



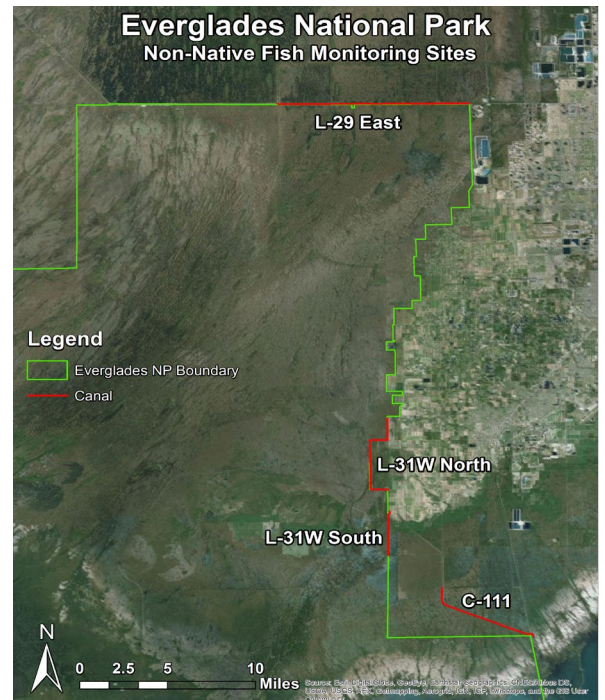
Invasive Exotic Animals: Monitoring Non-Native Fish in Canals Adjacent to Everglades National Park 2017

Importance:

Canals are an integral component of the present-day, altered Everglades. Canals disrupt water flow, hydroperiod, and hydrological connectivity of natural habitats. They are also known to act as a source of nutrients, pollutants, and invasive species by linking urban and agricultural waters with more natural habitats in the marsh interior. Yet, we have a poor understanding of how canals function as habitat for both native and non-native fishes and their ecological interplay with adjacent marsh habitats.

Introductions of exotic fish can lead to adverse effects on the aquatic food web by altering community structure through displacement of native fish species. Canals bordering Everglades National Park are important vectors for invasion by new non-native fish species into the parks due to connectivity of these canals to the natural areas. These canals are hydrologically-connected, deep water refuges that act as a source population for exotic fishes to become established in the national park units.

Early detection and reporting of a new exotic fish species would allow resource managers to respond quickly and efficiently to the threat. The South Florida/Caribbean Network works in cooperation with Everglades National Park and the Florida Fish and Wildlife Conservation Commission as part of a multi-agency approach to combat non-native fish. The ability to act while these fishes are contained within the canal water bodies, as opposed to the expansive marsh environment, makes management action more likely to succeed



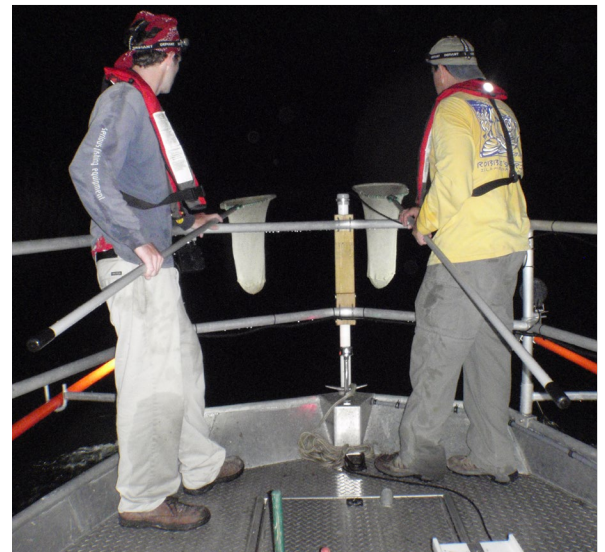
Map of canals bordering Everglades National Park that are monitored during non-native fish surveys. The network monitors these canals for the purpose of detecting new species of exotic fish.

Objectives and Approach

The network conducts sampling in the canals by way of electrofishing, an efficient technique for assessing fish populations. The L-29E, L31W-N, L31W-S, and C111 canals, located along the northern and eastern boundary of Everglades National Park, are monitored because of their proximity to the park.

The electrofishing technique uses an aluminum boat and associated equipment to produce an electrical field in the water that immobilizes fish, allowing fairly easy capture. Sampling takes place at the end of the dry season (April–May), when fish densities are at their highest. A portion of the sampling takes place at night, when fish catch-per-unit effort and species richness are higher. The protocol objectives are to routinely search canals bordering Everglades NP at locations that have high hydrological connectivity (for fish) in order to:

- Detect new exotic fish species which may invade the park's wetlands.
- Assess status and trends in canal fish community structure with a primary emphasis on the proportion and type of exotic fish species present.



South Florida/Caribbean Network crew conducting a nighttime non-native fish sampling.



South Florida/Caribbean Network
18001 Old Cutler Rd. Suite 419
Palmetto Bay, FL 33157

http://science.nature.nps.gov/im/units/sfcn/monitor/invasive/inv_animals.cfm

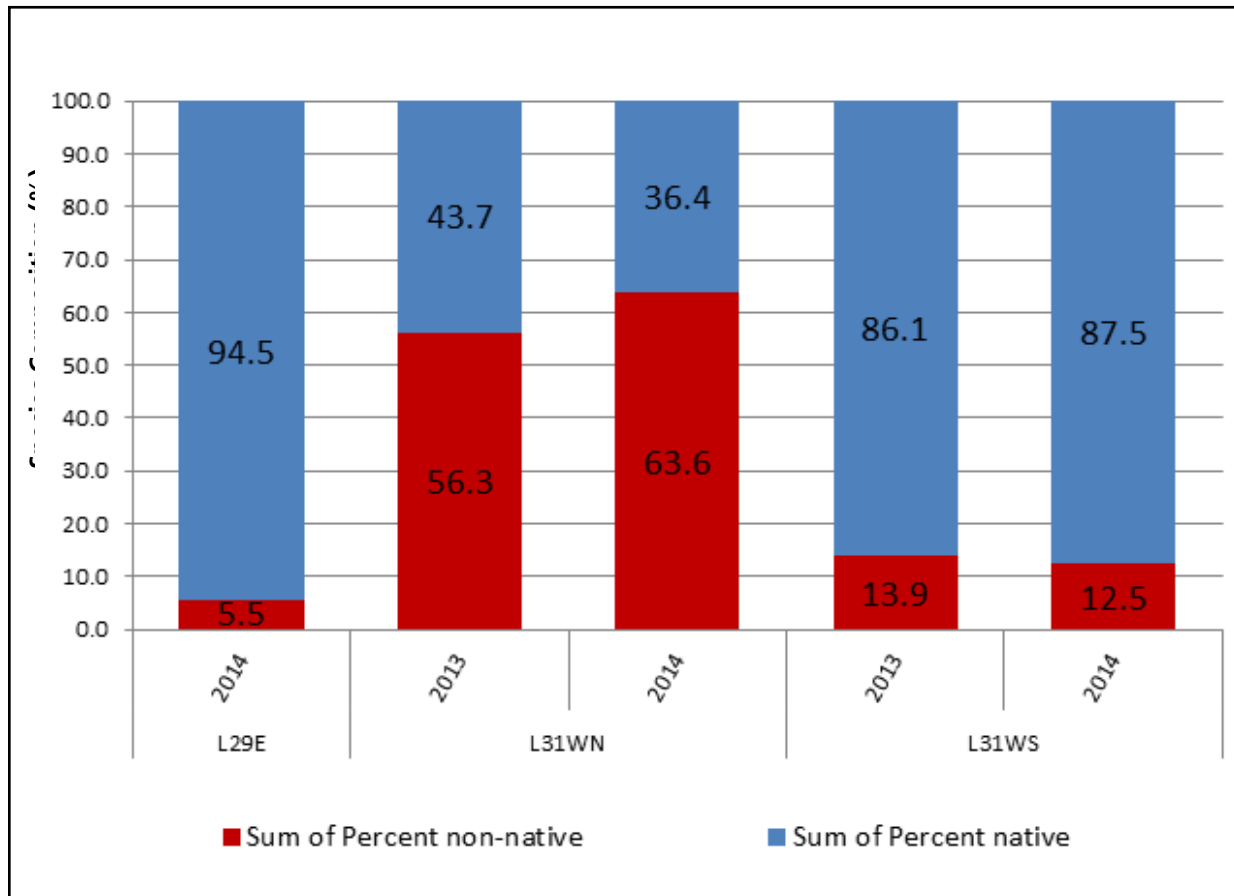
Protocol Status and Results

The network assisted Everglades National Park and sampled the L31W prior to the creation of a number of plugs in that canal. In January and February, we sampled the C111, the L31N and the L31 W canals. Across all three canals we captured 1,708 fishes of which 45.4% (776 fishes) were exotics. The L31N had very few fish captured (101 fishes) of which 90% were exotic fishes. The most numerous fishes were in the L31W with 1,218 fishes of which 34% were exotic.

A protocol for the annual sampling of the canals bordering Everglades National Park is being developed based on pilot work conducted by the network and baseline data provided by Florida International University. This is a second tier protocol and as such will be authored as the first tiers are completed. Progress has been made on the background portion of the main protocol and several electrofishing standard operating procedures have been drafted. Once the protocol is complete, fieldwork for this protocol will proceed.



Above: Invasive non-native fish species captured in canals adjacent to Everglades National Park. From left to right, Spotted Tilapia (*Tilapia mariae*), Jaguar Guapote (*Parachromis manguensis*), and Butterfly Peacock Bass (*Cichla ocellaris*).



Left: Percentage of native and non-native fish encountered during surveys in canals bordering Everglades National Park.



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