Program Name: Everglades Cooperative Invasive Species Management Area (ECISMA)
Project Name: Pinecrest Gardens ECISMA Exotic Fish Control Voluntary Workday
Project ID:
Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC) with Everglades National Park (ENP) assistance as part of ECISMA.

Strategic Plan Goal(s) Addressed: 2-B.1 Prevention 2-B.2 Eradicate Invasive Exotic Species by implementing Early Detection and Rapid Response.

Measurable Output(s): Species and quantity of individuals removed. The absence of a new nonnative species into the Snapper Creek Canal.

Project Synopsis: The presence of a new nonnative cichlid tentatively identified as *Petenia splendida* or "red bay snook" at Pinecrest Gardens was reported. Pinecrest Gardens is owned and operated by the City of Pinecrest in southeast Miami-Dade County. In mid-July 2014, representatives from FWC and ENP met with Mr. Craig Morell (Horticulturist-Pinecrest Gardens) to collect specimens for identification and assess the likelihood of release into Snapper Creek Canal (C-2). *Petenia* was observed reproducing in the isolated "koi pond" in the parking lot and in the "Hidden Gardens" interconnected network of streams and ponds. Native to the Atlantic slope of tropical Mexico, Guatamala, and Belize, *Petenia* are a large, piscivorous cichlid that prefers slow-moving freshwater rivers and lakes. They have a highly protrusible jaw and superficially resemble a jaguar guapote, a nonnative species now established in south Florida. A variety of common nonnative fish species were also observed on the premises. Mr. Morell commented that this property (formerly Parrot Jungle) had a long history of illegal dumping of nonnative fish which he and his staff were trying to remedy. Mr. Morell expressed an interest in removing the *Petenia* and other nonnative fish species except for a number of highly prized koi and large pacu, a large redtail catfish, and a large iridescent shark that posed no escapement problem, are popular with visitors, but are a confounding factor when trying to eradicate the target species without harming other native and exotic species. Mr. Morell also expressed interest in stocking largemouth bass and redear sunfish to add more predation pressure to unwanted exotics and perhaps bring some "balance" to the Gardens' fish communities. The main concern was the possibility that *Petenia* may escape from the "Hidden Gardens" network of ponds and streams into the brackish water section of Snapper Creek Canal via an overflow drainage culvert.

Our findings were presented at the 2014 ECISMA Summit in July 2014. Although it is unknown if *Petenia* would survive and establish a population in south Florida if it escaped from Pinecrest Gardens, the species was reproducing in the Pinecrest Gardens ponds, and it is native to a region and habitats that other non-native fishes established in Florida originate from which suggests there is a risk to establish outside of the garden ponds. We agreed to try an ECISMA early detection/rapid response (EDRR) workday to remove nonnative fish at Pinecrest Gardens. The objective was to use various harvest methods to remove as many *Petenia* as possible.

On August 19, 2014, 15 members of ECISMA representing four agencies and two universities met at Pinecrest Gardens to conduct a first-ever nonnative fish removal effort. The parking lot "koi" pond was drained and fish removed by seining and dip-netting. Four species of nonnative fish were recovered, comprised primarily by *Petenia* and Jack Dempsey. A singleton specimen of "upside down catfish" tentatively identified as *Synodontis eupterus* was supporting evidence of illegal dumping.

The interconnected waterbodies in the "Hidden Gardens" portion of the property was a more daunting challenge than the "koi" pond. The water level had risen since the mid-July visit, all the channels connected, and the pond was deeper. It was readily apparent the fish were more spread out and had access to many more hiding places in the limestone stream bed. A variety of methods to collect fish were tried including seining and cast netting. We tried to separate the koi, pacu, tarpon, and other large fish from the areas before seining but had limited success. Castnetters had some success when the seiners pushed the fish into shallow, relatively snag-free areas. As a follow-up, minnow traps and small fyke nets were deployed and fished overnight. Nonnative fish (including *Petenia*) were collected along with a variety of small native fish species.

Spotted tilapia were also removed from a sinkhole by a team using dipnets and a gig to pry them out from under the rocks. Castnets were used to substantially reduce the biomass of spotted tilapia in "Swan Lake".

Overall 302 pounds of nonnative fish comprised of eight species were removed from Pinecrest Gardens including 242 pounds of spotted tilapia (the majority from the isolated "Swan Lake") and 39 pounds of *Petenia*.

Outside of Pinecrest Gardens, an electrofishing crew sampled the freshwater section of Snapper Creek Canal from the S-22 salinity structure north approximately one mile looking for *Petenia* and other nonnative fish species. No *Petenia* were observed or collected in 74 pedal-minutes of sample time. The overall fish abundance was low and may have been influenced by a strong current. No surveys were conducted downstream of the S-22 salinity structure.

Current Status:

The removal effort eradicated *Petenia* from the "koi pond" and reduced their numbers in the "Hidden Garden" pond and streams. The biomass of spotted tilapia in "Swan Lake" was substantially reduced. The potential risk for *Petenia* to escape into the Snapper Creek Canal remains.

Potential actions:

1. The ability to drain the "koi pond" provides Pinecrest Garden staff the ability to periodically remove all unwanted exotic fish.
2. *Petenia* are not on FWC's Conditional or Prohibited fish lists and currently there is no biological or socioeconomic justification for FWC to incur the cost of an eradication effort at this time. Estimated cost=$20,000-$25,000.To better assess potential risk, a risk screening of *Petenia* that would include laboratory identified salinity tolerance and lower lethal temperature would provide valuable management information. Estimated cost = $7,500. Eradication may be possible via chemical reclamation of the ponds (Hidden Gardens and Swan Lake) and streams on the property but the feasibility and cost would be the responsibility of the City of Pinecrest . Currently, chemical treatment is beyond the scope of what can be conducted by the ECISMA partnership but assisting a private company in an eradication effort as a voluntary workday event would increase the likelihood of success. For ECISMA to undertake this type of effort, a trained person with a Resticted Use Pesticide certificate is necessary and funding would be required to support equipment and supply needs and personnel time costs to coordinate and conduct a chemical reclamation. In addition, much more coordination with Pinecrest Gardens, the public, and the media would be required
3. From the ECISMA perspective, the principal management recommendation following the Voluntary Workday at Pinecrest Gardens was to seal off the drainage culvert and cut off the potential connection between Pinecrest Gardens and the saltwater section of Snapper Creek Canal. This has been communicated to Mr. Morell and he estimates the pipe will be sealed by mid-October. This cost to be incurred by the City of Pinecrest. Until that time or if the seal to the culvert would fail, the risk for *Petenia* to escape into the Snapper Creek Canal would remain. Once FWC has been notified, a follow-up inspection of the outlet pipe seal will be conducted.
4. A list of fish producers was provided to Mr. Morell and largemouth bass and redear sunfish are scheduled to be stocked by the end of October to help build a native predator base. Cost on Pinecrest Gardens.
5. Early Detection monitoring in the Snapper Creek Canal upstream and downstream of the S-22 salinity structure would be prudent to determine if *Petenia* has already escaped the facility. Estimated cost=$100/sampling effort.
6. Funding is needed for these types of EDRR actions as funding is unavailable and limits what response actions can be undertaken. The cost of a small scale chemical renovation can be in excess of $25,000 and increase in cost with the size and complexity of the renovation effort. FWC is the lead agency on EDRR responses and funding could be allocated to this agency or through ECISMA's funding partner, Friends of ECISMA.

Project Schedule:

Start Date: July 2014
Finish Date: estimated October 2014

Detailed Project Budget Information

	2014	2015	2016	2017	2018	Balance to	Total

						Complete	
Federal	Volunteered staff time						
State	Volunteered staff time						
Local	Volunteered staff time						
Total	15 people volunteered 1 day						

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Hyperlink:

Pictures:

Bay Snook (Petenia splendida)

Seining for Bay Snook

Castnetting Spotted Tilapia from "Swan Lake"

Pinecrest Gardens outlet pipe

Map of area:

Pinecrest Gardens = former site of Parrot Jungle
City of Pinecrest, Miami-Dade County, FL
Bay snook in Turtle Pond
Bay snook in entrance pond
Google earth