# **Critical Ecosystem Studies Initiative** (CESI)

**National Park Service U.S. Department of the Interior** 

**Everglades National Park South Florida Natural Resources Center** 





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#### Who We Are

Since its inception in 1997, the Critical Ecosystem Studies Initiative (CESI) has been the primary investment by the U.S. Department of Interior (DOI) to provide scientific information for use in ecosystem restoration decision making and to guide its own land management responsibilities for South Florida ecosystem restoration. The program's mission is stated: "CESI supports studies conducted to provide physical and biological information, simulation modeling, and planning that are critical for achieving South Florida ecosystem restoration." The CESI Manager is the Superintendent of Everglades (EVER) and Dry Tortugas National Park (DRTO). The South Florida Natural Resources Center within EVER, which includes a Science Coordinator and a CESI Project Management Specialist, provides assistance in the solicitation of proposals, tracking of project information, and archival of products resulting from the studies.

### What We Do

Awards are selected through a request for proposal process using a Broad Agency Announcement (BAA). The BAA is administered following the Federal Acquisitions Regulation (FAR), Part 35—Research and Development Contracting. CESI funds are requested annually as part of the request for support of Everglades Restoration in the Department of Interior (DOI) Appropriations Bill. A BAA is posted on the http://www.Grants.gov. Three Florida universities have an Everglades Fellowship Program supported with CESI funding. Students work on projects directly related to the priority science needs of Everglades restoration. CESI has contributed to the Florida Coastal Long Term Ecological Research Network(LTER), interagency RECOVER Monitoring and Assessment Plan for South Florida, and the NPS South Florida and Caribbean Regional Inventory and Monitoring. The majority of the projects are administered through the Cooperative Ecosystem Studies Unit program.

### **CESI Program Areas**





#### Basic Research

Baseline Research projects are intended to fill the gaps in the data or analysis required to produce the science information needed by land managers. These projects are particularly related to hypothesis testing, process studies, and the linkages between hydrologic alterations and ecosystem responses.

CESI Basic Research projects include studies designed to characterize the pre-drainage ecosystem and the defining ecological and hydrological characteristics that have been lost from the current ecosystem. Also included are data collection efforts to parameterize models. Monitoring methods are tested through research projects as well as data collection need to determine the potential targets needed for the development of appropriate performance measures to characterize the ecological response to hydrological change.







ties in the Everglades. Each new organism introduced has the potential to overtal nities, displace native species, or disrupt a suite of ecological interactions. elatively recent discovery of Burmese pythons breeding in Everglades National Park now to ongoing restoration effort

agers must rely upon original science to guide their efforts. This ion sought to gather important data on movements and habitat use of the pythons using radio telemetry. The results of this study shed new light on the ability of ove great distances in a relatively short period of time, suggesting the preve of new colonizations will require the timely cooperation of numerous land management

Summary descriptions of Basic Research projects and downloads of final reports are available on-line: http://www.nps.gov/ever/naturescience/cesibaseline.htm

#### Long-term Monitoring

Long-Term Monitoring is critical to determining ecosystem responses to our restoration actions. CESI contributes to the physical and ecological monitoring needs of DOI at different landscape scales in the Greater Everglades. These projects contribute to measures of the progress of reaching restoration and resource management targets. Monitoring data is collected to provide calibration and validation data for simulation models and to provide status and trend reports of key indicators of the health of the Everglades system.

Monitoring projects include support for hydrologic monitoring stations, status reports on water quality and contamination, wildlife and vegetation inventories using reconnaissance flights, ground surveys and remote sensing, and monitoring of threatened and endangered species. Short-term monitoring projects, less than three years, have also been conducted to test indicator species of hydrological change.



and how these patterns are governed by eld and laboratory experiments, that populations thrive in long-hydroperiod environment ions further suggest that populations in the Rocky Glades could increase by an order of magnitude if restored to pre-drainage condition

Summary descriptions of Monitoring projects and downloads of final reports are available on-line: http://www.nps.gov/ever/naturescience/cesimonitoring.htm

## Simulation Modeling

Simulation Modeling projects support the development and refinement of physical and ecological predictive models, including GIS-based models, that simulate the response of the environment to proposed modifications to the Central and South Florida Project, the network of water control structures managed by the South Florida Water Management District (SFWMD).

Projects include the development of new models and refinement of models designed by other agencies involved in Everglades restoration activities. Studies focus on improving the confidence level of decisions that rely on sciencebased analysis. Moreover, CESI has cost-shared extensively with the USGS and USFWS to expand the scope of models beyond NPS application to include the landscape continuity of the Greater Everglades. Efforts include the Joint Ecological Modeling program (JEM) led by DOI and hydrologic modeling projects led by the SFMWD.





loe and slough landscape of the central Everglades is believed to have ife to these areas has been a central goal in restoration efforts, it is often believed that he systems upon which they depend are somewhat static. Greater understanding is necessary egarding how changes in flow, hydroperiod and water depth might influence the origin and maintenanc of receiving landscape

### Impact Assessments

Impact Assessments projects funded by CESI support evaluations of restoration projects before, during and after implementation. The focus of new CESI Impact Assessments projects shift with the science needs of large-scale restoration efforts such as Modified Waters Delivery, the Comprehensive Everglades Restoration Plan, and DOI concerns regarding the impacts of climate change on federally managed land. Projects funded through the other CESI program areas provide background data, analysis, and synthesis reports that is used to streamline assessment of Everglades restoration success.



results in the development of a conceptual model of ridge and slough drivers. This model assimilates riables of importance, including gradual sheetflow, peat accumulation, the dispersal of nutrients, occurrence of fire, and the effects of repetitive feedback loops. The use of such models is ritical in helping predict the possible effects of water management decisions on ecosystems

Summary descriptions of Simulation Modeling projects and downloads of final reports are available on-line: http://www.nps.gov/ever/naturescience/cesimodeling.htm

CESI funded impact assessment projects include analysis of specific proposed restoration projects, such as the Interim Operations Plan, C-III Spreader Canal, and bridging options for increasing the breadth of flow between State managed lands north of the Tamiami Trail and Everglades National Park to the south.



eality, program managers are always interested in learning how best to elicit interest and articipation from the community

Beginning with an extensive review of public engagement literature, this study makes key commendations for the development of effective public outreach strategies. Through the use of participatory research and community forums, project authors identified several critical tasks, including the assignment of outreach personnel, the integration of social science information the use of multi-faceted communications, and the need for constant evaluation

Summary descriptions of Assessments projects and downloads of final reports are available on-line: http://www.nps.gov/ever/naturescience/cesiassessments.htm

### History of Allocations

CESI funds are allocated on after an annual review of DOI science priorities. In 2005, specific science needs were compiled in the DOI Science Plan for Restoration, Protection, and <u>Preservation</u>. The percentage of projects in any one program area reflects the type of information that has been needed to assist federal land managers make decisions regarding the implementation of restoration projects.





NPS plays an critical role in the regional restoration of the Everglades because interagency restoration projects can impact resources put in their care. CESI funds are allocated to ensure the benefits of restoration projects outweight their cost. For this reason, an ecosystem approach is used to determine where the gaps are in restoration science needs.

### Past and Present Awardees of CESI Funding

#### Federal Agencies

National Park Service US Geological Survey US Fish and Wildlife Service Environmental Protection Agency National Oceanographic Atmospheric Administration

#### **Universities**

Florida International University Duke University University of Florida University of Tennessee University of Miami University of Virginia University of Wash FL Atlantic University University of Miami Columbia University University of Minnesota University of Wisconsin

#### State of Florida

Florida State University

University of South Carolina

Louisiana State University

University of South Florida

University of North Carolina

University of West Florida

Old Dominion University

University of Maryland

Fairfield University

Rutgers University

FL Atlantic University

University of California

University of Virginia

South Florida Water Management District Florida Fish and Wildlife Commission Florida Department of Environmental Protection

#### Local Governments

Miami-Dade County Department of Environmental Resources Management

#### Tribes

Seminole Tribe of Florida Miccosukee Tribe of Florida

#### **Consulting Firms**

**Ecostudies Institute** Wetland Management Service Institute for Regional Conservation Ever Research Group Beadman & Association Cetacean Logic William Walker FL Marine Research Institute Fairchild Tropical Gardens Cadmus Group The Institute for Regional Conservation Center for Biological Conservation **Everglades Foundation** Pomacea Project

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