SUSTAINABILITY OF LONG-TERM MONITORING FOR LARGE SCALE ECOSYSTEM RESTORATION

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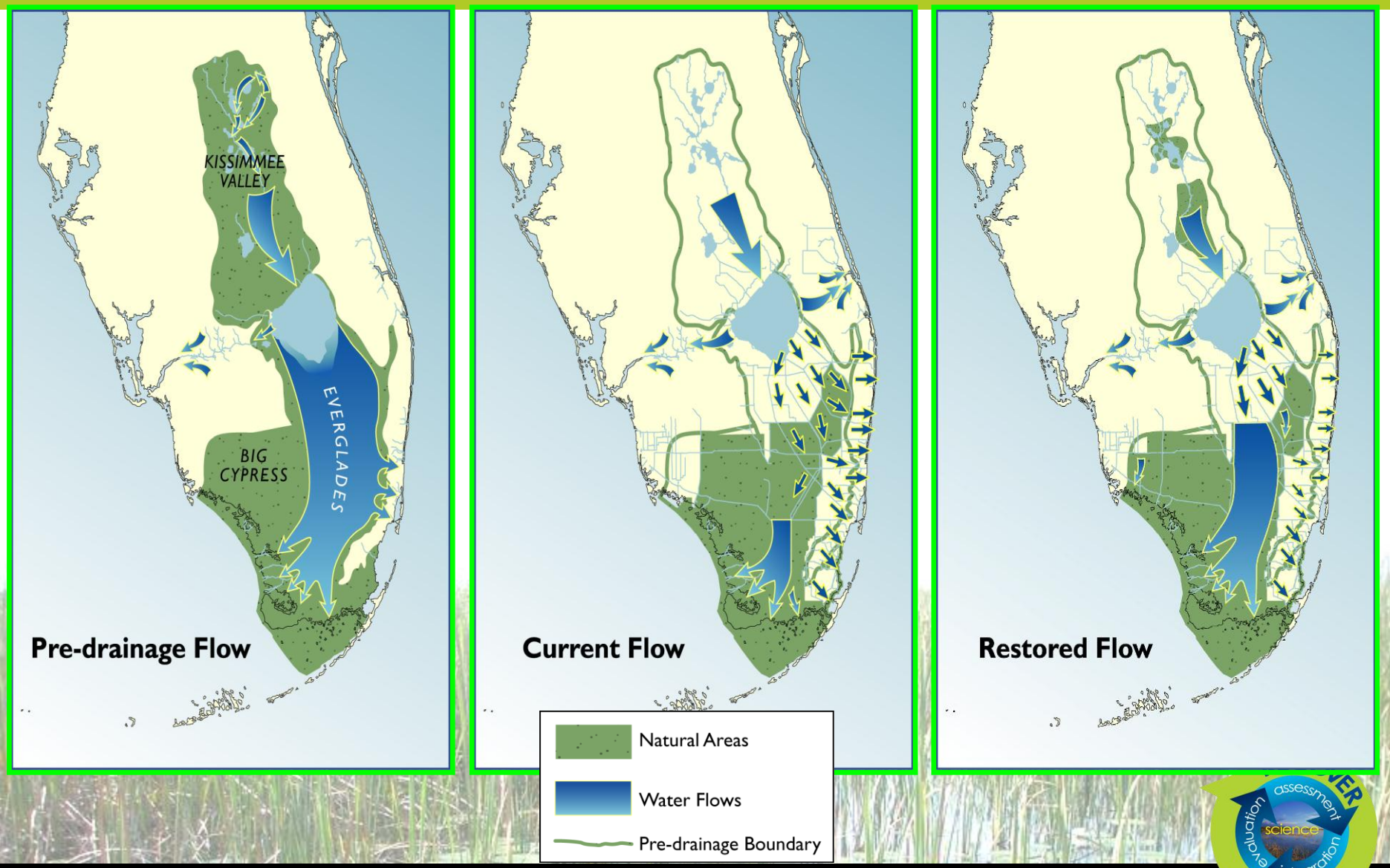
Long-term System-wide Monitoring

- Critical for ecosystem restoration
- Ability to detect changes as ecosystem restoration is implemented
- Provides information about the current status of the natural system
- Addresses key questions about how the system might respond to restoration actions

Comprehensive Everglades Restoration Plan (CERP)

- Restoration, preservation, and protection of the South Florida ecosystem
- Restore appropriate quantity, quality, timing and distribution of flows
- Large spatial scale
- Highly diverse mosaic of plant communities
- Dynamic storage and sheetflow
- Wet and dry hydrologic cycles
- Ecosystem adapted to low amounts of nutrients (oligotrophic)

CERP Restoration Vision and Role of Science



CERP System-wide Science

REstoration COordination and VERification (RECOVER)

- Ensure CERP implementation is guided by the best available science
- Programmatic and system-wide perspective
- Interagency and interdisciplinary
- Collaborative and consensus-based
- Three Major Components
  - Planning - integrating RECOVER with planning and operation of the system
  - Evaluation - forecasting project performance through predictive modeling
  - Assessment - measuring performance of projects through research and monitoring
    - **Monitoring and Assessment Plan (MAP)**

CERP Monitoring

Monitoring and Assessment Plan (MAP)

- Holistic description of the status of the Everglades ecosystem
  - Synthesis of findings across modules and across years
- Physiographic regions (modules)
  - Greater Everglades, Northern Estuaries, Southern Coastal Systems, and Lake Okeechobee
- ~35 monitoring components
  - Ecological, biological, water quality
  - Within and cross-module monitoring
  - Leverages monitoring from other agencies
- Heart of the CERP Adaptive Management (AM) Program
- Summary of ecosystem changes as they relate to CERP goals and objectives
- Identification of major unanticipated findings

Purpose of the MAP

- Documents restoration-induced change and status of the system
  - Measure hydrology, water quality, ecology responses
- Confirms/develops scientific information
- Provides feedback loop integrating science and management
- Informed decision-making
  - Provide science to guide implementation, operation and maximize benefits
  - Sound science to reduce risk and uncertainty

System Status Report

- Formal assessment of data generated from the RECOVER MAP and other sources
- Status, condition, and trends of hydrological, water quality, and biological data critical to Everglades restoration
- Address the overall status of the ecosystem relative to system level hypotheses, performance measures, and restoration goals
- Scientific information reported in the SSR is fed into the decision-making process, allowing managers and decision-makers to use the best available science during implementation of the CERP

Sustainability of the MAP

- Authorized by WRDA 2000
  - $100M between the Corps and SFWMD
- Implementation of CERP is slower than expected
- Challenges in justifying the need for long-term monitoring
- FY12 funds for the MAP were significantly reduced
  - Most monitoring significantly reduced, 4 monitoring components put on hold

WHY MONITORING IS IMPORTANT

- **CERP Projects – monitoring used for goals, objectives, performance measures, and benefits**
  - **Examples**: Project goals, objectives, and performance measures based on monitoring results since 2000
  - Alternative screening, modeling, benefits calculations, and tentatively selected plan based on current science knowledge gained since 2000
- **Documentation of ecosystem changes**
  - **Current Example**: Beneficial salinity changes in Florida Bay due to operational changes
- **Adaptive Management**
  - "Are we getting it right?" Monitoring results used by RECOVER, Task Force Stoplight Indicators report, and nationally to assess status of south Florida ecosystem
  - Measure success of CERP
  - Reduce uncertainty that comes with a long-term project

Why Monitoring is Important

- **Information for Decision-makers**
  - **Examples**: Lake O releases – Results from MAP monitoring have determined the affect of LO releases on estuaries; this expertise used to make decisions about the releases
  - River of Grass agreements on new water level/flow targets were based on RECOVER monitoring and assessment results
- **System-wide view of CERP effects**
  - CERP includes large geographic area; project monitoring covers small areas. How do we know the affects of several projects collectively on the Everglades? RECOVER works with projects to monitor entire ecosystem
  - "Before and After:" What is the reference condition and how well is CERP meeting restoration goals?

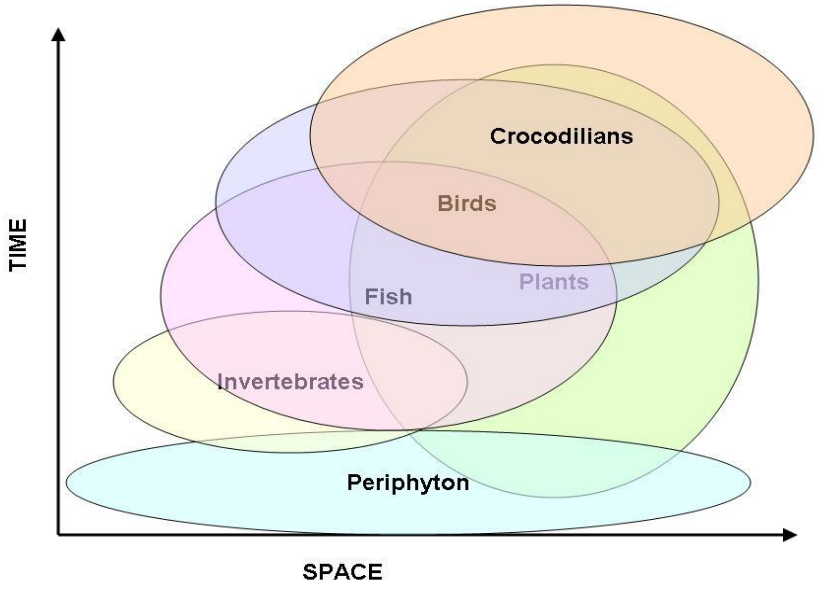
Challenges

- Dynamic implementation and construction schedules
- Changing interagency monitoring priorities
- Funding constraints due to budget reductions
- Management decisions focus limited dollars on project-scale effects, thus sacrificing monitoring at the system scale

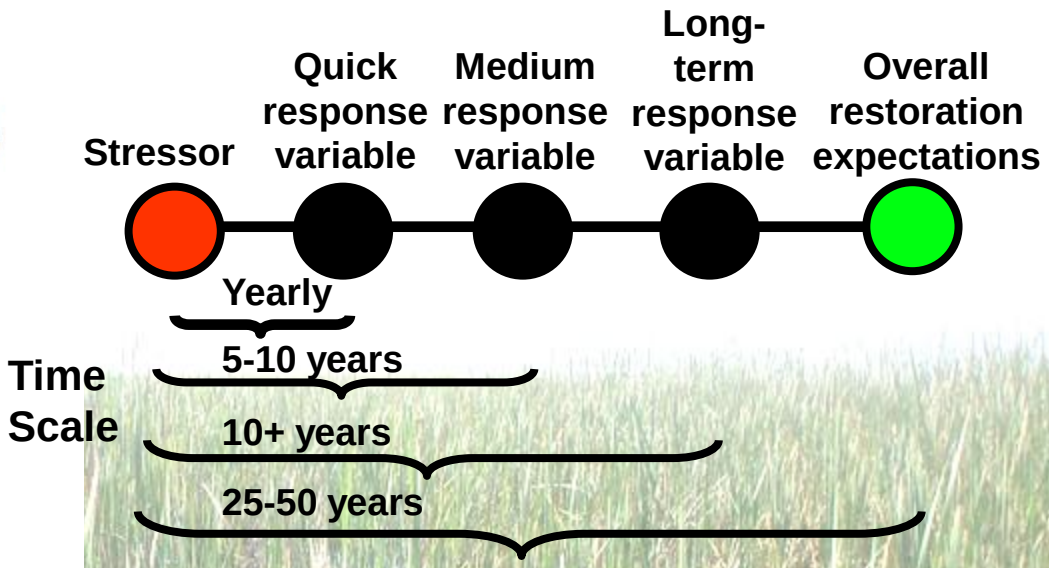
Challenges

Broad Spatial & Temporal Scales

Recognizing that the ecosystem responds over difference scales…



Ecosystem Response



…creates opportunity to best leverage monitoring efforts

Risks of Reducing System-wide Monitoring

- Inability to separate out project restoration success from natural system variability
- Reduction in the ability to capture potential unknown and significant changes across the system in the future
- Reduction of the ability for adaptive management

Key to Continued Support

- Link the science with policy and management questions and decisions
- Communicate the need to identify and evaluate environmental change that occurs across spatial and temporal scales to document restoration success
- Demonstrate environmental benefits that will only be evidenced through long-term monitoring

Questions