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Investigating the Presence of Exotic Fish in South Florida Lakes

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Blue Tilapia

Problem Statement:

What types of native and exotic fish are found in the lakes of West Kendall in Miami, Florida?

Background

After a recent period of investigation into domestic south Floridian lakes we have discovered a surprisingly diverse and large population of invasive species. Blue tilapia (*Oreochromis aureus*) and peacock bass (genus *Cichla*), along with other species of African cichlids were the dominant fish in terms of population. Carp were also evident. Native fish were represented by large numbers of Largemouth bass (*Micropterus salmoides*) and a lesser number of baitfish, including Bluegills (*Lepomis macrochirus*). Whether these invasives were introduced to South Florida's waters intentionally or accidentally, these species are here and they are thriving.

There are thousands of species of cichlids throughout the world, most being native to South America, all of Africa, the Middle East and some parts of Asia. Native cichlids can be found from Texas to Argentina, Syria to South Africa, and in southern China. Grass carp are native only to parts of Asia, including India and China.

Hundreds of cichlid species are now found in the freshwater lakes and canals of South Florida. They range from generally harmless, aquarium ready African jewelfish (*Hemichromis letourneuxi*) to large predatory species, such as the Oscar (*Astronotus ocellatus*). Predatory cichlids have absolutely devastated local populations of bluegills. During our investigation, we discovered an expected inverse relationship between these predatory fish and their prey. In our observations, lakes containing large populations of predatory cichlids were found to contain little to no bluegills.



The peacock bass were first introduced to Florida as a game fish, renowned for their strength and speed. The peacock bass brings 8 million dollars in revenue annually to the local government from sport fishermen. While these large predatory fish feed on the young cichlids, reducing numbers of these invasive species, they also feed on natives such as blue-gills. Blue-gills are also a target prey item for several other invasive species. The peacock bass also competes with the native largemouth bass, but this invasive fish does not yet have the numbers to have a large impact on the native game fish. In fact, the largemouth bass have adapted to eat some of the young cichlid invasive species.

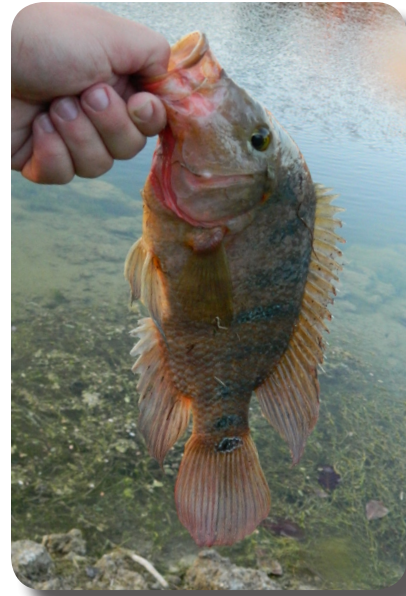
Most of the observed cichlids don't grow larger than three pounds, with Peacock bass and Oscars as exceptions. They are often purchased as aquarium fish, due to their colors, but people release them when they grow too large for their tank and become harder to care for. They are now successfully breeding and spreading throughout fresh-water canals and lakes in South Florida.

Implications and Conclusions

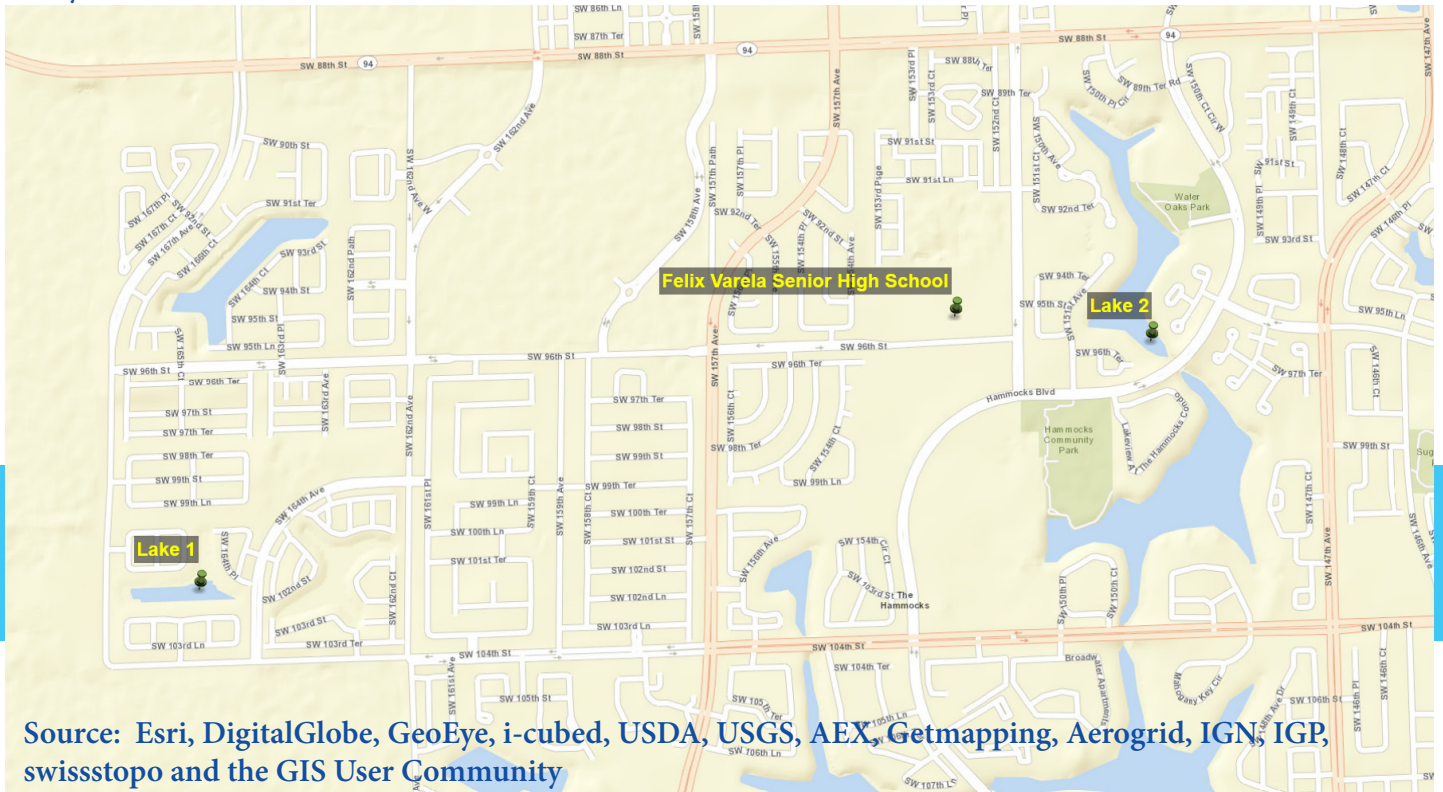
We also caught several Grass carp. These fish, originally from Asia have been introduced into lakes and canals for weed control. Grass carp from Asia have been introduced into lakes and canals for weed control. Originally only triploid carp, modified to contain an extra chromosome in their eggs rendering them sterile, were allowed to be introduced. Unfortunately, sterilization techniques are not 100% effective, and some triploid Grass carp have been able to produce viable eggs and sperm. Some states have banned Grass carp altogether, but in South Florida their population is not yet great enough to dramatically affect local vegetation or fish.

Study Location





Study Sites



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo and the GIS User Community

