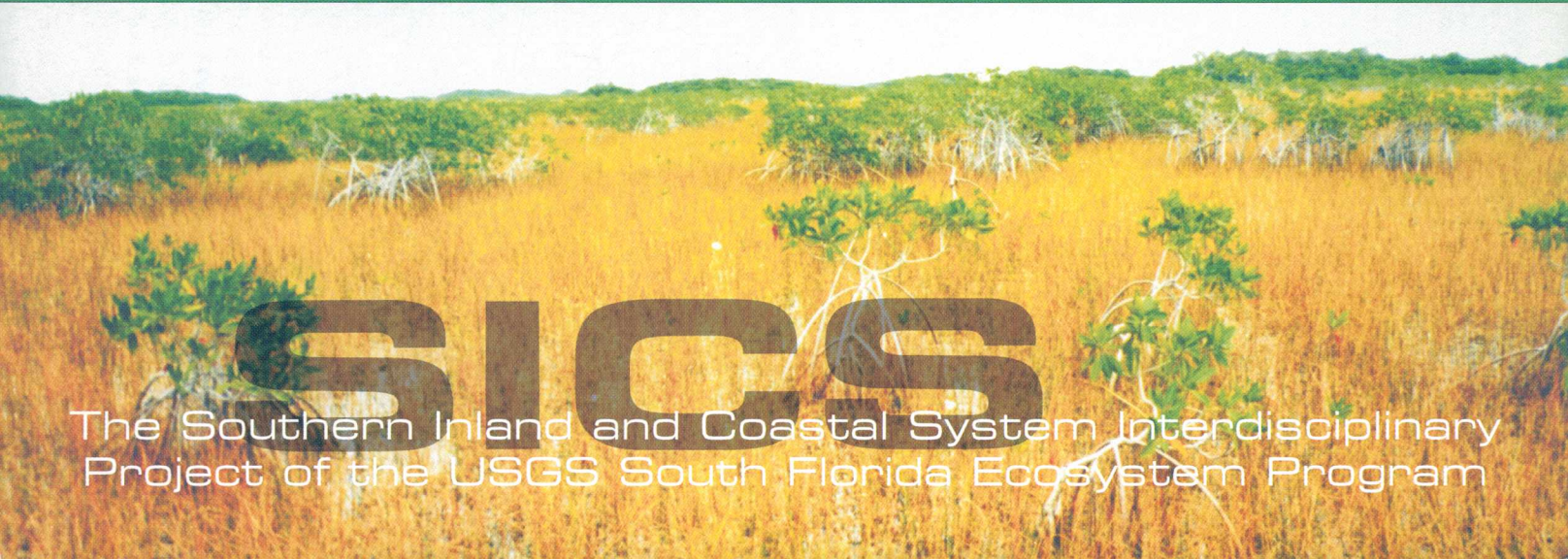
USGS
science for a changing world



SICS

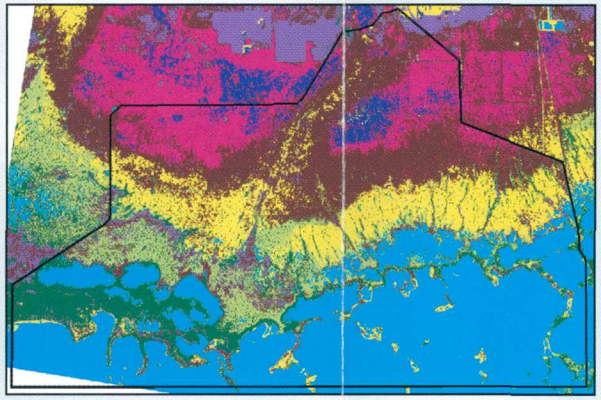
The Southern Inland and Coastal System Interdisciplinary Project of the USGS South Florida Ecosystem Program

Science Integrated with Modeling for Improved Management

The Southern Inland and Coastal System Interdisciplinary Project of the USGS South Florida Ecosystem Program

The interconnected wetlands of Taylor Slough and nearshore embayments of Florida Bay constitute a critical component of the Everglades ecosystem. Flora and fauna in the wetlands and aquatic life in the Bay are mutually dependent on the magnitude, duration, timing, and quality of freshwater inflows. Current restoration efforts are focused on sustaining hydroperiods in the wetlands and salinity levels in the embayments that are consistent with habitat requirements. Hydrologic investigations of the resistance effects of vegetation, evapotranspiration mechanisms, ground-water exchanges, canal/wetland interactions, wind-forcing effects, and biogeochemical processes have produced scientific findings for development of a hydrodynamic/transport model of this Southern Inland and Coastal System (SICS). Land-surface elevations have been accurately surveyed and vegetative communities classified to provide data essential for model implementation. Projects focused on characterization of the bathymetry and bottom materials of nearshore embayments in Florida Bay are contributing information needed tor represent the local forces driving flow. When complete, the model will be used to further investigate and evaluate factors that govern the flow of water and concurrent transport of nutrients and contaminants that affect living resources. Hydrologic results produced by the SICS model will be integrated with ecological analyses conducted within the Across Trophic Level System Simulation program to evaluate the effects of altered water deliveries on vegetative communities, such as the Muhlenbergia prairies needed by the Cape Sable Seaside Sparrow. Hydrological/ecological cause-and-effect relations will then be available to the U.S. Fish and Wildlife Service for development of endangered species assessments. Insight that the model provides on sheet flow and tidal interaction along the mangrove fringe will also aid the U.S. Army Corps of Engineers in developing a circulation model for Florida Bay and will benefit agencies such the Everglades National Park and the South Florida Water Management District in planning and evaluating restoration alternatives.

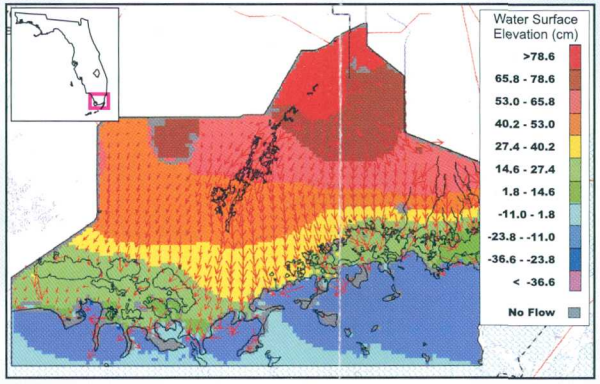
Flow Resistance



Vegetation Classification

Land-Surface Elevations

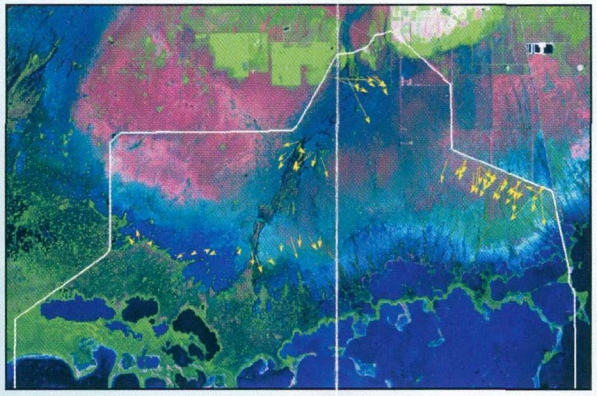
Evapotranspiration



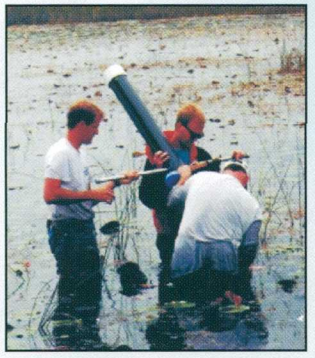
Model Output

Groundwater

Water Quality



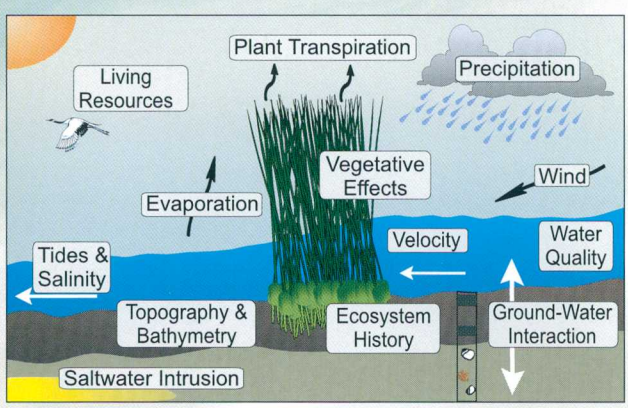
Boundary and Internal Flows



Ecosystem History

Concept & Scope

State and Federal agencies are working jointly on structural modifications and improved water-delivery strategies to reestablish more natural surface-water flows through the Everglades wetlands and into Florida Bay. Changes in the magnitude, duration, timing, and distribution of inflows from the headwaters of the Taylor Slough and canal C-111 drainage basins have shifted the seasonal distribution and extent of wetland inundation, and also contributed to the development of hypersaline conditions in nearshore embayments of Florida Bay. Such changes are altering biological and vegetative communities in the wetlands and creating stresses on aquatic habitat. Affected biotic resources include federally listed species such as the Cape Sable seaside sparrow, American crocodile, wood stork, and roseate spoonbill. The U.S. Geological Survey (USGS) is synthesizing scientific findings from hydrologic process studies, collecting data to characterize the ecosystem properties and functions, and integrating the results of these efforts into a research tool and management model for this Southern Inland and Coastal System(SICS). Scientists from all four disciplinary divisions of the USGS, Biological Resources, Geology, National Mapping, and Water Resources are contributing to this interdisciplinary project.



The diagram above illustrates the complex processes that interact within the hydrologic cycle of the SICS area to influence ecosystem functions.

SOFIA
SOUTH FLORIDA INFORMATION ACCESS

For more information on projects contributing to the SICS effort visit the South Florida Information Access web site (SOFIA).

http://sofia.usgs.gov

Color Infrared Digital Orthophoto Quadrangles
Callahan, G. Michael
Across Trophic Level System Simulation
DeAngelis, Donald L.
High Accuracy Elevation Data Collection
Desmond, Gregory B.
Land Characteristics from Remote Sensing
Desmond, Gregory B.; Jones, John W.
Geophysical Mapping of Freshwater/Saltwater Interface
Fitterman, David V.
Flow Velocity and Water Level Transects
Franklin, Marvin A.
Evapotranspiration Measurements and Modeling
German, Edward R.
Florida Bay Sedimentation, Sea-Level Rise, and Circulation
Halley, Robert B.
High-Resolution Bathymetry of Florida Bay
Hansen, Mark Erik
Groundwater-Surface Water Exchange Fluxes
Harvey, Judson W., Price, Renē M.; Shinn, Eugene A.
Geology and Ecological History of "Buttonwood Ridge"
Holmes, Charles W.
Effect of Wind on Surface Water Flows
Jenter, Harry L.
Vegetative Resistance to Flow
Lee, Jonathan K.; Carter, Virginia; Rybicki, Nancy B.
Geochemistry of Wetland Sediments
Orem, William H.
Freshwater Discharge to Florida Bay
Patino, Eduardo
Salinity Patterns in Florida Bay: A Synthesis
Robblee, Michael B.; Halley, Robert B.; Smith, DeWitt
Canal and Wetland Flow/Transport Interaction
Schaffranek, Raymond W.
Mangrove Die-off Study
Smith, Thomas J.III; Armentano, Thomas; Hunt, John
Land Margin Ecosystem Program
Smith, Thomas J. III
Southern Inland and Coastal Systems Model Development
Swain, Eric D.
Ecosystem History
Willard, Debra A.

Support and assistance provided by:
National Park Service/Everglades National Park
U.S. Army Corps of Engineers
South Florida Water Management District
Big Cypress National Preserve
U.S. Fish and Wildlife Service

U.S. Department of the Interior http://www.doi.gov
U.S. Geological Survey http://www.usgs.gov