The Role of Science in Ecosystem Restoration and Management:

The South Florida Ecosystem Restoration Initiative

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“There are no other Everglades in the world.” - Marjorie Stoneman Douglas
Why do we need science?

• Best decisions possible
• Build confidence and consensus in decisions
• Provide consistency to decision-making
• Reconcile conflicts between protection and use
• Prevention is cheaper than restoration
The Everglades System Was Defined by Space, Heterogeneity, Hydrology, and Water Quality

With two important landscape linkages.

Uplands/wetlands
Freshwater/saltwater
Eras of water management
• Drainage
• Flood control
• Water supply
• Ecosystem restoration
Impacts

- Loss of habitats
- Amount
- Fragmentation
- Diversity
- Compartmentalization
- Loss of flow
- Altered hydropatterns
- Altered water quality
- Soil subsidence
- Invasive species
Changes in Land Cover

1900 1989

Pine Flatwoods
South Florida Restoration Initiative

• Federal, State, Local, and Tribal “partnership”
  • Task Force
  • Working Group
  • Science Coordination Team
• Multiple Efforts
  • Restudy - COE
  • CERP – COE, SFWMD, RECOVER
• MSRP - FWS
• Mod Waters – COE, NPS
• Kissimmee River Restoration - SFWMD
• Everglades Construction Project - SFWMD
• Land Acquisition – State, Federal
• CWMP - EPA

Cost of SFRI is 15 billion dollars split almost evenly among CERP and non-CERP projects

Goal and Objectives

• Enhance Ecologic Values
  • Natural areas (condition, extent and diversity)
  • Native plants and animals (T&E spp)
• Enhance Economic and Social Values
  • Water supply and flood protection
  • Cultural and archeological resources
  • Recreational and navigational opportunities

Authorized by Water Resources Development Act
CERP Components

- Aquifer Storage & Recovery
- Surface Water Storage Reservoir
- Stormwater Treatment Areas (STAs)
- Reuse Wastewater
- Seepage Management
- Removing Barriers to Sheetflow
- Operational Changes
The Future of the Ecological Integrity of South Florida is Based on Decisions of Private Landowners

- Incentives and education
- Acquisition
- Regulation

If you want private landowners to conserve wildlife habitat; make it worth their while and teach them how to do it.
Integration of Ecology, Economics, and Socio-Political Components

Economically Feasible

Socially and Politically Acceptable

Ecologically Possible

Goals and Solutions
Research, Modeling, and Monitoring
(how science is done)

• Hydrology
• Water quality
• Spatial extent and arrangement of cover types
• Biological diversity (species richness)
• Listed species
• Indicator species
• Non-native species

Adaptive Management
Increasing certainty in an uncertain world

• Research - Experiments
• Modeling – Risk Assessment
  • Conceptual models
    Stressors
    Attributes
    Targets
    Uncertain Linkages
• Policy screening models
  Habitat suitability
  Stressor response
• Monitoring – Evaluating Success
Does Adaptive Management Work?

Proved controversial at best

Science → Education → Policy

Politics → Law → Economics → Social Factors

Science does not arrive at policy unscathed
Barriers to Progress

• Process not followed
• Institutional limitations – CERP, MSRP, CWMP,…
• Lack of goals and objectives – Who sets goals?
• Science has a weak voice in policy making
• Lack of integration
• Sustainability and economic expectations
  • Who pays and when? and Who benefits?
  • Lack of socio-economic component
• Re-engineer, restore, or rescue
• We do not have environmentally literate adults

A Mad Tea Party – Lewis Carroll
Current Models of Science/Policy Interaction

It is clear that our ability to collect good scientific information has outpaced our ability to deliver it to decision- and policy-makers.
Deliberate, Systematic Effort to Educate Decision- and Policy-makers

- Politicians
- Upper level management
- Staff
- Landowners
- Voters/Taxpayers

In the end, we will conserve only what we love.
We will love only what we understand.
We will understand only what we are taught.
– Baba Dioum

We need to educate adults now
The Challenge

• Need to communicate - speak and listen
• Recognize that science is uncertain and inconvenient
• Unified vision – common goals
• Comprehensive, regional, land and water use planning and regulation
• Sustainable economic and ecological expectations
• Education not just PR
Final Caveats

• Educate not advocate
• There is no substitute for common sense
• Funded

We can’t solve problems by using the same kind of thinking we used when we created them - Albert Einstein
Lessons Learned - Recommendations

- Prevention *is* cheaper than restoration
- Get out in front and stay out in front
  - Identify problems and solve them yourself
  - Identify benefits and communicate them