agreements to increase python control across the landscape through shared resources and/or land access.
- Organizational websites
 - Continue communicating python policy and regulation information on websites.

Goal 4: Clarify and streamline policies and regulations governing research projects and permitting to facilitate research that can aid in improved python control.

- The FPCP Python Website Subgroup (FPCP PWS) will discuss including permitting information on the FPCP website.

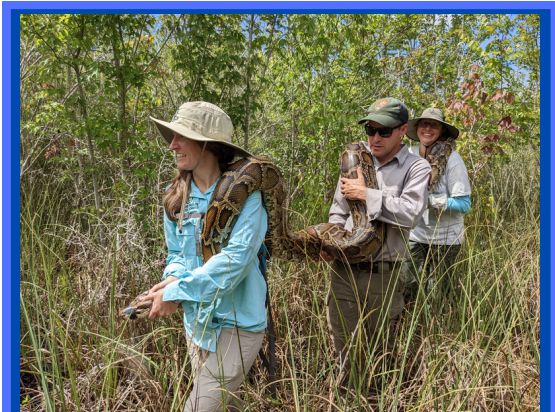
Control and Monitoring

Goal 1: Prevent the expansion of the python population to areas outside of the known, established range, focusing on areas most vulnerable to impacts.

- Focused control efforts
 - Focus control efforts by python contractors and organizational staff on the edges of the established range and in vulnerable areas.
- Early Detection and Rapid Response (EDRR) efforts
 - Maintain and expand current efforts through [IveGot1 hotline](#) and reporting websites.
 - Expand the current network of individuals that can respond to EDRR reports.

Goal 2: Reduce and contain the established python population and protect sensitive areas and areas of high ecological value.

- Python removal contractor programs
 - Programs (FWC and SFWMD) that engage qualified individuals using paid nonnative constrictor control efforts.
 - Maintain and expand current python removal contractor programs.
 - Maintain and expand current contractor access to land areas.
 - Expand access to select Miami-Dade County locations
 - Continue allowing assistants in the field with contractors.
- Scout snake programs
 - Programs where pythons are radio-tracked with a goal of finding and removing breeding aggregations, evaluating spatial extent and life history traits that can be used to better target python removal.
 - Expand current scout snake programs to new land areas.
- Vehicle mounted near-infrared camera python surveys
 - The vehicle mounted near-infrared camera helps detect pythons that visual searchers may have otherwise overlooked during regular vehicle survey efforts.
- Python detector dog programs
 - Programs with dogs trained to find pythons by scent instead of site.
 - Implementing dogs in sensitive habitats.
- Create tabular treatment matrix or flow chart
 - Combine tools, techniques, and technologies according to the season, characteristics of area and effectiveness to improve detection and increase removal rates.
- Python Patrol Program
 - Python Patrol is a no-cost training program that aims to create a network of individuals throughout south Florida who know how to identify Burmese pythons, and report sightings, as well as search for, safely capture, identify research animals, and humanely kill invasive constrictors.
 - Expand the availability of trainings.



A large female python captured during the scout snake program.

- Host audience specific python removal efforts
 - Continue youth python hunts, directed at educating and training the next generation of people interested in python removal.
 - Continue veteran python hunts, directed at engaging veterans in conservation efforts through python removal.

Goal 3: Facilitate coordination and planning among land managers, researchers and other stakeholders regarding effective control tools and management strategies.

- Everglades Cooperative Invasive Species Management Area (ECISMA)
 - Governmental agencies, nonprofit organizations, and universities are working together to address the growing invasive species problem within the ECISMA.
- FPCP Workgroup (FPCPW)
 - Will continue to facilitate coordination and planning among land managers through meetings, the distribution of the FPCP, of an annual implementation action plan, and of an implementation annual report.

Research

Goal 1: Advance science to assist land managers in decision-making on python control using the best-available science.

- Everglades Invasive Reptile and Amphibian Monitoring Program (EIRAMP)
 - Monitoring project to aid in determining the status and spread of invasive reptiles and amphibians on lands within the ECISMA.
- Scout snake telemetry research projects
 - Collect data on python physiology, behavior, habitat use, and life history traits.
 - Analyze scout snake removal data to refine this approach in remote areas and within different habitats and conditions.
- Environmental DNA (eDNA) research project
 - Research project collecting samples from the environment to test for the presence of pythons.

- Support research of novel detection methods
 - Explore funding mechanisms to encourage research targeting novel detection methods.
 - Drone near-infrared camera project
 - The creation of a drone near-infrared camera that, with the assistance of artificial intelligence, will improve our ability to detect pythons.
 - Mammalian lures research project
 - Research testing the efficacy of using mammalian scents to attract pythons to specific areas and remove them.
 - Cover box project
 - Deploy cover boxes within different habitats and monitor for python use.



- Research if next generation sequencing can identify python diet items
 - Assess whether molecular methods are possible to improve identification of python gastrointestinal tract items.
- Close-Kin Mark-Recapture (CKMR) population project
 - A preliminary feasibility study of genetic CKMR methods to estimate python population.
- Charlotte County Burmese python population project
 - Genotyping-by-Sequencing population genetic study to assess the Charlotte County Burmese python population in relation to other python populations in Florida.
- Keys, Florida meso-predator project
 - Track raccoons and opossums in the Keys to determine the level of predation by pythons.
- Research reptilian Ferlavirus in pythons
 - Reptilian Ferlavirus can cause death in snake species and, until recently, had only ever been detected in captive boas in southeast Asia. Recently Ferlavirus was the cause of death in wild native Florida snakes and this study explores the possibility of pythons as the Ferlavirus introduction vector in the state.

- Python identification artificial intelligence project
 - Preliminary study to determine the feasibility of detecting and identifying individual pythons using artificial intelligence.
- Research to link python ecology to removal efforts and assess the feasibility of robust population models
 - Collaborative and integrated approaches to link python ecology to removal efforts through the expansion of scout snake programs in unique habitats. Assess the feasibility of estimating python populations using scout snake and removal data in robust population models.
 - Assess juvenile survivability of python hatchlings.
- Evaluate efficiency of current python control efforts
 - Python removal contractor programs
 - Python detector dog programs
 - EDRR programs
 - Scout snake programs
- Pheromone research projects
 - Assess whether feminizing hormones can be used to manipulate the sex pheromones of male snakes, making them attractive to other males.

Goal 2: Increase alignment of research priorities, investments, and protocols across land managers and partners to increase efficiency so researchers are focusing on questions that will have the greatest impact on management decisions.

- Distribute RFP's for python related research.
 - Proposals to improve organizations abilities to detect and remove pythons.
- FPCPW creating an annual IP
 - The plan outlines recommended priorities for the following year.
 - Meeting quarterly to discuss recommended actions.

Communication

Goal 1: Increase public awareness of the harmful impacts of pythons, the efforts being conducted to control them, and promote the ecological value of native species to inform, empower, and engage the public in python control efforts.

- Targeted training and outreach efforts
 - Creating and implementing training and outreach targeting specific audiences, such as members of the public located in the Keys or other sensitive areas.
 - Target trainings and outreach with organizational staff.
- Training to humanely euthanize pythons
 - Create and distribute a video demonstrating proper humane euthanasia techniques.
- Training to identify research animals
- Promote and expand current awareness efforts
 - Python Patrol Program
 - IveGot1 hotline
 - Exotic Pet Amnesty days
 - Outreach and festival events
 - Schools and STEM educators
 - Zoos
 - Social media platforms
 - Dalton Discovery Center invasive species wing
- Create a Florida Python Control Plan website
 - A website for the FPCPW to share with the public updated information on pythons.
- Create and expand current outreach tools
 - Invasive animal ID decks
- 2023 Florida Python Challenge®
 - An event that provides awareness to the public about the impacts of invasive species in Florida while engaging participants in a competition to remove Burmese pythons from public lands.



Python Patrol training safe capture techniques of pythons before the 2022 Florida Python Challenge®

Goal 2: Increase interorganizational communication, data sharing, and collaboration.

- FPCP Workgroup (FPCPW)
 - The Florida Python Control Plan Workgroup will continue to meet regularly throughout the year.
- Attend and present at conferences
 - Greater Everglades Ecosystem Restoration (GEER) conference
 - ECISMA conference
 - Southwest CISMA conference
 - Other relevant conferences

Goal 3: Create a communication strategy to support implementation of the Florida Python Control Plan.

- The FPCPW will create a communication strategy.



FPCP Workgroup meeting with researchers to discuss python control (Photo credit: SFWMD).

Appendix I: Embedded Hyperlink Web Addresses

- Exotic Pet Amnesty Program
 - <https://myfwc.com/wildlifehabitats/nonnatives/amnesty-program/>
- Wildlife Alert
 - <https://myfwc.com/contact/wildlife-alert/>
- Executive Order (EO) 20-17
 - <https://myfwc.com/media/23764/eo20-17.pdf>
- IveGot1 hotline
 - <https://myfwc.com/wildlifehabitats/nonnatives/report/>
- FWC python removal program
 - <https://myfwc.com/wildlifehabitats/nonnatives/python/action-team/>
- SFWMD python removal program
 - <https://www.sfwmd.gov/our-work/python-program>
- Python Patrol Program
 - <https://myfwc.com/wildlifehabitats/nonnatives/python/patrol/>
- Everglades Cooperative Invasive Species Management Area (ECISMA)
 - <https://www.evergladescisma.org/>
- Everglades Invasive Reptile and Amphibian Monitoring Program (EIRAMP)
 - <https://crocdoc.ifas.ufl.edu/projects/eiramp/>
- Florida Python Challenge®
 - <https://flpythonchallenge.org/>
- Greater Everglades Ecosystem Restoration (GEER)
 - <https://conference.ifas.ufl.edu/geer/>