

Evaluating Effects of Ecosystem Restoration on Crocodiles and Alligators in the Florida Everglades




Introduction

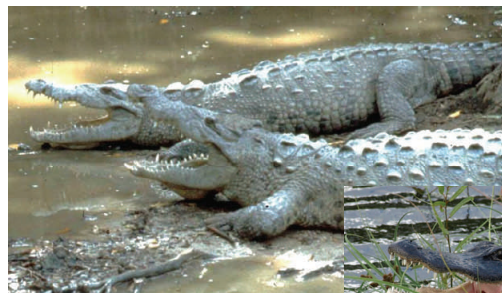
The Florida Everglades is the only place in the world where both alligators and crocodiles live. The **American crocodile** (*Crocodylus acutus*) is a **federally threatened species** that continues to be challenged by expanding coastal development in south Florida. The **American alligator** (*Alligator mississippiensis*) once occupied all wetland habitats in south Florida but **has been negatively affected by canal construction, drainage, and saltwater intrusion**. Both crocodiles and alligators are critical in the Everglades food web as top predators. Alligators are ecosystem engineers that create wet and dry conditions in the wetlands (holes, trails, nests), providing habitat for plants and animals that otherwise would not be able to survive. The crocodile is a flagship species in Everglades estuaries, meaning it represents the ecological importance of restoring freshwater flow.

The Everglades is the stage for the **largest and most complex ecosystem restoration** ever undertaken. As the Comprehensive Everglades Restoration Plan (CERP) proceeds, crocodiles and alligators have been identified as a key indicator to track ecological responses to restoration. By restoring hydrology and salinity patterns to more natural conditions, CERP is expected to improve the health and abundance of alligators, crocodiles, and their habitats.



Project Objectives

-  Determine extent and magnitude of impacts of ecosystem restoration on crocodiles, alligators, and their habitats in Florida
-  Determine patterns of movement of crocodiles and alligators in response to ecosystem restoration
-  Develop interactive web- and social media-based outreach program to communicate results

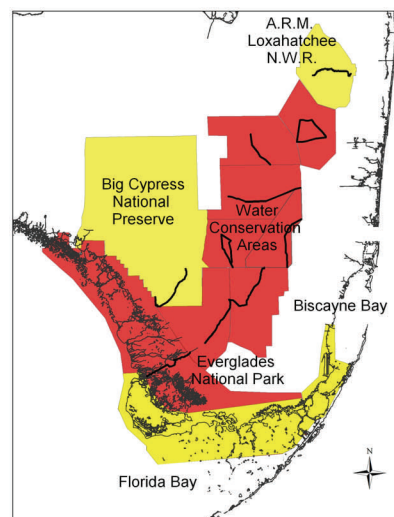





Approach

We are collecting data on the health of crocodile and alligator populations, movements of individual animals, and environmental effects of restoration. These data will be integrated in a geographic information system and communicated online using an interactive “Google Maps” application.

Population Health

- Crocodiles surveyed 3 times per year in coastal areas
- Alligators surveyed 2 times per year (wet season and dry season) in marshes, canals and estuaries
- Relative abundance (animals per km) counted by boat using a spotlight to detect “eyeshines”
- At least 15 animals are captured and measured in each area to determine “body condition” (relative fatness)
- Abundance and body condition combined and displayed in **stoplight colors** on map to represent health of crocodile and alligator populations:



-  **Red** = Substantial deviations from restoration targets creating severe negative condition that merits action.
-  **Yellow** = Current situation does not meet restoration targets and merits attention.
-  **Green** = Situation is good and restoration goals or trends have been reached.

Environmental Effects of Restoration

- Water depth and salinity data will be obtained from environmental stations operated by National Park Service, U.S. Geological Survey (USGS) and the Audubon Society, and from hydrological models such as TIME (Tides and Inflows in the Mangroves of the Everglades, USGS).
- Data will be displayed on maps showing how environmental conditions change over time and in response to restoration projects.

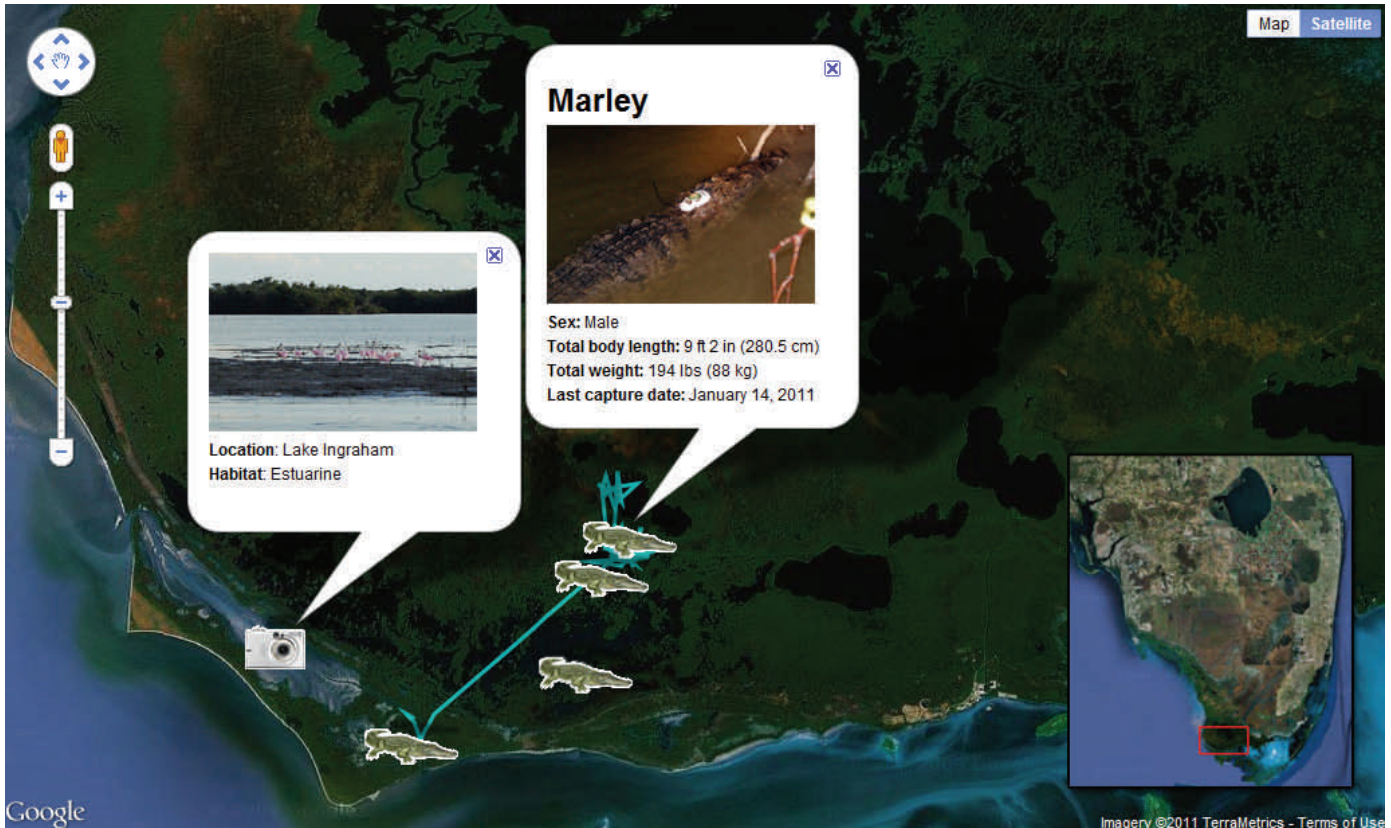


Patterns of Movement

- Crocodiles and alligators are outfitted with satellite telemetry systems to track locations, movements, and habitat use.
- Geographic focus: Everglades National Park estuaries
- GPS receivers collect hourly locations and transmit them to a satellite.
- Location data are downloaded into a geographic information system and presented on interactive maps.

Outreach Program

Interactive maps will allow users to **track the movements of crocodiles and alligators** through Everglades estuaries and to view their population status (abundance and body condition) relative to environmental patterns of water depth and salinity. We will disseminate our multimedia products via websites, Facebook, Twitter, and YouTube.



Sample screenshot of “Google Maps” application showing current locations of telemetered crocodiles. When a user clicks on a crocodile icon, an information box pops up with a photo, brief description, and option to view the path the crocodile has traveled (shown here for “Marley” in light blue). Camera icons display habitat photos to provide a visual description of the environment where an animal is located. We will augment this mapping application to include additional telemetered animals, alligator and crocodile population status (displayed in “stoplight” colors), and environmental conditions such as water depth and salinity.



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