Development and Implementation of the CERP Monitoring Plan

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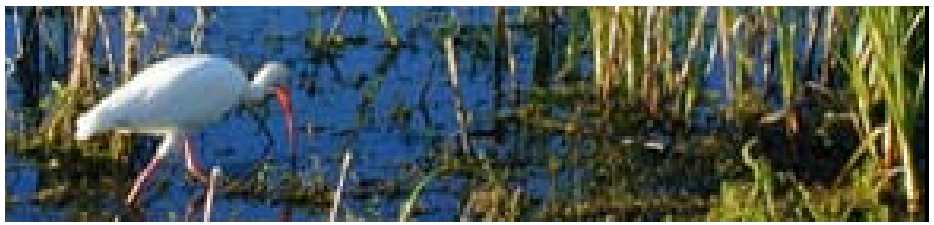
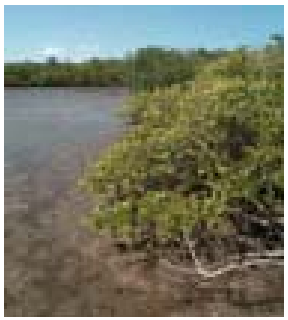
CERP RECOVER MAP
Briefing Overview

- Background
- CERP and RECOVER
- Applied Science Strategy
- Monitoring Plan Development and Implementation
- Adaptive Management
- Conclusions

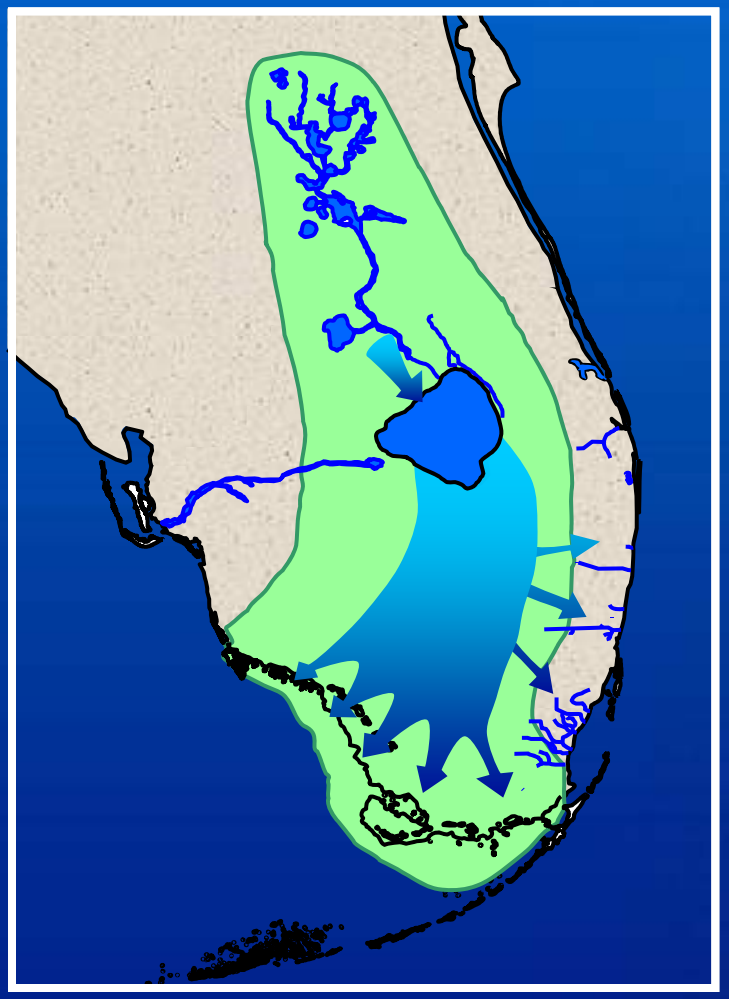
The Everglades and CERP …

The Florida Everglades is one of the largest freshwater marshes in the world. The Everglades traditionally extended from Lake Okeechobee in the north to Florida Bay in the south and housed precious floral and faunal resources.



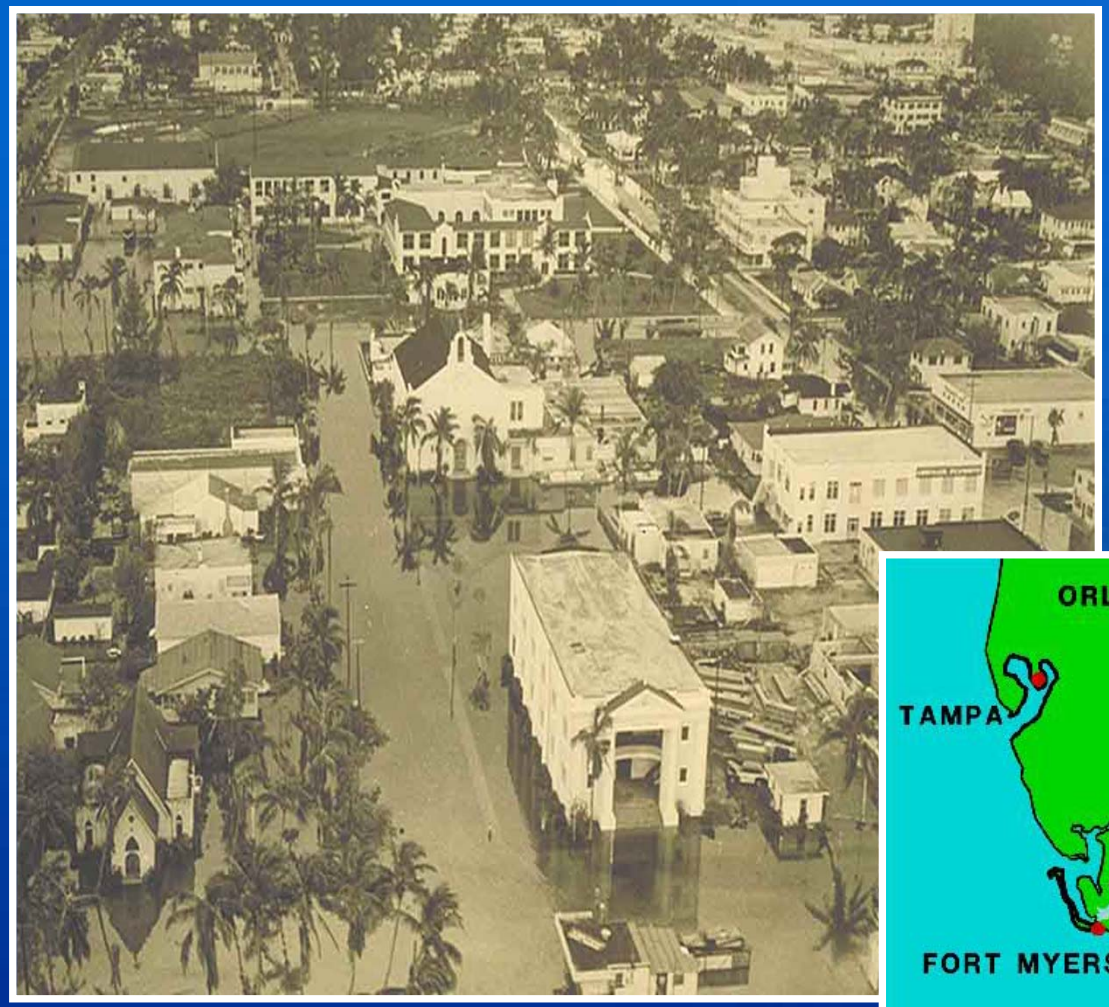


The “Original” Everglades Ecosystem

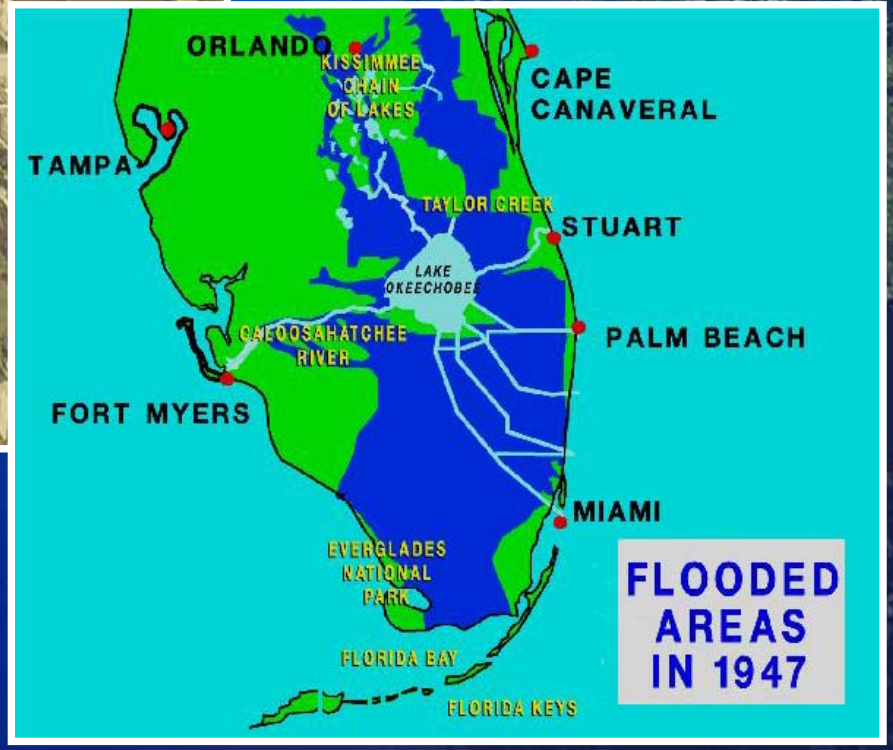


“River of Grass”

- Water connected the system, from top to bottom
- 9 million acres of wetlands providing a variety of habitat
- Diverse mosaic of landscapes and seascapes



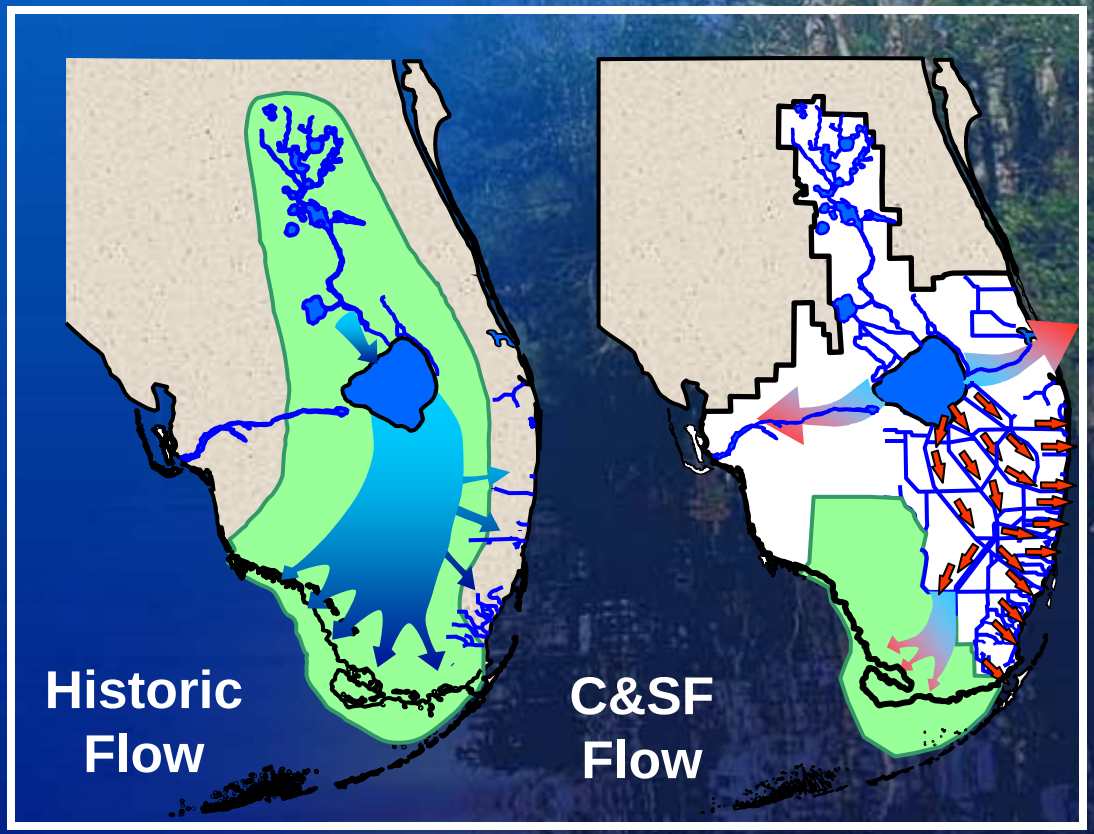

KISSI MEE


ORLANDO
KISSIMMEE CHAIN OF LAKES
CAPE CANAVERAL
TAMPA
TAYLOR CREEK
STUART
LAKE OKEECHOBEE
CALOOSAHATCHEE RIVER
PALM BEACH
FORT MYERS
MIAMI
EVERGLADES NATIONAL PARK
FLORIDA BAY
FLORIDA KEYS
FLOODED AREAS IN 1947

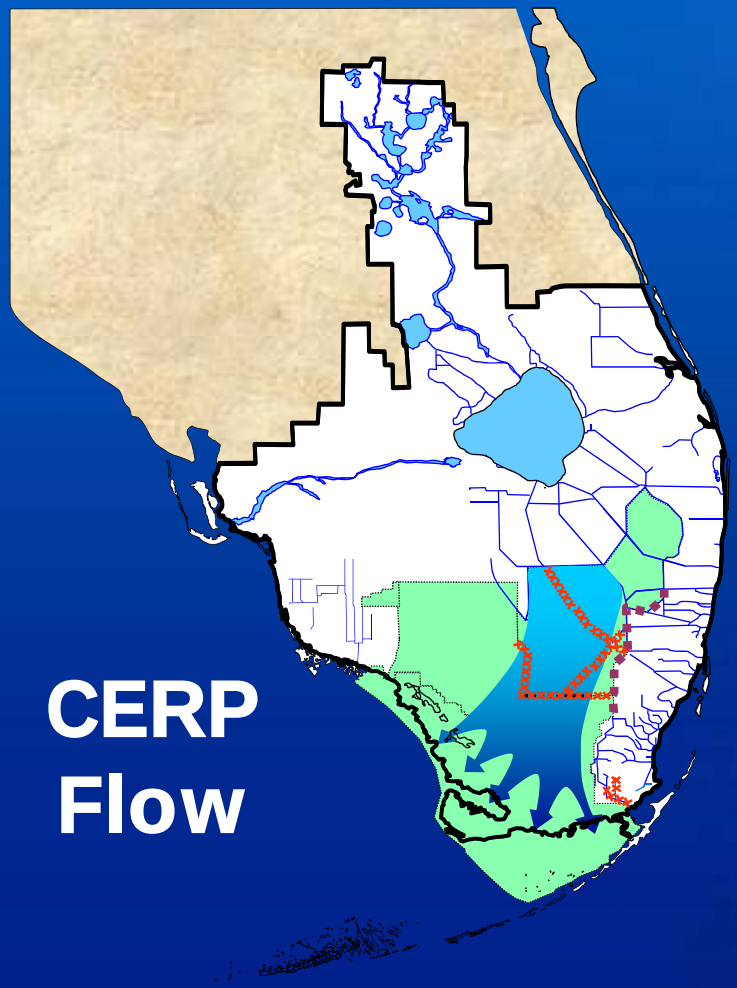
1947 Flood

The Central and Southern Florida (C&SF) Project

- **Project authorized by Congress in 1948**
- **Constructed over 25 years**
- **Multi-purpose project**
- **1,800 miles of canals and levees**
- **Over 150 water control structures, including 16 major pump stations**



Comprehensive Everglades Restoration Plan



- 6 pilot projects
- 15 surface storage areas
- 3 in-ground reservoirs
- 330 aquifer storage and recovery wells
- 19 stormwater treatment areas
- 2 wastewater reuse plants
- Removal of over 240 miles of canals, levees and structures
- Operational changes

What is RECOVER?

- **RECOVER - REstoration COordination and VERification**
- **Role - Organize and apply scientific and technical information to support the objectives of CERP**
- **Composition - Interdisciplinary, interagency body with Corps and SFWMD jointly responsible**
- **Scope - Programmatic, system-wide, for duration of CERP**

Why RECOVER?

- Evaluate and assess Comprehensive Plan performance
- Recommend refinements and improvements in design and operations of CERP components
- Review effects of other restoration projects on Comprehensive Plan performance
- Ensure that system-wide focus is maintained

CERP Monitoring and Assessment Plan

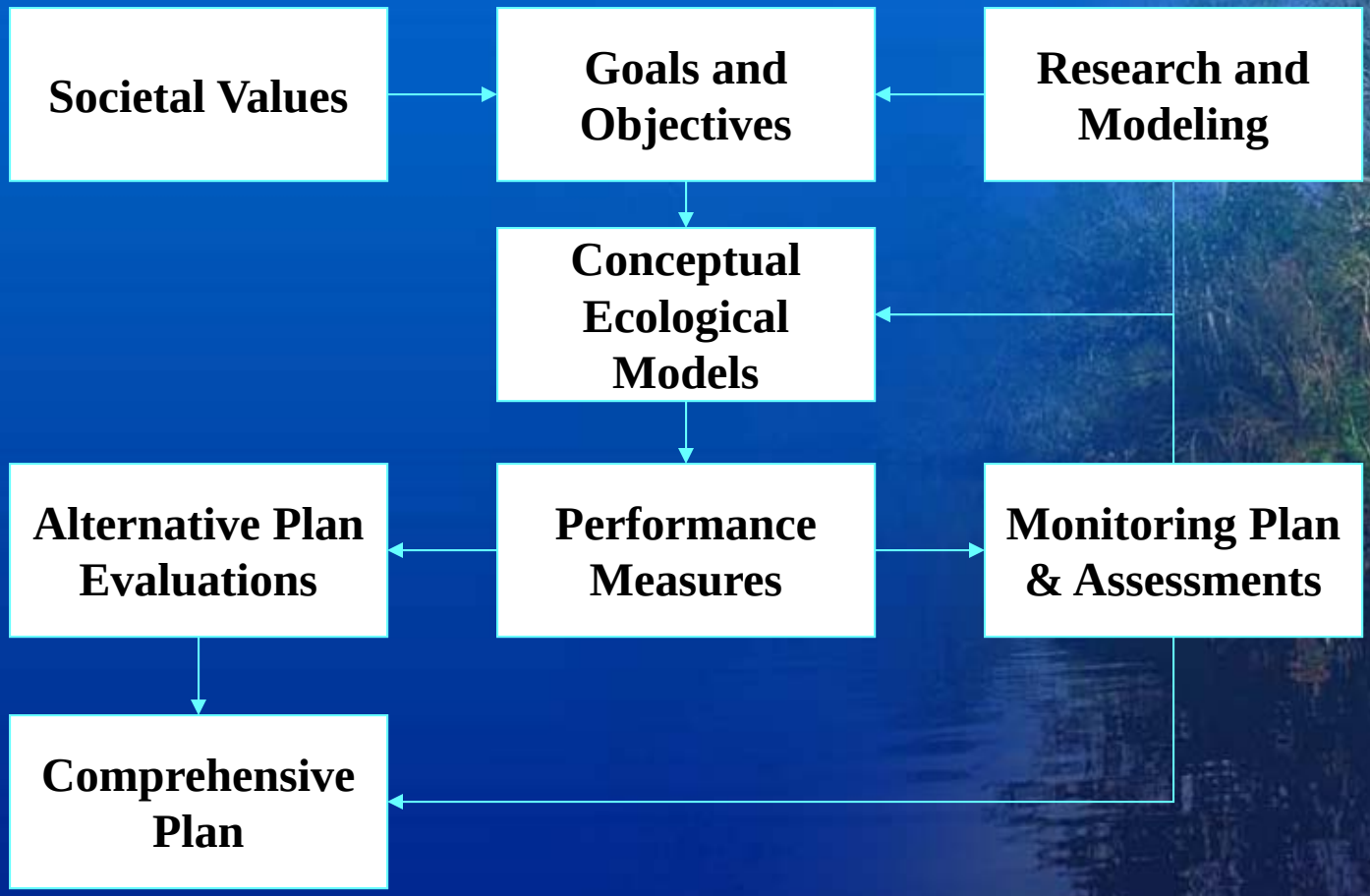
- The MAP was developed to:
  - determine how well CERP meets the system-wide objectives described by a set of performance measures
  - create a single, integrated system-wide monitoring and assessment program that will be used and supported by all agencies as the primary means of measuring the performance of CERP

MAP Origins

- An interagency collaborative team was formed to complete the first draft of the MAP – March 2001
- The focus and scope of the CERP Monitoring and Assessment Plan (MAP) was derived from the Restudy Monitoring Program Planning Guidelines and the CERP Applied Science Strategy

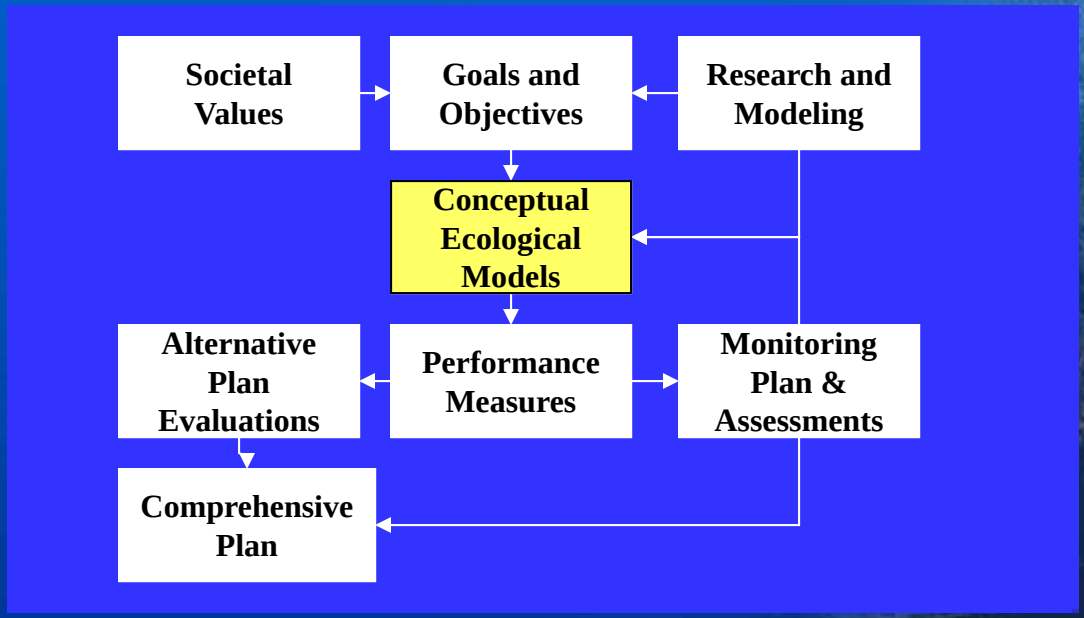
2001	2002	2003	2004	2005

CERP Applied Science Strategy



The Applied Science Strategy contains the characteristics on which the CERP MAP is based.

Conceptual Ecological Models



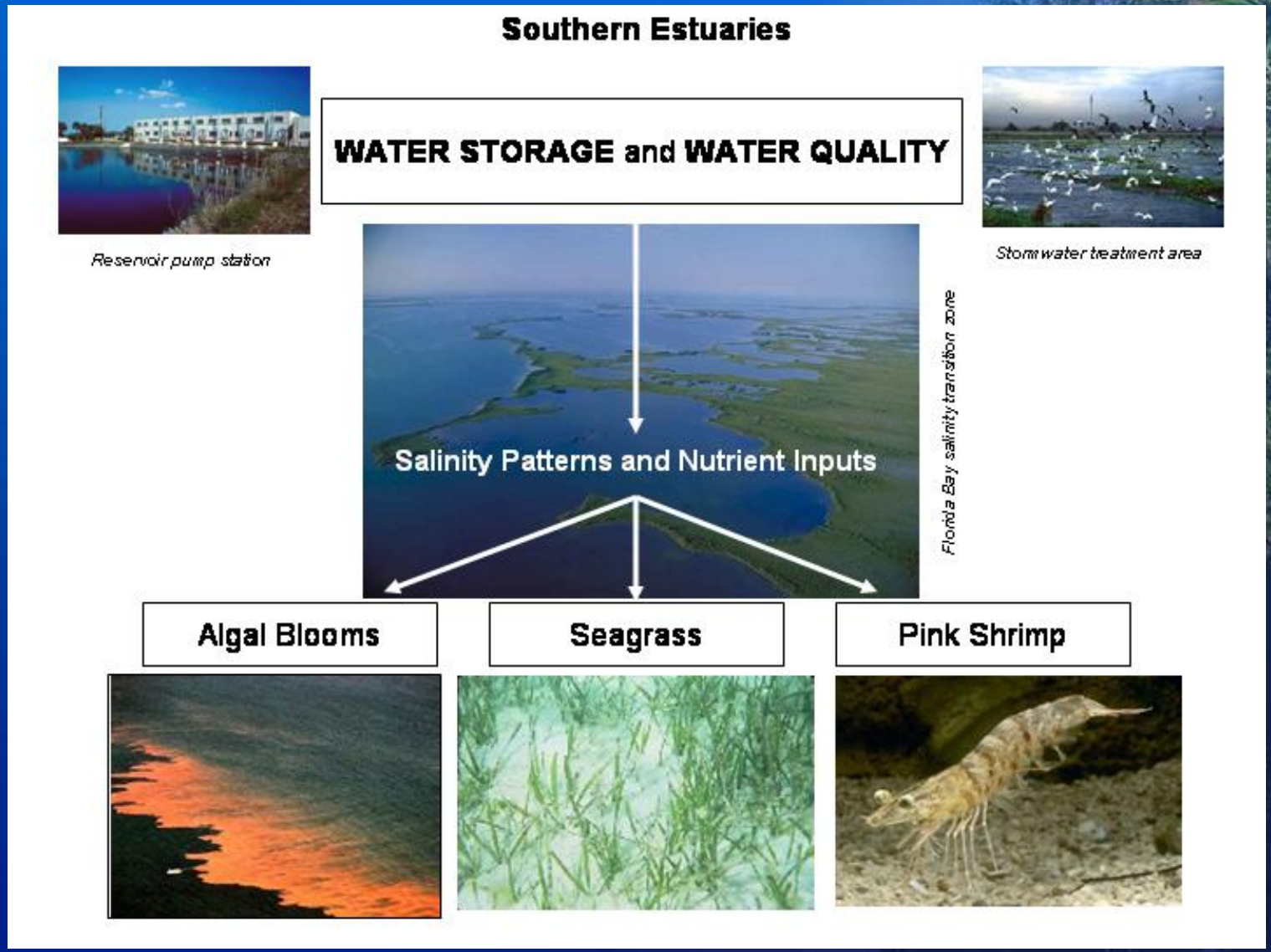
Conceptual ecological models provide a planning tool to translate overall restoration goals of the CERP into specific performance measures that will be used to plan, design, and assess the success of the Plan.

Conceptual Ecological Models

Drivers & Sources

Stressors

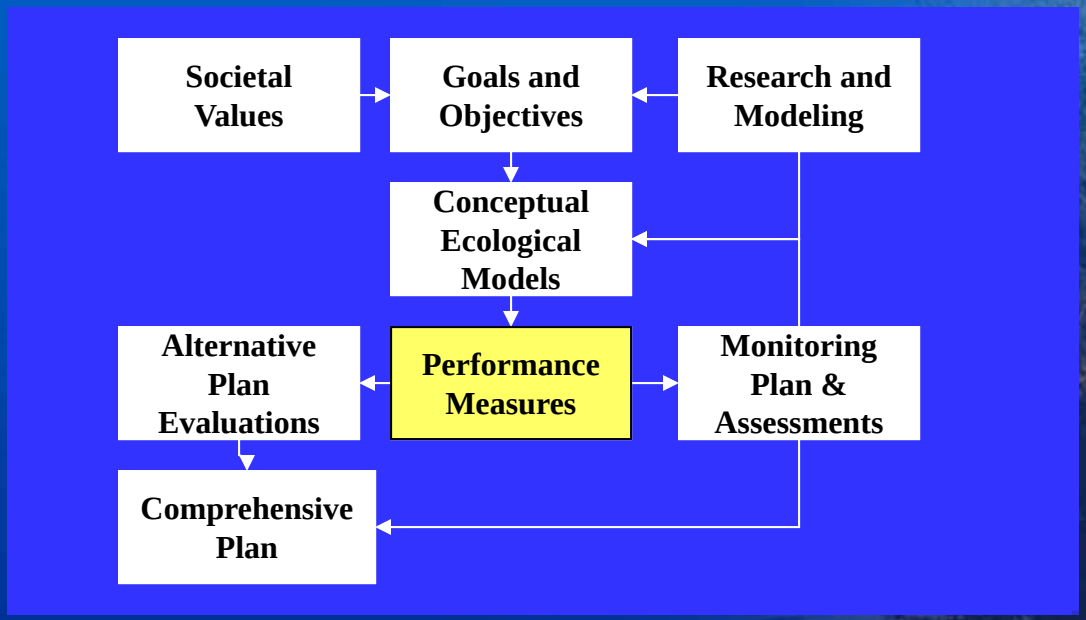
Attributes



Conceptual Ecological Models

- The process of developing the CEMs was designed to do the following:
  - Illustrate ecological linkages in specific physiographic regions
  - Develop hypotheses linking physical stressors with ecological effects to predict responses to the CERP
  - Create a set of measurable indicators of success (i.e. performance measures) to assess how well the projects achieve system-wide goals

Performance Measures

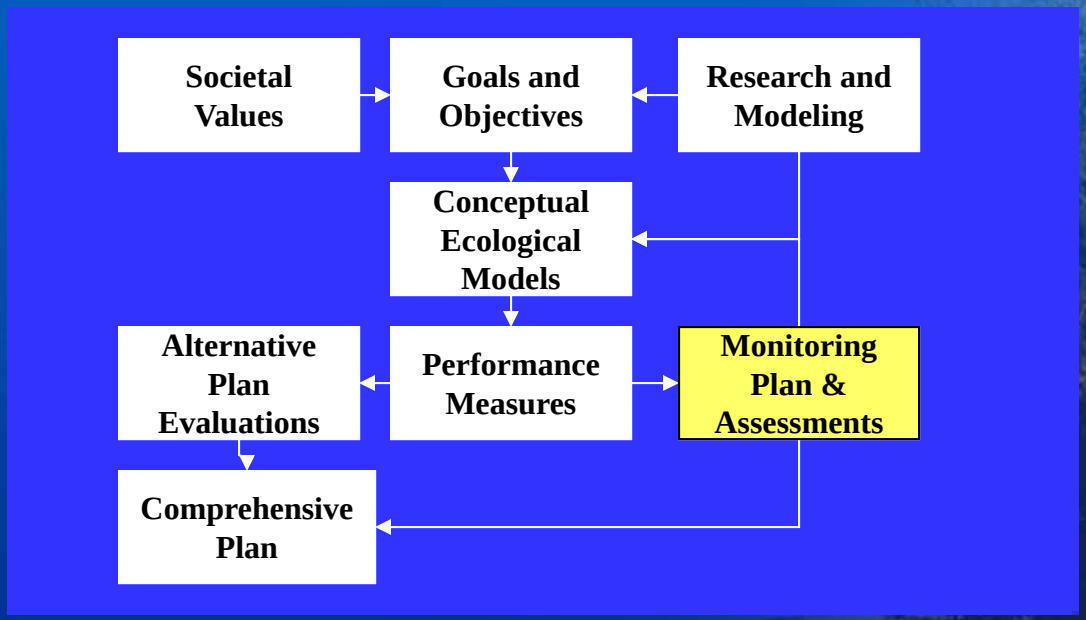


Performance measures are quantitative indicators of conditions in the natural and human systems. Achieving the targets of a well selected set of performance measures is expected to result in system-wide sustainable restoration.

Performance Measures

- Determined that performance measures were needed to clearly define the restoration targets of CERP
- CERP hypotheses, ecological premises, and supporting science needs were developed to clearly link the PMs with the CEMS and module components

Monitoring Plan and Assessments



The responses of the south Florida ecosystem will be assessed to determine whether or not the system responses match expectations, including the achievement of expected performance levels. This is a key component of the CERP Adaptive Management Strategy.

Development of Integrated Monitoring Modules

- As a result of the MAP review process, a series of technical workshops were held to focus on sampling techniques and the design and integration of monitoring plans – October 2001 through February 2002

2001		2002	2003	2004	2005

Purpose of Integrated Monitoring Module Workshops

- Identify the stressors, ecological linkages, and biological attributes within the CEMs CERP is designed to affect
- Refine monitoring and research topics necessary to improve evaluations of system-wide performance
- Develop monitoring network designs for each module
- Identify existing monitoring programs critical to the CERP that should continue
- Estimate approximate costs for each part of the monitoring plan

Monitoring Module Workshops

- What were the significant results of the workshop? – laying out ecological premises and supporting science needs
- Resulted in release of the second draft of the MAP – March 2003

2001	2002	2003	2004	2005

Monitoring and Assessment Plan (MAP Part I)

- Final MAP Part I: Monitoring and Supporting Research was published in January 2004.

2001	2002	2003	2004	2005

Refinement of the MAP

- Development and refinement of the MAP is a continuous and iterative process
- Three drafts versions of the MAP underwent extensive agency and public scrutiny
- The Assessment Team of RECOVER has the lead responsibility for development and updating of the MAP
- Formal reviews of the MAP will occur every 3 years

Initial MAP Implementation (FY 03-05)

- Goal One: fill gaps in existing hydrological & water quality monitoring networks
- Goal Two: fill gaps in existing biological monitoring network
- Goal Three: initiate high priority new biological monitoring
- Goal Four: initiate priority supporting ecological research

2001	2002	2003	2004		2005

MAP Implementation Assumptions

- **Existing Monitoring Programs –** existing monitoring will continue with existing funding sources
  - *Problem: Funding sources not secure over a 30-year period*
- **Partnering Agencies –** Partnering agencies will contribute funding and/or will participate in the implementation of MAP

Prioritization of Monitoring Activities

- Formal process established for prioritizing monitoring activities on an annual basis
- Evaluation criteria
- Peer-review panel
- Results approved by the Assessment Team

MAP Coordinator

- Central to successful MAP implementation is the establishment of MAP Coordinator:
  - Tracking and Coordination
  - MAP Data Management
  - Compiling Monitoring Results
  - Reporting
  - QA/QC
  - Document Management

2001	2002	2003	2004	2005

Monitoring and Assessment Plan (MAP Part II)

- MAP Part II will document assessment protocols and statistical methods to carry out assessment of monitoring data
- A draft of MAP Part II is expected to be available in Fall 2005

2001	2002	2003	2004	2005

Monitoring and Assessment Plan (MAP Part II)

Scope & Purpose -

- Comprehensive, system-wide plan
- Measure hydrological, water quality, water supply, biological, ecological responses to CERP
- Support adaptive management, interim goals, CERP report card
- Substantially revised from MAP (I)

Component of Adaptive Management Strategy

- Assess actual performance vs. anticipated performance
- Periodically report on ecological and hydrological trends
- Looks at science and regional trends rather than specific project performance
- Adaptive management strategy structured to receive monitoring results and make adjustments to Plan if required

Best Practices for Large-Scale Monitoring Programs

- Long-term effort using collaboration to reach consensus
- System-wide monitoring is a key component of adaptive management
- Use of Conceptual Ecological Models
- Reliance on existing monitoring programs
- Centralized coordination of monitoring efforts
- Formal process for prioritizing monitoring components annually

Questions ?