

Program Name: Critical Ecosystems Science Initiative (CESI)
Project Name: **Effects of exotic fish on Everglades structure and function: risk assessment**
Project ID: 2507
Lead Agency: NPS with USGS interagency agreement

Strategy and Biennial Report Objective Addressed: 2-B.1
Invasive Species Strategic Action Framework Goal: 1

Measurable Output(s): 1. A literature review of the existing knowledge of the life-history characteristics, physiological tolerances, and habitat requirements of the non-native fishes in Florida.
2. Research providing knowledge of the information gaps of physiological tolerances and potential impacts of non-native species in support of quantitative risk assessment development.

Project Synopsis:

NPS units within the southeastern US play a key role in the preservation of native fish populations, and native fish are key components of food webs that support the diverse fauna of the parks. Disturbances outside NPS boundaries promote invasion by non-native species (Long et al. 2012), and this appears particularly true in Florida. Florida has the second highest number of non-native fish species reported from the freshwaters of any state (Fuller et al. 1999). Those species are spreading into and establishing within Everglades NP and other south Florida NPS units. Since 1965, 17 non-native freshwater fish species have been observed in Everglades National Park, including eight new species since 2000 (Kline et al. 2013). Sixteen of the 17 species were first established in canals outside the boundaries of EVER prior to colonizing inside (Loftus 1988, Kline et al. 2013) suggesting fish are spreading from canals into EVER marshes (Kline et al. 2013). In addition, hydrologic changes that alter flows through canals may affect the spread of non-native species into natural areas.

Preventing introduction of non-native species into protected natural areas will require management actions outside the NPS unit boundaries. One of the first steps will be to identify those species that may present the highest risk to establish populations within the NPS units. Resource managers attempting rapid response or control efforts would benefit from a tool that identifies species that pose the greatest risk of establishing populations within the freshwater marshes of the south Florida National Parks. The USGS Natural Resources Preservation Program (USGS NRPP) is supporting the development of such a quantitative predictive risk assessment tool. However, gaps in the knowledge of life history characteristics or physiological tolerances that may influence the likelihood of establishing population in marsh habitats need to be identified and evaluated. This CESI project supports research to identify and fill gaps in the knowledge of physiological tolerances or potential impacts of select non-native species in south Florida.

Current Status:

A literature review is currently being conducted to research the biological and ecological variables (e.g. life-history characteristics, physiological tolerances, habitat requirements) of the non-native fishes in Florida. In previous years, studies filled gaps in the known physiological tolerances of Spottfin Spiny Eel and Banded Cichlid, two species key to the development of a quantitative risk assessment model funded under the USGS Natural Resources Preservation Program. FY15 and FY16 funds are supporting a study to examine the risk of potential impacts of African Jewelfish on the structure and function of simulated marsh communities. The final year of work will either fill additional information gaps on physiological tolerances of non-native fishes in Florida in support of quantitative risk assessment development or conduct additional research into the potential impacts of non-native fishes on the structure and function of aquatic communities in Everglades National Park.

Project Schedule:

Start Date: September 2013

Finish Date: September 2015–September 2018 pending available funding

Detailed Project Budget Information

	2014	2015	2016	2017	2018	Balance to Complete	Total
Federal	\$30,000	\$45,000	\$45,000	\$45,000	n/a	\$13500	\$300,000
SFWMD**	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Local	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	\$30,000	\$45,000	\$45,000	\$45,000	n/a	\$135000	\$300,000

Contact: Agreement Representative Jeff Kline, EVER; PI Dr. Pamela Schofield, USGS