Fourth Biennial Report on Everglades Restoration Progress National Research Council

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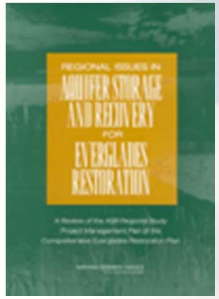
The Role of Science in Everglades Restoration

"While not all parties agree on the details of the restoration, there is near universal agreement that the best possible science should support planning, implementation, and, ultimately, operation of restoration projects." (NRC, 2003)

In 1999 the National Academies established the Committee on Restoration of the Greater Everglades Ecosystem (CROGEE). In 2004 the Committee on Independent Scientific Review of Everglades Restoration Progress (CISRERP) was formed.

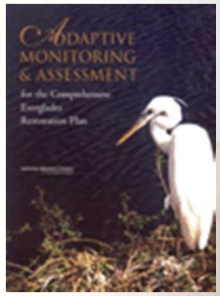
The CROGEE/CESI Reviews Prior Everglades Studies (2000-2005)

Aquifer Storage and Recovery in the Comprehensive Everglades Restoration Plan (2001).
Regional Issues in Aquifer Storage and Recovery for Everglades Restoration (2002).



Florida Bay Research Programs and their Relation to the Comprehensive Everglades Restoration Plan (2002).
Science and the Greater Everglades Ecosystem Restoration, the Critical Ecosystem Studies Initiative (2002).

Does Water Flow Influence Everglades Landscape Patterns? (2003).
Adaptive Monitoring and Assessment for the Comprehensive Everglades Restoration Plan (2003).



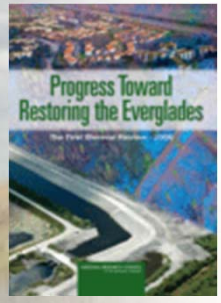
Re-Engineering Water Storage in the Everglades: Risks and Opportunities (2005).

Committee on the Independent Scientific Review of Everglades Restoration Progress (CISRERP)

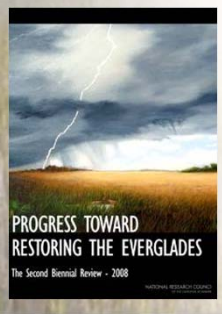
Independent Scientific Review: WRDA 2000, Section 601 (j)

Establish an independent scientific review panel convened by a body, such as the National Academy of Sciences, to review the Plan's progress toward achieving the natural system restoration goals.

Produce a biennial report to Congress, the Secretary of the Army and Interior, and the Governor that includes an assessment of ecological indicators and other measures of progress in restoring the ecology of the natural system.

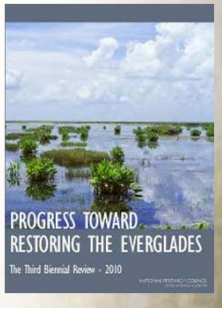


Progress Toward Restoring the Everglades: The First Biennial Review (2006).



Progress Toward Restoring the Everglades: The Second Biennial Review (2008).

Progress Toward Restoring the Everglades: The Third Biennial Review (2010).



Progress Toward Restoring the Everglades Fourth Biennial Review (2012)

Regular Themes for the NRC/CISRERP Reports:

- ***The Restoration Plan in Context*** **(progress in restoring the natural system)**
- ***Implementation Progress*** **(significant accomplishments, specific scientific/engineering issues that may affect restoration progress)**
- ***Science and Decision Making*** **(monitoring and assessment protocols to be used to evaluate CERP restoration progress)**

Special Topics in the 4th Biennial Review

- ***Ecosystem Trajectories Affected by Water Quality and Quantity***
- ***Timeline of Significant Legal Actions Related to Water Quality***
- ***Status of Numerical Nutrient Criteria for the State of Florida***

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Restoration Progress:

Notable progress has been made in the construction of Everglades restoration projects over the last two years.

Eight CERP projects are now under construction:
1st Gen. Picayune Strand, Site 1, IRL-S, Melaleuca E.,
2nd Gen. C-111 SC, Biscayne Bay Coastal Wetlands,
3rd Gen. Loxahatchee River, Lakeside Ranch.

Production of restoration benefits within the Water Conservation Areas and Everglades National Park continues to lag behind.

Progress Toward Restoring the Everglades Fourth Biennial Review (2012)

Significant Accomplishments:

State proposed projects (Restoration Strategies) to improve water quality represent an important step forward. Critical implications for restoration of attributes impacted by high phosphorus levels.

The Central Everglades Planning Project provides a means to expedite restoration benefits to the remnant Everglades. Responsive to prior committee concerns, and addresses impediments in USACE planning and approval process.

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Funding and Authorization Issues:

State funding declines have shifted responsibility for implementation progress to the federal government. The State has vastly outspent the federal government, so an increased level of federal funding will be necessary to maintain the pace of restoration progress.

Project authorization could soon become a major impediment to restoration progress. Only four projects are eligible for federal construction funding, which affects the State's cost-sharing. With no additional authorization and current spending rates, federal credits could exceed the state's in 3 years.

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Scientific Foundation for Decision Making: Monitoring:

Effective assessment of restoration progress will depend on:

Monitoring to establish pre-project trends, followed by similar data to determine the ecological changes that can be ascribed to the project.

A comprehensive assessment of our monitoring efforts is needed:

To ensure that fundamental short and long-term needs are met,
To ensure critical gaps are addressed in a cost effective manner,
Should consider all CERP-related monitoring programs.

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Scientific Foundation for Decision Making: Monitoring:

The Dynamic Reference Concept:

New tools that don't rely on historical precedence, but instead focus on reference sites to define restoration goals and measure restoration progress.

Requires a sufficient number of reference sites to capture the natural variations in communities across ecological gradients.

Should have utility in areas with relatively intact habitats (tree islands, ridge and slough, marl prairies) that have remained in good condition, and have a history of monitoring.

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Scientific Foundation for Decision Making:

Trajectories Analysis:

CISRERP used this approach to describe the current status, trends, and timescales of recovery for 10 attributes.

They considered impacts under three hypothetical scenarios:

- ***Improved water quality***
- ***Improved water quantity/hydrology***
- ***Improved water quality and quantity/hydrology***

Identifies trade-offs and benefits of integrated analyses, and opportunities to accelerate restoration.

TABLE 4-1 Summary of Trajectories of Different Ecosystem Attributes in the Current System and under Three Restoration Scenarios

Attribute	Current "Grade" of System (A to F)	Current System Trend	Effects of Restoration Scenarios on Current Trends			Timescales of Recovery[3]
			(1) Effect of Improved Water Quality[1]	(2) Effect of Improved Hydrology[1,2]	(3) Effect of Improvements in BOTH Water Quality and Hydrology[1]	
Stressors						
TP load	C	Stable to Improving	++	--	+	Years
Interior TP conc.	B to C[4]	Stable to Improving	++	-	+	Decades
Soil P	C	Stabilizing	+	--	+	Decades to centuries
Ecosystem condition						
Cattail	C	Degrading, but degradation slowing in some areas	+	--	+	Decades to centuries (years if actively managed)
Periphyton	C	Stable	++	--	+	Years. Recovered communities may not be the same as prior to disturbance
Peat	D	Degrading in dry areas	0	++	++	Centuries
Tree islands	D	Degrading	0	+[5]	+[5]	Decades to centuries; may require active restoration
Ridge and slough	D	Degrading	0	+	++	Centuries; could involve adaptive management
Snail kite	F	Degrading	0	+	+	Years to irreversible
Fish mercury	D	Stable	-	+	+	Years to decades

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Overall CISRERP Summary:

The pace of ecosystem restoration has improved, but the focus has been on the periphery of the remnant Everglades.

Substantial progress has been made to reduce phosphorus.

Minimal progress to restore hydrology. Declines of hydrology dependent features (tree islands, peat, ridge and slough, snail kites) will take long timeframes to recover.

Declines will continue until both hydrology and water quality improvements can be addressed. The Central Everglades Planning Process is a step in the right direction.