CISMA
Everglades Cooperative Invasive Species Management Area

Newsletter

VOLUME 11 2021

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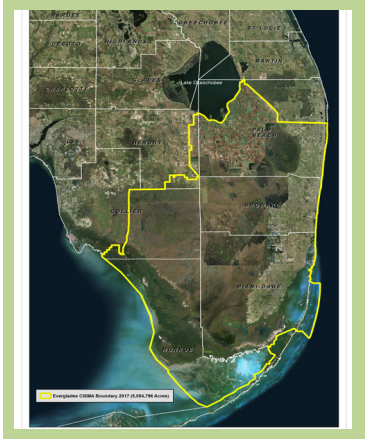


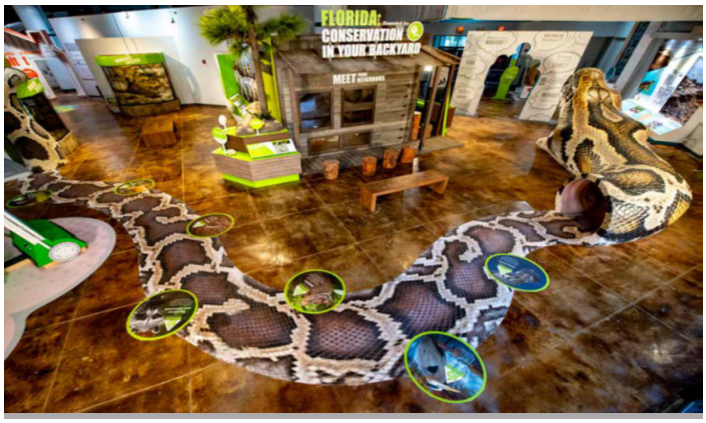
Newly opened Conservation Action Center, Photo courtesy of Zoo Miami.

A Place to Meet Your Everglades Neighbors at Zoo Miami

By: Justin Dalaba, President of Friends of ECISMA, Inc.

From a creative vision, 5 years of work, and 7,000 square feet of underutilized space, South Florida's newest public exhibit on invasive species opened its curtains this year. Graphics and Exhibits Manager, Julia Klumb, tells us the story behind the newly opened Conservation Action Center at the heart of Zoo Miami. and invasive species displays, offering visitors and residents the chance to get to know their South Florida neighbors better. The exhibit was designed with help from a team of scientific advisors and expert representatives, and would not have been possible without the generosity of donors and sponsors.

Formerly Dr. Wilde's World of Discovery, the aging exhibit went from passive viewing to exciting and interactive, telling stories of inspiration and engagement in conservation actions. Julia explains that the bulk of the new exhibit aims to show "how our actions impact ecosystems not only right here in South Florida, but globally." At least a quarter of the exhibit is occupied by native



Crawl-through Burmese python exhibit in the Conservation Action Center, Photo courtesy of Zoo Miami.

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A Place to Meet Your Everglades Neighbors at Zoo Miami (CONTINUED FROM PAGE 1)

Virtual model of the crawl-through Burmese python exhibit at the Conservation Action Center, Photo courtesy of Zoo Miami.

"Definitely one of the stunning focal points is the Burmese python part of the exhibit," says Steven Whitfield a member of the core team and expert representative for the Conservation and Research Department. Most visitors wouldn't dream about crawling into the mouth of a python, but now they can get a real insiders' view on what's eating the Everglades. As you crawl, you are guided by bubbles on the floor illustrating animals of the Everglades that are impacte by Burmese pythons.

Zoo Miami's support and involvement in Burmese python management with partners like USGS, NPS, and FWC, are also displayed on the interactive graphics. If you're looking for a little more interaction, you can visit the collection of live animal ambassadors at a little shack called "Meet Your Neighbors." There you'll get up close with native and imperiled reptiles like the Eastern indigo snake, along with two of their invasive counterparts: The Argentine black and white tegu and red-tailed boa. What sets this exhibit apart from the rest of the zoo is not the live animal displays, but the greater message on how locals and visitors can take action. From light hearted wanted posters framing the invasive "criminals" the conservation community is combating to a small model house with information about choosing the right pets, the newly revamped museum space suits all audiences.

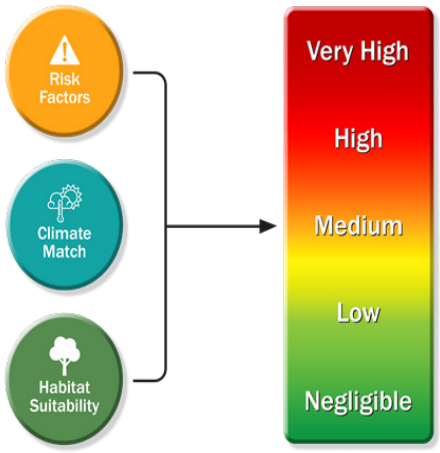
"We were supposed to open the exhibit last July on our 40th anniversary, but COVID brought production to a screeching halt," Julia said. The wait paid off. When the exhibit finally opened to the public on January 16th, 2021, Julia estimates a stream of 500 visitors an hour on the first day alone. It's the perfect platform to educate the masses, with a normal year drawing nearly 1 million visitors to the only subtropical zoo in the continental United States. The Conservation Action Center will help reach those who are not as closely connected to environmental threats across the Everglades CISMA footprint.

Florida's Most Wanted exhibit at the Conservation Action Center, Photo courtesy of Zoo Miami.

Recent Rule Changes Addressing High-Risk Nonnative Reptiles

By: Sarah Funck, Florida Fish and Wildlife Conservation Commission

Florida is incredibly susceptible to invasive species due to our subtropical climate which creates an environment conducive to the establishment of many species. Multiple ports of entry, other introduction pathways, and the presence of the live animal trade contribute to the likelihood that nonnative fish and wildlife have the opportunity to enter the state. These factors have resulted in over 100,000 observations of nonnative fish and wildlife reported to the FWC (excluding lionfish); however, not all nonnative species are considered high-risk. The FWC's Nonnative Fish and Wildlife Program (NFWP) is charged with determining the level of risk a nonnative species poses to Florida's ecology, economy or human health and safety and what management strategies are appropriate to minimize their adverse impacts on the state.



Factors considered in the risk-screening tool developed by University of Florida.

Activity	Conditional Species	Prohibited Species
Allowed as pets	**No**	**No**
Import and possess for breeding for the purposes of commercial sale	Yes	**No**
Import and possess for exhibition	Yes	Yes (limited breeding)
Import and possess for research	Yes	Yes (limited breeding)

Chapter 68-5, F.A.C. regulatory structure for nonnative fish and wildlife.

The most efficient and cost-effective means of mitigating impacts from a high-risk nonnative or invasive species is through prevention. One prevention tool the FWC employs is regulation to address high-risk nonnative fish and wildlife. To assess risk levels, the FWC uses risk-screening tools to determine the risk of a species.

These tools consider biological risk factors (e.g., detectability, invasion history, fecundity, disease vector, etc.) and climate match to Florida as compared to the species' native range. Once the relevant data are entered into the tool, it provides managers with a risk level ranging from very high to negligible. The NFWP also considers habitat suitability in Florida, either through existing publications or by developing new habitat suitability models. The output of the risk screening tool combined with habitat suitability information helps to inform managers of potential risk of a species using a science-based process. In 2020, the FWC determined 16 species were a high-risk to Florida.

Florida's regulations address ecologically risky nonnative species in Chapter 68-5, F.A.C., that include the Conditional and Prohibited species regulatory classifications. Neither of these categories allow for people to keep these animals as pets, but the Prohibited status takes it a step further and restricts commercial sales. Nonnative fish or wildlife that pose the highest risk to Florida should ideally be listed as Prohibited.

In July 2020, the FWC took a draft rule package to the Commission proposing to list 16 high-risk nonnative reptile species as Prohibited, including tegus (all species in the genera), green iguanas, Nile monitors, and the large constrictor snakes previously listed as Conditional (i.e., Burmese, North African, South African, scrub, Amethystine, reticulated pythons, and green anaconda). The goal of this proposal was to eliminate commercial breeding and pet ownership of these

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Recent Rule Changes Addressing High-Risk Nonnative Reptiles (CONTINUED FROM PAGE 3)

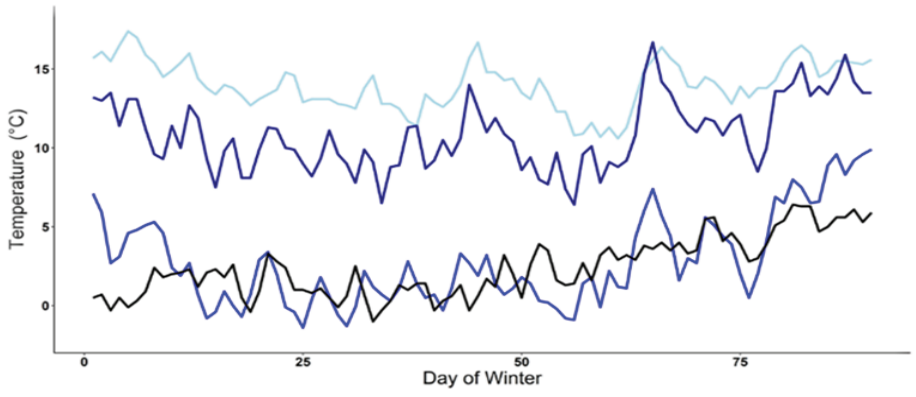
high-risk species to protect Florida. The Commission approved staff recommendations at this meeting and in the following months, the FWC obtained significant stakeholder feedback on the draft rules through 10 public workshops, 3 focus groups and two online surveys tools. Most Florida residents generally supported the proposed changes and staff made significant adjustments to the draft rules based on the public input.

In February 2021, FWC Commissioners unanimously approved the final rule package moving the 16 high-risk nonnative reptiles to Florida's Prohibited list. The rules also identified several provisions intended to lessen the impact for those currently in possession of tegus and green iguanas. People in possession of these lizards as pets prior to the rule change can keep their pets for the life of the individual animal through a no-cost permit, but their animals will need to be PIT tagged and maintained in appropriate caging. The rule change also incorporated limited exceptions to allow some businesses to sell and breed their stock of tegus and green iguanas; however, the breeding allowance will be phased out by June 30, 2024. The high-risk constrictors and Nile monitor were not given a limited exception for sales, thus effectively eliminating commercial sales of these species in Florida. A new permit type for eradication and control efforts will also allow nuisance wildlife trappers to continue the important to continue the important work they do while having a temporary trapped Prohibited reptiles offsite for the purposes of euthanasia. These rules became effective April 29, 2021, but the public has until July 28, 2021 to come into compliance with the new rules through the 90-day grace period provision in rule. Commissioners also added a 180-day grace period that ends October 26, 2021 for people to upgrade their outdoor caging as biosecurity requirements have increased. Additional details regarding the rule changes can be found here: www.myfwc.com/reptilerule.

Tegus Survive Winter in a Temperate Climate

By: Scott Goetz, U.S. Geological Survey

The Argentine Black and White Tegu (Salvator merianae), native to South America and established in at least three locations in Florida, may be capable of surviving in other southeastern US states as indicated by species distribution models (Jarnevich et al. 2018). To experimentally test these model predictions, we captured twelve adult tegus in southern Florida and translocated them to semi-natural outdoor enclosures equipped with underground refugia boxes on the campus of Auburn University in Alabama. The tegus were maintained at this location for a full calendar year to assess their ability to survive the winter in a more



Comparison of mean ten-year (2007–2016) daily low winter temperatures for two of the invasive Florida populations of Argentine Black and White Tegus (Miami-Dade County, light blue line; Hillsborough County, dark blue line), a location near the southern limit of their native distribution (Santa Rosa, Argentina, black line), and the location of our study site in Alabama (Lee County, blue line). Climate data retrieved from the National Oceanic and Atmospheric Administration (NOAA; https://www.ncdc.noaa.gov/cdo-web/datatools/selectlocation).

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Tegus Survive Winter in a Temperate Climate (CONTINUED FROM PAGE 4)

temperate *climate. We were also interested to* learn if the tegus would alter their behavior in response to harsher winter conditions by starting hibernation earlier and remaining underground for longer.

Nine of the twelve tegus (75%) survived the winter and emerged from hibernation in the spring. Of those nine, two later died. Seven survived the full year, including three of four females, four of eight males. All lizard body temperatures stayed above freezing throughout the winter but dropped as low as 6.6 ºC in surviving individuals. Our findings provide direct evidence that adult tegus can survive in largely natural conditions in areas far north of southern Florida.

Tegus were individually housed in these enclosures on the campus of Auburn University throughout the winter. Photograph taken in January by study coauthor Melissa A. Miller following an abnormal accumulating snow event in Auburn, AL. All lizards were underground in artificial refugia boxes during this event.

These experimental lizards were at least several years old and acclimated to southern Florida. Their survival in Alabama indicates the vulnerability of northern areas to intentional or accidental introduction from Florida populations. Tegus in Alabama entered hibernation earlier in the year and remained underground for longer than free-ranging tegus in southern Florida (McEachern et al. 2015, Currylow et al. in press). One individual hibernated for 244 days (> 8 months) which is the longest period of dormancy ever reported for this species. Tegus appear to have a high degree of behavioral flexibility to escape unfavorably cold temperatures suggesting translocated individuals can adapt to varying climatic conditions.

Following this experiment, at least 30 tegu sightings were reported in Georgia. Observations were concentrated in Toombs and Tattnall counties located at a similar latitude as Auburn University. The preponderance of tegu observations in Georgia over several years provides evidence for an established population (Haro et al. 2020) and supports our experimental findings of tegu survival in climates colder than subtropical southern Florida.

Where established, tegus are likely to negatively impact native species. They can weigh more than 10 pounds and eat everything from fruits and insects to small mammals and birds. Tegus are particularly accomplished nest predators threatening ground-nesting birds and many reptile species.

To read this full study,a free download is available, visit: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0245877

Literature cited:

Jarnevich CS, MA Hayes, LA Fitzgerald, AA Yackel Adams, BG Falk, MA Collier, LR Bonewell, PE Klug, S Naretto, and RN Reed. 2018. Modeling the distributions of tegu lizards in native and potential invasive ranges. Scientific Reports, 8(1):10193.

McEachern MA, AA Yackel Adams, PE Klug, LA Fitzgerald, RN Reed. 2015. Brumation of introduced black and white tegus, Tupinambis merianae (Squamata: Teiidae), in southern Florida. Southeast Naturalist, 14(2):319–328.

Currylow AF, MAM Collier MAM, EB Hanslowe, BG Falk, BS Cade, S Moy, A Grajal-Puche, FN Ridgley, RN Reed, AA Yackel Adams. In press. Thermal stability of an adaptable, invasive ectotherm; Argentine giant tegus in the Greater Everglades ecosystem, USA. Ecosphere.

Haro D, LD McBrayer, JB Jensen, JM Gillis, LR Bonewell, MG Nafus, SE Greiman, RN Reed, AA Yackel Adams. 2020. Evidence for an Established Population of Tegu Lizards (Salvator merianae) in Southeastern Georgia, USA. Southeast Naturalist, 19(4):649–662.

Python Population Puzzles: The Vital Need for Vital Rates

By: Jillian M. Josimovich and Amy A. Yackel Adams, U.S. Geological Survey

Decades of research and management efforts by federal, state, county, tribal, university, and non-governmental organization partners have substantially increased our Burmese python knowledge base. Collectively, we've acquired information about many aspects of python invasion ecology, including how the snakes were likely introduced (Reed et al., 2012; Snow et al., 2007; Willson et al., 2011), how difficult they are to detect (Hunter et al., 2019; Nafus et al., 2020), what habitats they use (Bartoszek et al., 2018; Hart et al., 2015), and how they impact humans, wildlife, and the environment (Dorcas et al., 2012; Miller et al., 2018; Reed and Snow, 2014). These joint efforts have also evaluated many innovative python control tools such as visual surveys, detector dogs, live-capture traps, and Scout snakes, which has resulted in thousands of Burmese python removals to date. Despite the great strides in increasing our understanding of this invasive species, we lack basic knowledge on how large the python population size is. This prevents us from determining whether any of these control tools are significantly reducing python numbers. To determine population size and maximize control tool efficacy, we still have hard work to do to learn more about what researchers refer to as "vital rates". Vital rates are demographic data such as survival, growth, and reproductive rates, sex ratios, and ages at maturity amid selected snake habitats. Though this type of field-intensive information takes years to gather over python generations, we eventually will be able to estimate python population size, identify key demographics to target for management, and understand the number of individuals that must be removed to ensure population decline.

Partners working together to capture an adult female Burmese python associated with a telemetered Scout male in Big Cypress National Preserve. Left to right: Matthew McCollister (NPS), Shannon Buttimer (UF), Cheryl Reupert (NPS), Michael Reupert (NPS). USGS photo by Austin Fitzgerald.

To move our knowledge in this direction, researchers from U.S. Geological Survey (USGS) are coordinating and planning with collaborators to address this knowledge gap to help meet the management needs of partners and stakeholders throughout the Greater Everglades Ecosystem. This focused research collaborative will require years of intensive, sustained effort and funding. In 2021, USGS researchers are conducting virtual meetings with partners and stakeholders to establish priorities, design studies, coordinate data collection, and develop a unified communication plan. Please reach out to us - we'd like to hear from you!

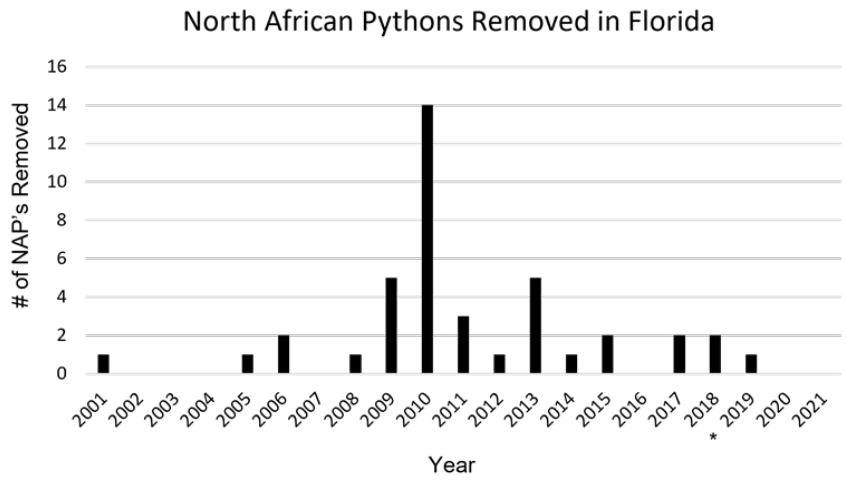
Partners working together to collect blood from a Burmese python to study reproductive and stress physiology. Clockwise from top left: Matthew McCollister (NPS), Christina Romagosa (UF), Jennifer Ketterlin (NPS), Jillian Josimovich (USGS). Photo by Andrea Currylow.

Stay tuned for vital rates research developments, and look out for a comprehensive review of research relevant to managing pythons that will be coming out later this year (Guzy et al., In prep. Invasive Burmese pythons in Florida: A synthesis of biology, impacts, and management tools).

North African Python Removal

By: McKayla Spencer, Florida Fish and Wildlife Conservation Commission

The North African Python (NAP; Python sebae) is an invasive species in Florida that was first observed in the wild in 2001. It is a large constrictor snake species introduced through the pet trade, causing similar negative impacts on the environment as the Burmese python (Python molurus bivittatus). It is listed as an injurious species by the federal Lacey Act and in 2010 was regulated in the state of Florida as a Conditional species until April 2021 when it became a Prohibited species. The Prohibited status restricts possession of this species to permitted entities conducting research, educational exhibition, or for eradication/control. This species can no longer be sold in the state of Florida or kept as pets.



*Graph of NAP's removed over time in the Florida through May 19, 2021. *This graph does not include the 37 hatchlings confiscated by LE in 2019.*

Visually searching for NAP's at sites in the BDB during the May 2021 survey.

NAP's are considered locally established with 78 removed from the wild, 37 of which were hatchlings confiscated by Florida Fish and Wildlife Conservation Commission (FWC) Law Enforcement in 2019 from an individual who claimed to have collected the eggs in Miami-Dade County. The majority of those reports occurred in western Miami-Dade County in the Bird Drive Basin (BDB). Since the first removal of a NAP in 2001, agencies and organizations in south Florida have conducted regular surveys for NAP's to try to eradicate the species from the wild. These efforts include a yearly Everglades Cooperative Invasive Species Management Area (ECISMA) survey in the BDB during National Invasive Species Awareness Week (NISAW). On May 18th, during the 2021 NISAW, a total of 22 people from the FWC, National Park Service, Zoo Miami, University of Florida, U.S. Fish and Wildlife Service, South Florida Water Management District, and Miami-Dade County completed an evening survey across multiple sites in the BDB. The ECISMA partners did not find any NAP's or other invasive constrictor species. Continued multi-agency monitoring has been key to the control of NAP's with the last capture of a wild NAP occurring on July 24, 2019.

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Update on Recent Efforts to Eradicate *Lumnitzera racemosa*

By: Jennifer Possley, Fairchild Tropical Botanic Garden

Since ECISMA's early days (2008), the group has been working to eradicate the non-native invasive mangrove Lumnitzera racemosa from relatively undisturbed mangrove forests at Fairchild Tropical Botanic Garden and surrounding Matheson Hammock. Hard-working state contractors removed nearly 50,000 stems between 2010 and 2016, but since then, ECISMA members have handled surveys and removal on their own.

Dennis Giardina holds the harvest from this scaled-down Lumnitzera Blitzera in December 2020. Also pictured are Jane Griffin Dozier, Isabel Lamas, Dallas Hazelton, Joanne Rose, Mary Jackson, Lydia Cuni, and Brian Harding. Photo credit: Jennifer Possley.

As lumnitzera diminished and contractors were no longer needed, an annual tradition was born! ECISMA members were invited to converge for just one morning each year to yank up as many lumnitzera stems as possible on the day of Fairchild's International Chocolate Festival. Fairchild provided pizza for lunch (Miami-Dade County's Joy Klein would often pick it up for us), then ECISMA members could stroll through the Chocolate Festival, muddy boots and all, before heading home. These big, fun "Blitzera" events, which seemed to get bigger each year (65 people in January 2020!), were the driving force behind removal efforts. The annual Blitzeras in 2016 through 2020 yielded 52, 118, 258, 401, and 187 lumnitzera, respectively.

Of course, like it did most everything else, COVID-19 put the kibosh on our lumnitzera eradication efforts for winter of 20/21. So, instead of one big removal effort, small groups of Miami-area staff and volunteers (plus ECISMA co-chair Dennis Giardina, traveling from Naples) have been working in smaller groups. To date, we have removed 172 stems over 4 mornings. We are going extra slow and careful, getting those hard-to-find plants. Most are 3' and under. A few plants in the tall mangroves near Fairchild's lowlands gate have been as tall as 6,' but these shaded plants were quite spindly.

We have plans to restart again next winter. We very much hope that by then, we can invite everyone back!

Lumnitzera racemosa. Photo by Ben Caledonia.CC.

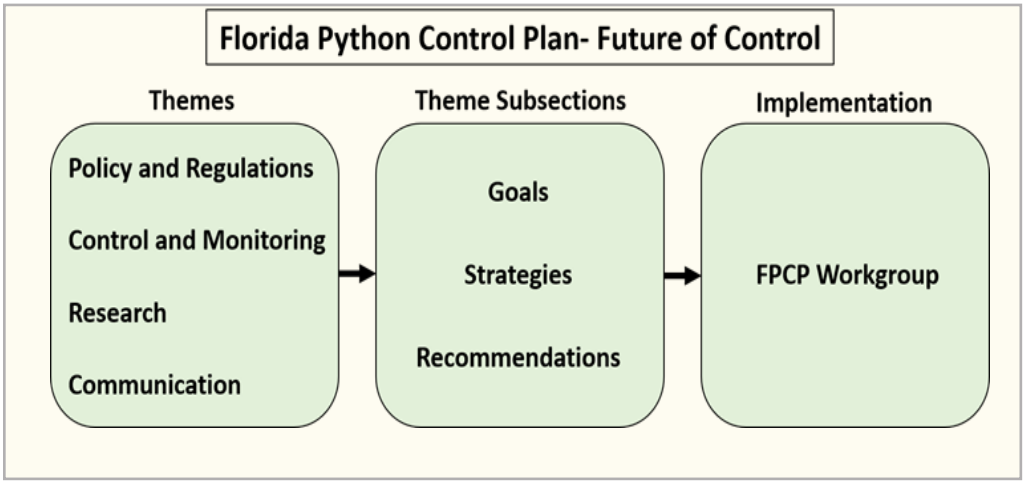
Development of a Florida Python Control Plan

By : McKayla Spencer, and Sarah Funck, Florida Fish and Wildlife Conservation Commission

Burmese pythons are an invasive species in Florida, causing negative impacts to the ecosystem through the consumption of native species and the introduction of novel parasites and diseases. In 1979, South Florida received its first report of a Burmese python near the northern border of Everglades National Park. Since that time they have spread across south Florida's vast natural areas, establishing a breeding population. This species is incredibly difficult to find and exists in some of the most remote and inaccessible areas within the Everglades, creating a significant challenge for control of the species. The population size of Burmese pythons remains unknown, but the Florida Fish and Wildlife Conservation Commission (FWC) has received over 13,000 reports of pythons killed or found dead by members of the public, staff, partner agencies and organizations, and contractors. Due to the scale of the python invasion and the challenges faced by land managers, fifteen federal, state, and local agencies, Tribes, and a non-governmental organization began development of the first Florida Python Control Plan (FPCP) in 2019.

First meeting of FPCP partners in Fort Lauderdale in 2019.

The overarching objective of the FPCP is to provide a science-based framework to coordinate and guide efforts to minimize adverse impacts of Burmese pythons in Florida and protect native ecosystems. This document covers the background of the python invasion, python biology, and focuses on future control of pythons structured within four main themes: Policy and Regulations, Control and Monitoring, Research, and Communication. Within each theme is a series of goals, strategies, and recommendations to guide land managers that engage in python control efforts. The final section of the FPCP outlines how the plan will be implemented moving forward and discusses the development of a FPCP Workgroup that will meet at least four times per year to calibrate on goals and create an annual Action Plan that will provide partner agencies with recommendations on priorities and focal points for on the ground control efforts or research. The final draft of the FPCP will be completed by June 30, 2021 and the Workgroup will have their first meeting in summer 2021.

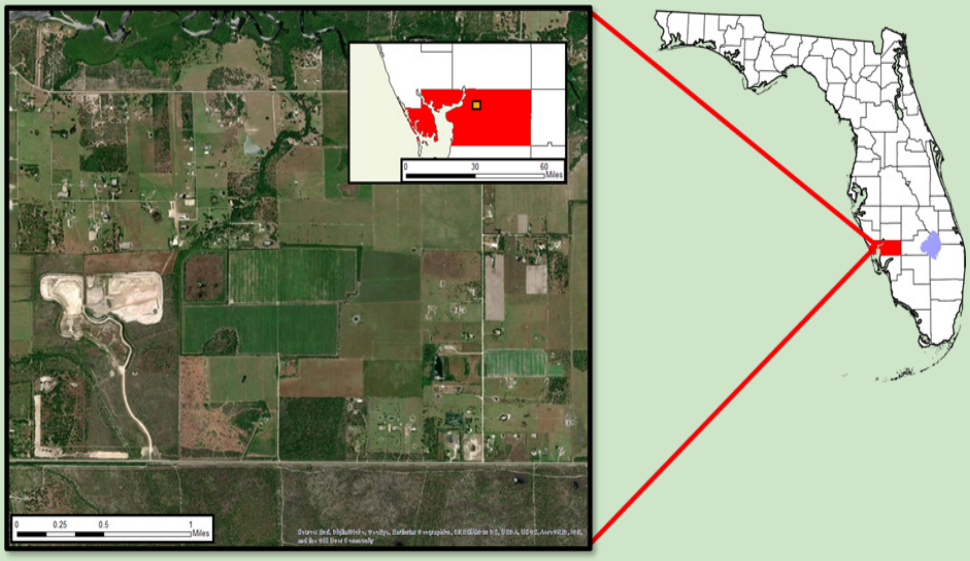


Four main themes provide the primary structure of the FPCP: Policy and Regulations, Control and Monitoring, Research, and Communication.

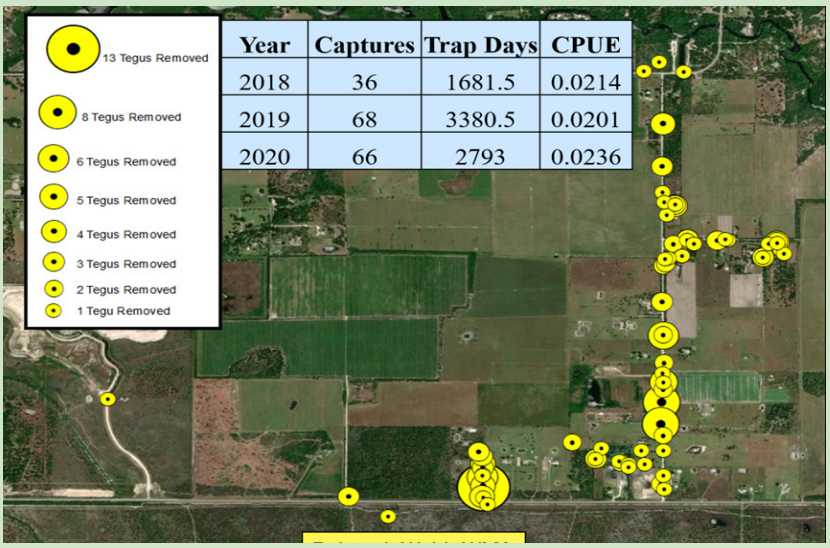
Tegu Population and other Nonnative Lizards in Charlotte County

By: Daniel Quinn, Florida Fish and Wildlife Conservation Commission

Since June of 2018, the Florida Fish and Wildlife Conservation Commission (FWC) has been responding to an emergent population of Argentine black and white tegus (Salvator merianae) in rural Punta Gorda, FL (Charlotte County). The population appears to be located east of I-75 around Bermont Rd. and the southern portion of Washington Loop Road. Both these roads run parallel to each other and are bisected by a gravel road named Bronco Rd, where many of our traps were placed.



Rural Punta Gorda, FL (Charlotte County) where Florida Fish and Wildlife Conservation Commission trapping efforts have been underway for Argentine black and white tegus and other nonnative herpetofauna since June 2018.



Year	Captures	Trap Days	CPUE
2018	36	1681.5	0.0214
2019	68	3380.5	0.0201
2020	66	2793	0.0236

Florida Fish and Wildlife Conservation Commission trapping locations with at least one successful capture in Punta Gorda, FL (Charlotte County). Data table is broken down by year for capture numbers, trap days, and captures per unit effort (i.e., captures per trap day; CPUE).

From 2018 – 2020, we set out upwards of 38 traps at a time and typically set them Monday – Friday during the active season (i.e., March – October). We used a combination of Havahart 1079 traps with some wrapped in hardware cloth to prevent juvenile escape and others without. We also began incorporating Tomahawk S90 traps in 2019-2020. From 2018-2020 the FWC trap lines removed 170 Argentine black and white tegus from the area. Since beginning trapping efforts, the FWC has also attempted to increase public awareness and reports in the area through news media, posting signs at roadways, and sending informational postcards to all residential addresses in the area. Based on trapping efforts and public reports, the tegu population seems to be contained to a relatively small area. While the two

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Tegu Population and other Nonnative Lizards in Charlotte County

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furthest tegu reports were separated by 8.6 km, the vast majority of observed/removed tegus occurred within a three km radius. While this tegu population is breeding in the wild and can therefore be defined as "established", the remarkably small area of the known population and lack of any obvious barriers to movement leads us to believe that the population is in its infancy (i.e., early stages) and is therefore incipient and still in the colonizing process.

Since trapping began in 2018, we have also discovered other, rare nonnative herpetofauna with no indication of a reproductive population in the area. Specifically, we are aware of 20 incidents of other nonnative herpetofauna, many of which were removed.

Traps set were live traps (pictured: Tomahawk S90) and baited with whole chicken eggs in the back behind the trigger plate. Eggs were also crushed at the entrance to increase attraction to the trap.

There is a large, commercial reptile breeding and exhibition facility within this area that is located within three km of 198 of the tegus reported or captured in the area (91.2%) and is within 2 km of all the other notable nonnative herpetofauna reports (95% of which are within 0.5 km). As a result, this facility is suspected to be the cause of these loose nonnative species and the tegu population. The FWC continues to manage the situation by working with local landowners to trap and remove any nonnative wildlife reported, including, but not limited to, taking any necessary legal action to mitigate or prevent further issues.

New Guinea Flatworm Update

By: Lawrence Lopez[1], Alícia Warren[2] and Timothy Collins[1]

[1] Department of Biological Sciences, Florida International University
[2] Miami-Dade County Natural Areas Management (Parks, Recreation & Open Spaces Department) & Environmentally Endangered Lands Program (Department of Regulatory & Economic Resources).

You may have seen them crawling by the dozens in your yard, or you might have seen one or two of them creeping up an outside wall of your house or over your pool cover. You might also have asked yourself, "What kind of animal is this exactly? It looks like some sort of 'worm'." This is a typical story when people observe land flatworms for the first time. There are hundreds of species of land flatworms all over the world, and one in particular has caught the attention of many Floridians who are increasingly reporting their observations to crowdsourcing biodiversity databases like iNaturalist and the Early Detection and Distribution Mapping System (EDDMapS). We are talking about the New Guinea flatworm (Platydemus manokwari) which was first described in 1962 in New Guinea (de Beauchamp 1962), but now has spread worldwide primarily through human agency to Indian Ocean Islands, South Asia, East

Platydemus manokwari (New Guinea flatworm) on trunk of a wild tamarind tree in Miami-Dade County. Photo by Tim Collins.

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New Guinea Flatworm Update (CONTINUED FROM PAGE 11)

Asia, Australia, Micronesia, Melanesia, Polynesia, Europe, the Caribbean, and the United States, with the first specimens found in Florida in 2012.

The problem with the New Guinea flatworm is that as a non-native, invasive species, it is a polyphagous predator able to consume various prey items such as snails, slugs, earthworms, insects, and other critters in ecologically unchecked ways (Sugiura 2010). As an introduced invasive species in Florida and other U.S. states (including Texas), it has practically no ecological brakes (e.g., no predators) and thus can attain nuisance proportions, consuming native prey populations to the point of extirpating them. The current rate of spread for New Guinea flatworm in Florida has been calculated to around 190 km per year (Gerlach et al. 2021) given its ease of accidental transport via materials, plant trade, as well as on boots, tires and construction/ field equipment, and it has been reported now from about two thirds of Florida counties (45 out of 67) based on current distribution points registered in EDDMapS (EDDMapS 2021). The natural spread of these species is much lower (30—180 meters per year), so this rapid spread has been made possible by the movement of soils, mulch, potted plants, and other materials that have flatworms on or in them.

Florida tree snail (Liguus fasciatus var. simpsoni) in the Florida Keys, along with two rainbow drops, Helicina clappi (smaller snails). Photo by Tim Collins.

The New Guinea flatworm has a feeding preference for land snails, either ground snails or tree snails (Gerlach 2019). In fact, they have been used in many parts of the world as a biocontrol for large populations of invasive land snails, such as the giant African land snail (Lissachatina fulica), an herbivorous snail capable of gobbling several hectares of an agricultural crop in a single season (Muniappan et al. 1986). Unfortunately, the New Guinea flatworm preference for land snails includes virtually all land snails not just invasive species, and high densities of these flatworms have been found to exert a significant decline in snail population survival in field and laboratory settings (Sugiura 2009). Overall, this flatworm has been historically affecting world native land snail communities to the point of their extinction, and it is now affecting iconic tree snail species in Florida such as Florida tree snails (Liguus fasciatus), banded tree snails (Orthalicus floridensis), and Stock Island tree snails (Orthalicus reses reses), all of which have been listed as Species of Greatest Conservation Need by the Florida Fish and Wildlife Conservation Commission (FWC).

There is no time to lose as this flatworm species continues to spread throughout Florida and the U.S. Currently, we are surveying native tree snail populations and introduced flatworm populations to determine the effects of this predator on tree snail populations in mainland south Florida and the Keys, but efforts to counteract the spread of this invasive species will benefit from community involvement. Descriptions of the New Guinea flatworm can be found on the FWC website https://myfwc.com/wildlifehabitats/nonnatives/invertebrates/new-guinea-flatworm/?redirect=ngf.

By just taking a photo using your mobile phone and uploading it to EDDMapS (https://www.eddmaps.org/florida/report/) you can help officials and scientists alike to keep track of this menacing invasive and help guide future operational management. activities.

Litterature Cited

De Beauchamp P. (1962). Platydemus manokwari n. sp., planaire terrestre de la Nouvelle-Guinee Hollandaise. Bulletin de la Societe Zoologique de France 87: 609-615.

EDDMapS (2021). Early detection and distribution mapping system. University of Georgia – Center for Invasive Species and Ecosystem Health. http://www.eddmaps.org/. Accessed May 30, 2021.

Gerlach, J. (2019). Predation by invasive Platydemus manokwari flatworms: A laboratory study. Biological Letters 54(1): 47-60.

Gerlach, J. et al. (2021). Negative impacts of invasive predators used as biological control agents against the pest snail Lissachatina fulica: The snail Euglandina 'rosea' and the flatworm Platydemus manokwari. Biological Invasions 23: 997-1031.

Muniappan, R. et al. (1986). Gian African Snail control in Bugsuk Island, Philippines, by Platydemus manokwari. Oleagineux 41(4): 183-188.

Sugiura, S. (2009). Seasonal fluctuation of invasive flatworm predation pressure on land snails: Implications for the range expansion and impacts of invasive species. Biological Conservation 142: 3013-3019.

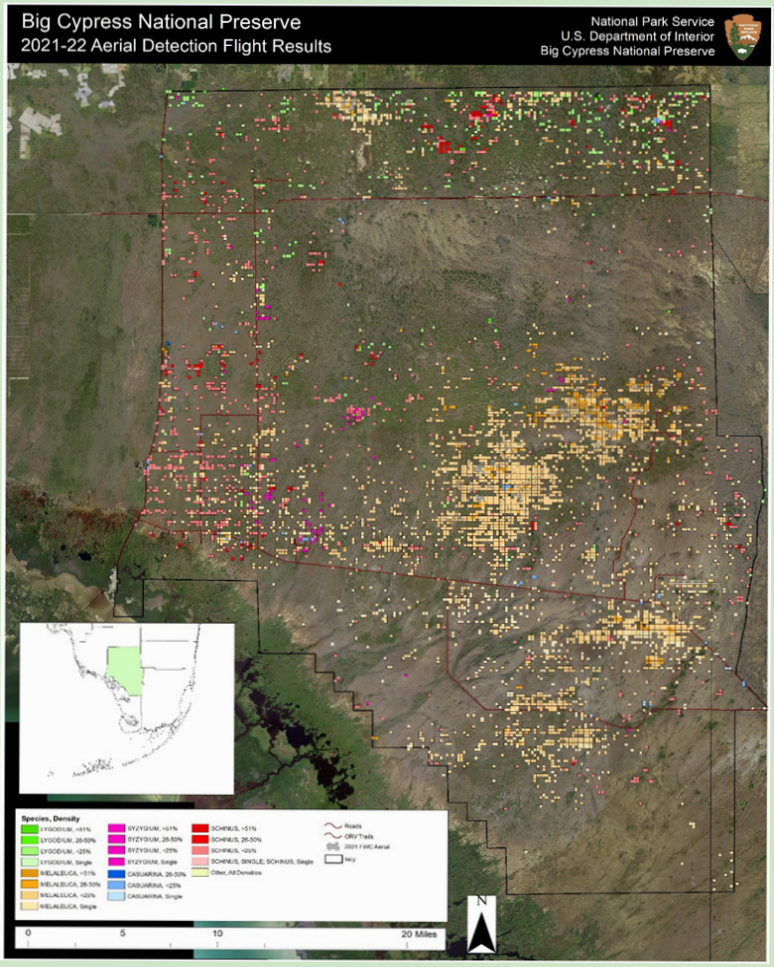
Sugiura, S. (2010). Prey preference and gregarious attacks by the invasive flatworm Platydemus manokwari. Biological Invasions 12: 1499-1507.

Digital aerial sketch mapping survey in Big Cypress National Preserve

By: Courtney Angelo, Billy Snyder, and Tony Pernas, National Park Service.

Big Cypress National Preserve (BICY) employs an integrated approach to invasive species management. Digital aerial sketch mapping (DASM) is one of the key techniques that BICY uses to detect invasive plant species across its vast landscape. The DASM survey involves dividing the Preserve into 500 m transects and systematically flying the transects in a helicopter with two observers on either side.

Using pen-top computers similar to large tablets, each observer visually watches the ground, looking out the helicopter 250 m for target invasive plant species. When a species is observed on the ground, a point is dropped on the computer map in the approximate location of the species, and density is simultaneously applied. The points are then used to designate specific 250 m grid cells representing species' infestations and densities.



BICY DASM results for 2020-2021 survey. Survey results are displayed in 250 m grid cells with target species with the highest density for each cell represented on the map. Some grid cells have more than one species, but are not displayed here.

From fall 2020 to spring 2021, BICY and South Florida Water Management District (SFWMD) biologists completed DASM across the entire Preserve (Figure 1). The 2020-2021 DASM surveys recorded 6,536 total points, each containing data on five targeted invasive plant species recorded at varying densities ranging from individual trees to dense infestations. The five species surveyed included: Melaleuca quinquenervia (melaleuca), Lygodium microphyllum (Old World climbing fern), Casuarina equisetifolia (Australian pine), Schinus terebinthifolia (Brazilian pepper), and Syzygium cumini (Java plum).

For the 2020-2021 DASM, melaleuca was found to cover the most area with 9,070 acres across the central-eastern portion of BICY and south of US 41. Brazilian pepper was concentrated in the central-western portion of BICY, while Lygodium was the highest north of I-75. Java plum was found in a staggering 252 acres and signifies that emerging invasive species also need to be included in detection processes. Each species was most commonly found in low densities (class 2-25%). At this density class, Melaleuca was found across 6,691 acres, followed by Brazilian pepper with 1947, Lygodium with 597, Java plum 165, and Australian pine with 91 acres, respectively.

During the 2012-2013 DASM, Melaleuca was detected in 4,639 acres. Thus, Melaleuca in BICY has increased roughly 200% in this time period. The expansion of melaleuca is due to the explosive recruitment of the species after the Avian Bar fire in 2018. Large pine flatwoods were left charred and susceptible to invasion post-fire. Brazilian pepper has decreased in acreage by 300%. Australian Pine has

CONTINUED ON PAGE 14

Digital aerial sketch mapping survey in Big Cypress National Preserve (CONTINUED FROM PAGE 13)

remained the same; while, Lygodium acreage has increased in this time period. In the 2012-2013 survey, Java plum was not targeted.

DASM data informs land management strategies and guides invasive plant treatments. BICY is actively treating melaleuca using a variety of methods including ground crews, aerial spray treatments – boom and spot, and biological control. Most individuals of Australian pine are in private camps and cannot be removed. Furthermore, BICY treats infestations of Lygodium north of I-75 on a yearly basis along its boundary. The coordinated effort of all land managers along our boundaries plays a role in successful invasive species treatment results. Lastly, in fiscal year 2022, BICY will aerially treat Java plum guided by the results of the 2020-2021 DASM survey.

Melaleuca monoculture with scattered Sabal palms surrounded by deciduous cypress domes, winter 2021.

Green mus*sel (Perna viridis) in* Little Lake Worth Lagoon,

By: Kelly Gestring, Florida Fish and Wildlife Conservation Commission'

In October 2020, the FWC's Nonnative Fish and Wildlife Program (NFWP) received a report of green mussels (Pernas viridis) in Little Lake Worth, Palm Beach County. Photographs of mussels removed from a private dock and ladder were confirmed by FWC as nonnative green mussels. This nonnative species was first discovered in Tampa Bay in the late 1990s and rapidly increased in abundance. They soon spread south along the west coast, into the Keys and then up the east coast of Florida to several locations north of Lake Worth Lagoon in Palm Beach County. The FWC and other partners are currently undertaking major restoration projects in the Lake Worth Lagoon, including creating nesting islands surrounded by rip-rap intended for native oyster habitat. Green mussels are a bio-fouling organism and there are concerns that they could displace native oysters and cause substantial economic fouling issues for ships and structures such as floating docks, channel

Green mussels (Perna viridis) collected from floating dock on Little Lake Worth.

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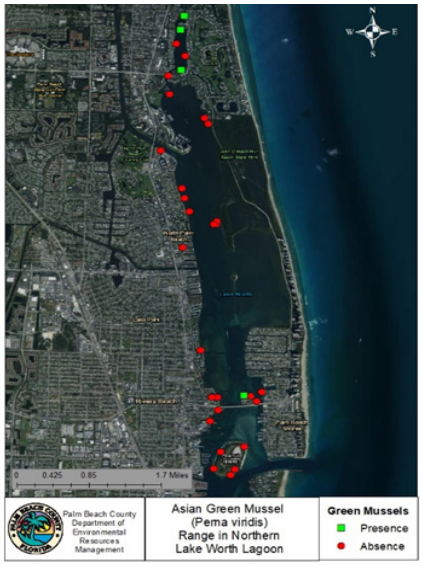
Green mussel *(Perna viridis)* in Little Lake Worth Lagoon,

(CONTINUED FROM PAGE 14)

markers, pilings, and intake pipes.

The initial survey of Little Lake Worth discovered green mussels at four locations with floating docks. Little Lake Worth is directly connected to the main Lake Worth Lagoon on the northern end. Concern that green mussel larvae could spread into Lake Worth Lagoon and settle on critical restoration habitats and submerged infrastructure (intake pipes, ship hulls, navigation buoys, etc.) initiated additional surveys for presence of this species. Palm Beach County Environmental Resources Management staff sampled 25 sites in this area between October 2020 and March 2021. All but one of the 25 sites sampled in Lake Worth Lagoon were free of green mussels, but they were present in three of the five sites in Little Lake Worth Lagoon. Additionally, FWC staff have confirmed green mussels at several locations further north in the Intracoastal Waterway, including the Ft. Pierce and Sebastian inlets. Green mussels have been reported from these areas in the past, but they were assumed eradicated due to cold water temperatures. Green mussels are very cryptic and may have been present in background numbers and only now have been identified in these areas .

The FWC is working closely with partners to monitor the presence of this species in Lake Worth Lagoon and assess the threats it may pose to the natural environment and ongoing restoration efforts. A flyer has been developed to aid in outreach for the public that provides information on the identification and reporting of green mussels to the FWC using the IveGot1 app or www.IveGot1.org. FWC staff will review the reports to monitor the presence of green mussels in Lake Worth Lagoon and surrounding areas.



Green mussel (Perna viridis) distribution in Little Lake Worth and Lake Worth Lagoon. Map courtesy of Palm Beach County Environmental Resources Management.

Stay at Home Weed Wrangle

By: Emily Bell, UF IFAS Florida Invasive Species Program Coordinator

In February 2021, the Florida Invasive Species Partnership (FISP) teamed up with FL's 16 Cooperative Invasive Species Management Areas (CISMA), the National Weed Wrangle® Program, and National Invasive Species Awareness Week (NISAW), to host a month-long Stay-at-Home Weed Wrangle®! Typically, during NISAW, which falls on the last week of February each year, CISMAs across the state bring volunteers together to tackle invasive plants in public spaces. However, due to the ongoing

A berfore and after 'snapshot' of the succes of at-home weed removals targeting invasive plants.

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Stay at Home Weed Wrangle (CONTINUED FROM PAGE 15)

COVID-19 Pandemic, we decided to switch gears and encourage private property owners to take on their own landscapes. With generous sponsorship from Weed Wrangle®, Invasive Plant Control Inc., and Uprooter, we were able to provide a total of 24 prizes including gardening gloves, native plant gift certificates, and 10 Uprooter tools as incentives to participate!

The rules were simple, remove an invasive plant from your landscape and complete a simple form to tell us what county you were in, what species you removed, and submit a before and after photo. In total, 65 private landowners from 23 different counties participated, removing over 30 different species of invasive plants. Throughout the month, we also took to social media to share information on common invasive landscape plants and resources for private landowners, this campaign was well received and helped us reach a wider audience. As we begin to bring folks back together for in-person volunteer efforts, we plan to integrate to Stay-at-Home Weed Wrangle® in the future. It provides a great opportunity to bridge the gap between public and private lands!

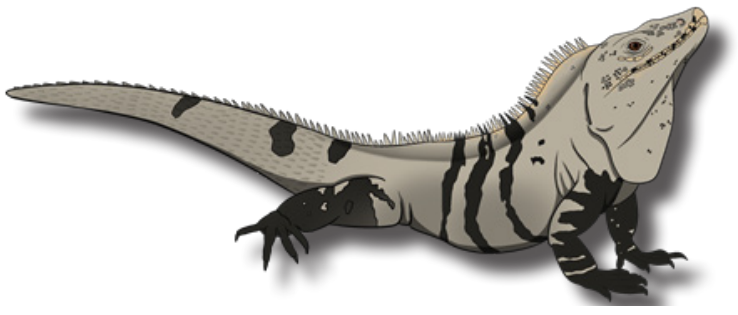
Water Resources Development Act 2020 South Florida Ecosystem Restoration Task Force

By: Carrie Beeler, Department of Interior

Authorized by the Congress in the Water Resources Development Act (WRDA) of 1996, the South Florida Ecosystem Restoration Task Force (Task Force) brings together the federal, state, Tribal, and local agencies involved in restoring and protecting America's Everglades. The critical role of the intergovernmental Task Force is to facilitate the coordination of a myriad of conservation and restoration efforts being planned and implemented. It also provides a forum for the participating agencies to share information about their restoration projects, resolve conflicts, and report on progress. The Task Force is chaired by the Secretary of the U.S. Department of the Interior or their appointed designee. The Task Force is staffed and supported in the accomplishment of its mission and duties by the Department's Office of Everglades Restoration Initiatives (OERI) located in Davie, Florida.

In 2019, Congress recognized the importance of invasive species management for restoration to succeed and new legislation referred to as the Suppressing Looming Invasive Threats Harming Everglades Restoration (SLITHER) Act was developed and then included in WRDA 2020 in section 504 labeled as "Invasive Species Risk Assessment Prioritization and Management." This legislation amended section 528 of WRDA 1996 and added specific duties to the Task Force related to invasive species. In WRDA 2020, section 504 Congress directs the Task Force to develop a priority list of invasive species that significantly impact the structure and function of ecological communities, native species, or habitats within the south Florida ecosystem. The Task Force member agencies are directed to manage those species through coordination and collaboration to develop innovative strategies and tools, guide applied research, facilitate improved management, and to prevent future introductions of nonnative species

The WRDAs 1996 and 2020 can be found at www.evergladesrestoration.gov/overview.



Python Detector Dog Teams, Sniffing out Invasive Pythons in South Florida

By: McKayla Spencer, Florida Fish and Wildlife Conservation Commission, and Jeremy Dixon, USFWS Crocodile Lake National Wildlife

Burmese pythons are a notorious invasive species in Florida causing negative impacts to the native Everglades ecosystem through the consumption of native wildlife including mammals, birds, and reptiles. Agencies and organizations are taking a multi-pronged approach to controlling this species and one of the newer tools being implemented is python detector dogs.

Dogs are often referred to as "man's best friend" and humans have been working with dogs for thousands of years. In 2011 and in 2017 studies were conducted, researching dog's capability to detect Burmese pythons in the Everglades. Both studies indicated that dogs were able to locate pythons and in some cases dogs found pythons that visual searchers would have over-looked. These results led to the current use of detector dogs by the Miccosukee Tribe of Indians of Florida, Crocodile Lake National Wildlife Refuge (CLNWR) since December 2019, and as of July 2020 the Florida Fish and Wildlife Conservation Commission (FWC).

Each detector dog team went through intense training with J and K Canine, a company that specializes in scent training dogs. Some of the current detector dogs trained on python scent include FWC's black labrador named Truman, FWC's point setter named Eleanor, and CLNWR's Australian shepherd mix named Percy. Training included desensitizing the dogs to environmental conditions, building the dogs stamina, dog and handler safe searching behavior, training dogs alert behavior, and training dogs to search for Burmese pythons by scent. Live pythons were often used in scent training alongside python scented towels. Dog handlers also undergo training; FWC contracted with J and K Canine to train a private handler while CLNWR had USFWS biologists trained as handlers. After the training periods ended these dogs start working in the field.

The detector dog teams search for pythons on different properties in southern Florida. Teams collect data in the field including dog alert locations and capture information for pythons. For future analysis, FWC's team collects additional environmental data that can affect scent dispersal. Depending on the habitat, searching can consist of following levees or using a grid search pattern. The dogs are trained

Florida Fish and Wildlife Conservation Commission's detector dog Eleanor with captured Burmese python.

Crocodile Lake National Wildlife Refuge's detector dog Percy.

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Python Detector Dog Teams, Sniffing out Invasive Pythons in South Florida (CONTINUED FROM PAGE 17)

to alert when they are within three *feet of* a python and then, depending on the team, either the handler or an accompanying biologist will then search for and capture the python. The teams also respond to directed python surveys after receipt of a confirmed report. These efforts assist FWC and partners with Early Detection and Rapid Response (EDRR).

The main goal of the detector dog teams is to find and remove pythons. As with any field project, there are challenges including rough terrain, difficult to access habitats, and land access. Last year's record-breaking high-water levels made it difficult to survey areas in south Florida. Even when the dogs started to respond to a python smell, the teams' access to searchable areas was restricted due to the high water conditions and they could not get close enough for a full dog alert and python capture.

The teams continue to overcome these challenges and FWC and CLNWR have successfully removed six pythons from the environment. The use of the dog teams for continued surveys in areas where pythons exist will continue. Moving forward, the FWC plans on expanding their efforts to include directed surveys in sensitive habitats such as tree islands and bird rookeries and additional responses to EDRR scenarios. CLNWR will be implementing their team to systematically survey nests of the federally endangered Key Largo woodrat to help USFWS determine the relative impact of pythons on the species. CLNWR and FWC plan on continuing to use a multi-pronged approach to managing pythons including detector dogs.

Florida Fish and Wildlife Conservation Commission's detector dog Truman with captured Burmese pythons.

CISMA

Everglades Cooperative Invasive Species Management Area

ECISMA was created to formalize cooperation among land management agencies to improve the effectiveness of exotic species control by sharing information, innovation and technology across borders through a memorandum of understanding with the ultimate goal of helping to ensure the success of the Comprehensive Everglades Restoration Plan.

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Agency/Organization Abbreviations

DOI - Department of Interior
ECISMA - Everglades Cooperative Invasive Species Management Area
EDDMapS - Early Detection and Distribution Mapping System
EDRR - Early Detection and Rapid Reponse
FIU - Florida International University
FLEPPC - Florida Exotic Pest Plant Council
FOE - Friends of Everglades CISMA, Inc.
FWC - Florida Fish and Wildlife Conservation Commission
MDC - Miami Dade County
NPS - National Park Service
SFWMD - South Florida Water Management District
TC CISMA - Treasure Coast Cooperative Invasive Species Management Area
UF - University of Florida
USDA - U.S. Department of Agriculture
USGS - U.S. Geological Survey

2021 ECISMA Newsletter

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