

Loxahatchee River Science Plan

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Loxahatchee River Science Plan

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**Coastal Ecosystem Sciences Division
Restoration Sciences Department**

in collaboration with

The Loxahatchee River Interagency Science Team



Background

- Recommended
 - By the Restoration Plan for the Northwest Fork of the Loxahatchee River (2006)
- Interagency Effort – Loxahatchee Interagency Science Team
 - South Florida Water Management District
 - Loxahatchee River District
 - Florida Park Service District 5
 - Florida Department of Environmental Protection
 - Martin County Division of Environmental Quality
 - Palm Beach County Environmental Resources Management



Purpose

- Monitor effects of restoration efforts to support adaptive management
- Fill knowledge gaps critical to ecosystem restoration success
- A guide for scientific efforts to be conducted over the next five years
- A communication tool to prioritize, coordinate and implement applied science activities



Science Plan Organization

- Hierarchical decision analysis framework for environmental science and management (Reckhow et al., 1997)
- Overall management goal - Restore Northwest Fork of Loxahatchee River and Enhance Watershed and Estuary



Hierarchical Decision Analysis Framework

Management Goal

Restore Northwest Fork of Loxahatchee River and Enhance Watershed & Estuary

Management Objectives

Maximize watershed restoration benefits Enhance river & estuary abiotic conditions Restore & protect river and estuary biotic resources

Research Objectives

Assess wetland restoration benefits Quantify watershed loading Develop operation protocols Evaluate floodplain inundation Evaluate salinity due to flow & sea level rise Characterize water quality Predict river & estuary response Assess status of VEC's Link abiotic effects with VECs Predict ecosystem responses Evaluate habitat & ecosystem improvement

Research Methods

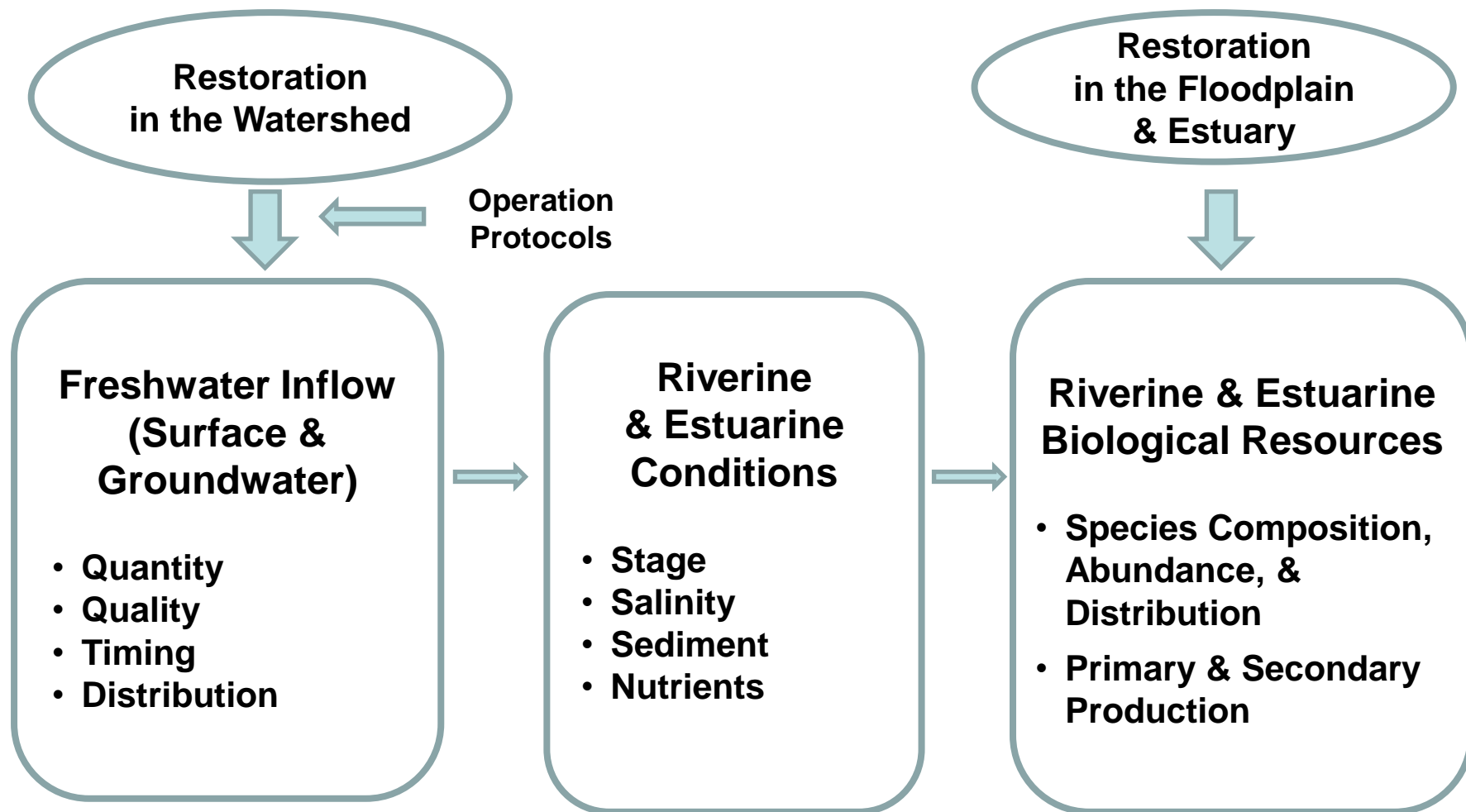
Monitor flow and stage and vegetation of restored wetland Monitor/model timing & magnitude of flow and nutrient inputs Define operational criteria and performance measures Develop relationship between flow, elevation & inundation Develop relationship between flow and tides & salinity patterns Define patterns of particulate and dissolved materials in river & estuary Develop coupled watershed, estuarine models Data compilation, analyses & exploration Functional responses of VEC's to flow, salinity, and water quality Ecosystem simulation models featuring VEC's Assess Habitat & ecosystem changes with management and restoration

Outcome

Qualitative & quantitative knowledge of linkages between watershed hydrologic restoration, abiotic drivers, and biotic responses along the land-ocean continuum

Research Objectives

Conceptual Model (Modified from Alber, 2002)



Management Objective 1

Maximize Watershed Restoration Benefits

Research Objectives:

- Assess hydrologic and ecologic benefits of wetland restoration
- Quantify watershed hydrology and nutrient
- Develop operational protocols and feasibility study

(refer to sections 3.1.1 – 3.1.3)

Management Objective 2

Enhance River & Estuary Abiotic Conditions

Research Objectives:

- Evaluate floodplain inundation
- Evaluate salinity due to flow and sea level rise
- Characterize water quality
- Predict river and estuary responses

(refer to sections 3.2.1 – 3.2.4)

Management Objective 3

Restore & Protect River & Estuary Biotic Resources

Research Objectives:

- Assess baseline status of Valued Ecosystem Components (VECs)
- Characterize (define) mechanisms linking abiotic factors and VECs
- Predict ecosystem responses to changes in abiotic and watershed attributes
- Evaluate habitat and ecosystem improvement

(refer to sections 3.3.1 – 3.3.4)

Research Objectives & Methods

- Centered on a series of practical science questions concerning quantitative and qualitative understanding of the linkages
- Inventory existing information and projects
- Identify data and information gaps
- Recommend technical needs to attain research objectives



Next Step

- FY11 – Northwest Fork of Loxahatchee River Restoration Plan Addendum (based on new biological and hydrological data collected in the system)
- Adaptive Management – Evaluate restoration success with monitoring and research programs proposed in this science plan

