

# **A Multi-Species/Habitat Ecological Evaluation of Alternative Everglades Restoration Plans**

**Frank J. Mazzotti**, Christa Zweig and Michelle Moller  
University of Florida, Belle Glade, Florida

Laura A. Brandt  
U.S. Fish and Wildlife Service - A.R.M. Loxahatchee NWR, Boynton Beach, Florida

Leonard G. Pearlstine  
University of Florida, Gainesville, Florida

## **Introduction**

The protection of biological diversity has been identified at the global, national, state, and local level as a critical component of protecting native ecosystems. Major goals of the South Florida Everglades Restoration Initiative are to restore and maintain the native biological diversity of South Florida, and to recover threatened and endangered species. The first step to doing this is to conduct an ecological inventory of existing biological resources. To conserve biological diversity, we must have knowledge on what species will be found in what habitats and the patterns of distribution of habitats and communities in relation to environmental parameters. This information can be used as a base for monitoring, a base for developing models that predict amounts and locations of habitat types under different land use/management plans, and a base for the development of scientifically based conservation plans. Being able to model the potential effects of changes in land use allows us to decrease uncertainty when making management decisions.

Gap analysis has been developed as a landscape scale approach to biological diversity planning at the national scale. Gap analysis consists of mapping the vegetation of each state, developing databases on species habitat affinities, linking species to the mapped vegetation, overlaying the boundaries of existing and proposed conservation lands, and looking for areas of high species richness that are not in areas designated for conservation. These spatially referenced data layers are managed in a Geographic Information System (GIS) that allows large amounts of data to be presented in a format that is easily assimilated by decision makers.

In Florida, it was recognized from the onset of the gap analysis project, that it was important to develop products that were compatible with national efforts, but also could be used within the state to address in more detail ecosystem management issues. Data layers completed to date in conjunction with the gap project include: a vegetation map of South Florida consisting of 70 vegetation types (60 are natural and the rest are urban and agriculture) developed from 30m resolution 1993/94 satellite imagery, databases on the habitat affinities of terrestrial mammals, breeding birds, wintering birds, reptiles, amphibians, ants, butterflies and skippers. These layers provide the information that can be used to address questions on the current status of critical habitats, to develop hypotheses on the effects of different landscape configuration on future biological diversity, to provide direction for the development of restoration plans, and set priorities for restoration projects.

In the tasks below, "potential habitat" is defined as areas that have been identified as having plant communities and, in some cases, other attributes that a specific species will use for its habitat. The particular species may or may not be currently present in that "potential" habitat.

## **Greater Everglades Ecosystem Restoration (G.E.E.R.) Science Conference**

This project provides direct integration of South Florida wide data layers on species richness and potential habitats developed through the USGS gap analysis project with questions on how to protect and conserve threatened and endangered species and the biological diversity of South Florida. It provides a scientifically based ecological evaluation procedure for assessing the potential effects of alternative restoration plans. It can be used to examine how restoration plans for one species may impact available potential habitat for other species and for developing habitat management plans that optimize the benefits to the greatest number of species on a regional scale.

The objectives of this project are to provide a comprehensive assessment of the effects of restoration alternatives on the amount and configuration of ecosystem types and potential habitats of endangered and threatened vertebrates and to evaluate the effectiveness of threatened and endangered species habitat protection for protection of overall South Florida biological diversity.

### **Tasks**

Task 1. Ensure that the existing data layers for vegetation and species correspond with other data layers developed by FWS for the multi-species recovery plan. Update species/habitat models for listed species.

Task 2. Quantify existing potential habitat for terrestrial vertebrates and examine patterns of distribution of potential habitat for threatened and endangered in relation to overall vertebrate species richness.

Task 3. Forecast the amounts and locations of potential habitats for threatened and endangered species under different scenarios for land cover change and hydrological conditions.

Task 4. Develop a user friendly ArcView interface for easy access to all data layers and models developed in this project.

### **Significance**

This project is the only study to evaluate the effects of restoration alternatives on biological diversity and ecological integrity throughout the Greater Everglades/South Florida region. The tasks in this proposal provide a consistent, structured methodology for the integration of multiple spatial data themes and the evaluation of region-wide habitat changes throughout South Florida. The proposed structured methodology will facilitate the presentation and exploration of resulting recommendations. Conveying the information and decisions to the public will be substantially enhanced. These tasks also will provide a multi-species evaluation procedure that is complimentary to other ongoing efforts for selected species. Additionally, the results can be compared to other assessment methods to add robustness to decisions made regarding importance and protection of habitats and will provide a flexible tool that can be used to monitor and evaluate potential impacts. This project meets a critical science information need of local governments for integrating land-use decision making with ecosystem restoration.

Contact: Frank Mazzotti, University of Florida, PO Box 8003, Belle Glade, Florida, 33430, Phone: 561-993-1555, Fax: 561-993-1582, Email: [fjma@gnv.ifas.ufl.edu](mailto:fjma@gnv.ifas.ufl.edu), Poster, Ecology and Ecological Modeling