

# Historical Ecology of the American Alligator in Greater Everglades Ecosystems

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## Introduction

USGS-BRD and its cooperators are using a system of empirical data collection and simulation modeling to apply information on wildlife community patterns in guiding the restoration process. Evaluating long-term trends and developing population models require a large amount of data collected over a number of years and a number of locations. Information on alligator densities, nesting, and growth have been collected in south Florida since the 1950s by rangers and researchers in Everglades National Park and Big Cypress National Preserve, Florida Game and Fresh Water Fish Commission personnel, University researchers, and private consultants. Many of the most critical data sets (those having the largest amount of data or those from particular areas or years) are not accessible for use in evaluating restoration alternatives or developing models. The data are not available in a centralized, easily accessible, well documented database. Further, the size and scope of these data sets are not fully known. Certainly, thousands of individual records need to be evaluated, compiled, and entered into an appropriate database.

It is critical that these data sets are accessible to establish restoration targets for alligator populations, develop models, and design short and long-term monitoring tools for evaluating restoration success.

The primary objective of this project is to compile and make accessible the three most important data sets for alligators in Greater Everglades Ecosystems. Other objectives of this project include: developing a standardized format for collecting and managing data on alligators, and producing a digital library of historic reports. An immediate application of historical data assembled above will be to develop a method and to compare body condition among alligator populations in south Florida both spatially and temporally.

## Methods

*Historical Data Sets.* -- A list of historic and current alligator projects and data sets will be compiled by sending a questionnaire to FFWCC, NPS, USFWS, University researchers, and private consultants who are conducting or have conducted research on alligators in south Florida. The three most important data sets will be obtained and compiled during the first year. This may involve physically retrieving field notes from locations outside of south Florida, entering data from field notes, reading data from old tapes, converting computerized data sets into a form usable by our chosen database housing software (ORACLE, ACCESS), and reviewing data sets with the PIs.

Guidelines for establishing standardized databases for the types of alligator research projects will be developed. This will include metadata requirements. Metadata guidelines will be consistent with

federal metadata standards. These guidelines will be distributed to all researchers working on alligators in south Florida so that data currently being collected can be easily combined with historic data sets.

*Condition.* -- The definition of a reasonable “condition factor” is not trivial. This is true in part because our informal evaluations are often normative. For example, we proclaim that one animal is in good condition; another, we say, looks terrible. Even when applied to individuals within one population these terms are not objectively informative. In crocodylians we tend to believe that fat is good. Amongst crocodylians it is probably true that fatter females do produce larger clutches in a given year; however we have no strong evidence that their lifetime productivity is higher. Furthermore, even when our condition-assessments have been value-free, they have usually been qualitative rather than quantitative. So long as our definitions of condition remain unquantified, we shall confront serious difficulties when we attempt to compare across populations. The preliminary problem is to define the condition of an individual animal. The more complex objective is to establish a protocol for comparison across populations.

Study areas include sampled sites from each major compartment in the Everglades: A.R.M. Loxahatchee NWR, Water Conservation Area 2, Water Conservation Area 3, Everglades National Park, and Big Cypress National Preserve. Animals were captured by cable nooses from airboats at night. For each animal, we measured total length (TL), snout-vent length (SVL), tailgirth, chestgirth, neckgirth (all in cm), and mass (kg). We also determined the sex of each alligator, and we noted any deformities, particularly the loss of tail tips. Because condition among small alligators appears to be unstable over short time periods, we included only animals with SVL > 50cm.

## **Results and Significance**

Interviews, questionnaires, and discussions with crocodylian biologists and managers in South Florida have been used to identify, locate, and assess availability of historical data sets.

We have conducted alligator capture and measurements for current alligator condition throughout the Everglades Ecosystem. Animals have been captured from A.R.M. Loxahatchee NWR, WCA 2A, WCA 2B, WCA 3A North, WCA 3A South, Everglades National Park (Shark Slough and estuarine areas), and Big Cypress National Preserve and we have developed an initial condition model for comparison of current alligator condition to historical information in the collected data sets.

This study provides access to data required for developing evaluative tools used during adaptive implementation of the Comprehensive Ecosystem Restoration Plan. We also provide other timely investigations involving comparisons of condition of alligator populations in the Everglades. The alligator is both a keystone and indicator species in the Everglades ecosystem. Therefore, it is critical to understand the effects of restoration alternatives on this species and to include the alligator in restoration alternative selection, evaluation, and monitoring. This study allows access to historical data required for ecological modeling and assessment of current and future status of alligator populations that would be otherwise inaccessible.

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