Southwest Florida Feasibility Study (SWFFS): A Framework for Ecosystem Restoration on a Regional Scale

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Pre-development Ecology

Prior to development, the study area was characterized by:

- A mosaic of wetland and upland habitat
- A shallow regional water table
- Species composition primarily driven by hydrologic regime
- Short hydroperiod wetlands dominated by mesic and hydric flatwood and hammock communities
- Numerous flowways composed of freshwater marsh, swamp forest, wet prairie, and cypress habitat that allowed for gradual sheetflow to the coast

Current Ecological Issues

Urban and agricultural development has led to channelization of flow throughout the system; draining inland wetlands, lowering the water table, and flushing coastal estuaries with unnatural pulses of freshwater.

Feasibility Study Development

- Recommended in the Comprehensive Everglades Restoration Plan (CERP) in 1999
- A multi-agency effort to develop a conceptual framework for regional ecosystem restoration
- Conceptual framework will include a wide range of features for future study and implementation by local, state, and federal agencies in cooperation with public and private land owners
- Anticipated level of detail similar to that of the Central and Southern Florida Project Comprehensive Review Study ("Yellow Book")
- Incorporating and building upon ongoing regional efforts

Study Area

- 4,300 square miles
- Encompasses all of Lee County, as well as portions of Collier, Charlotte, Hendry, Glades, and Monroe counties
- Project boundary corresponds with the South Florida Water Management District (SFWMD) Lower West Coast Water Supply Plan Planning Area

Study Performance Measures*

SWFFS Performance Measures					
Type of PM	**Location in Study Area**	**Performance Measure**	**Goal/Objective**	**Target (Hydrologic or other)**	**What Input/Data Do We Need For This?**
Hydrologic	52 Indicator regions (41 coastal) - throughout study area.	Water Flows to Tide	Evaluates amounts of water going to tide as point discharges in channels, sheet flow across transects, or groundwater seepage through a vertical plane for each indicator region	Natural Systems Model (NSM) ±10%; or other targets as established	STELLA Hydrologic Modeling output
Ecological (Inland)	All inland areas with MIKESHE flow data	Large Mammal (Habitat Connectivity)	Restore function of primary habitat, traversable land cover, density, and richness	NSM Conditions	Land cover (predevelopment, 2000, and 2050 land use maps), STELLA flow data
Water Quality	Throughout	Total Nitrogen (TN) Load	Identify annual or seasonal TN reduction load targets (lbs) to achieve ecosystem restoration for various large water bodies	Target is NSM for each ADG Basin	CDM Water Management Model run results/revised estuarine acreages
Ecological (Estuarine)	11 Identified Bays (See below for list)	Water Flows to Tide	Function of flows and salinity - specific to each estuary/bay and dependent upon season	See Table Below	Flow Estimates from STELLA model/ revised estuarine acreages
Non-modelable	Throughout	Acres of Exotic Plant Coverage	Minimize infestations of invasive exotic vegetation in publicly owned natural areas	NSM Conditions	BAT Matrix contains acreage estimates for existing, future w/o, and future with conditions - exotics expressed as % of site acreage
Non-modelable	Throughout	Berms	Minimize length of berms	NSM Conditions	Data in BAT Matrix
Non-modelable	Throughout	Impeded Flows	Minimize impedances to water flows (due to berms, blockages, and/or insufficient or nonexistent culverting)	NSM Conditions	Data in BAT Matrix
Non-modelable	Throughout	Wildlife Crossings	Maximize opportunities for safe passage of wildlife, large and small, across high-risk roadways to help prevent collisions. Related to large mammal connectivity PM.	Reduced Mortality	Collision records, animal population tracking data

*SWFFS performance measures are currently undergoing RECOVER review and are subject to change.

Estuarine Performance Measures*

- **Caloosahatchee Estuary (S-79):** minimum monthly flows of 450-2800cfs; salinity 10-25ppt
- **Estero Bay:** flow of 30-200cfs into bay depending on source; salinity 15-25ppt
- **Matlacha Pass:** flows of 10-100cfs
- **Henderson Creek/Rookery Bay:** average daily flows of 150-400cfs; salinity 20-30ppt
- **Naples Bay:** Natural Systems Model flow target for the Gordon River; close to 0cfs is possible for Golden Gate Canal, flow (currently 200cfs)
- **Blackwater Bay/Buttonwood Bay:** average daily flows of 150-400cfs; salinity 20-30ppt
- **Pumpkin Bay:** average daily flows of 150-400cfs; salinity 20-30ppt
- **Faka Union Bay:** flows of 500cfs; salinity 10-30pp
- **Fakahatchee Bay:** average daily flows of 150-400cfs; salinity 20-30ppt

*Target flow and salinity ranges account for wet and dry season affects

Alternative Development

- Prior to alternative development, the conceptual plan included over 300 potential projects
- The following sub-teams were formed to help manage the work load:
  - Estuarine
  - Water Quality
  - Landscape and Sensitive Lands
  - Surface Water Hydrology
- Sub-teams ranked project subset based on defined scoring criteria
- All sub-teams convened and normalized rankings; projects were screened out based on team scores
- Three alternatives were developed that met the goals of all sub-teams while also satisfying the study objectives

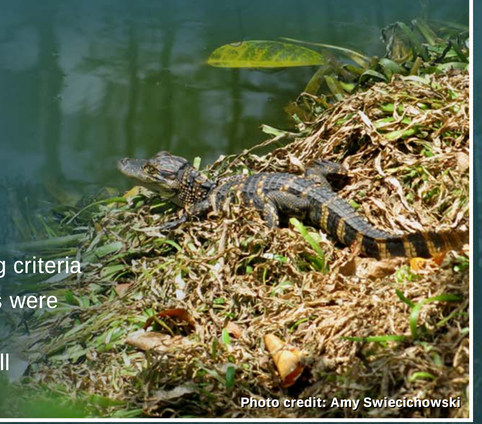

Photo credit: Amy Swiecichowski

Study Goals

Develop a blueprint for regional restoration that:

- Reduces pulse flows to the coast thereby restoring more natural estuarine salinity regimes
- Restores inland wetland and upland mosaic to reestablish natural ecosystems that support native flora and fauna, including 23 listed species
- Improves the quantity, quality, timing and distribution of surface water and groundwater for environmental, agricultural and urban uses

Alternative Evaluation

Modeling of alternatives

- STELLA Hydrologic Model used to model water storage alternative components
- CDM Water Management Model used to model water quality alternative components
- Model output will be used to calculate alternative benefits based on defined methodologies
- Rough Order of Magnitude (ROM) costs will be calculated and used in conjunction with benefits to assess alternative cost effectiveness, ultimately leading to a tentatively selected plan (TSP)

Next Steps

- Begin drafting the feasibility study report
- Move forward with sub-team work to calculate project benefits
- Complete ROM project designs and costs
- Complete ROM project real estate costs
- Determine alternative cost effectiveness
- Choose tentatively selected plan based on cost effectiveness evaluation

Schedule Milestones *

- **TSP - Fall 2008**
- **Alternative Formulation Briefing - Winter 2008**
- **Draft Feasibility Study Complete - Spring 2009**
- **Final Feasibility Study Complete - Fall 2009**

* Subject to change as directed by USACE/SFWMD management