

Water Resources Analysis Coalition  
December 6, 2018



Seventh Biennial Review - 2018  
from the Committee on Independent Science  
Review of Everglades Restoration Progress

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# CISRERP Biennial Report to Congress

- Congressionally mandated study of the Comprehensive Everglades Restoration Plan (CERP) under the Water Resources Development Act (WRDA) 2000
  - ❖ “The Secretary, the Secretary of the Interior, and the Governor, in consultation with the South Florida Ecosystem Restoration Task Force, shall 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 of the Plan.”
  - ❖ “The panel ... shall produce a biennial report to Congress, the Secretary, the Secretary of the Interior, and the Governor that includes an assessment of ... measures of progress in restoring the ecology of the natural system, based on the Plan.”
- Study funded since 2004 under 5-yr contracts with the USACE, with funding support from DOI and SFWMD

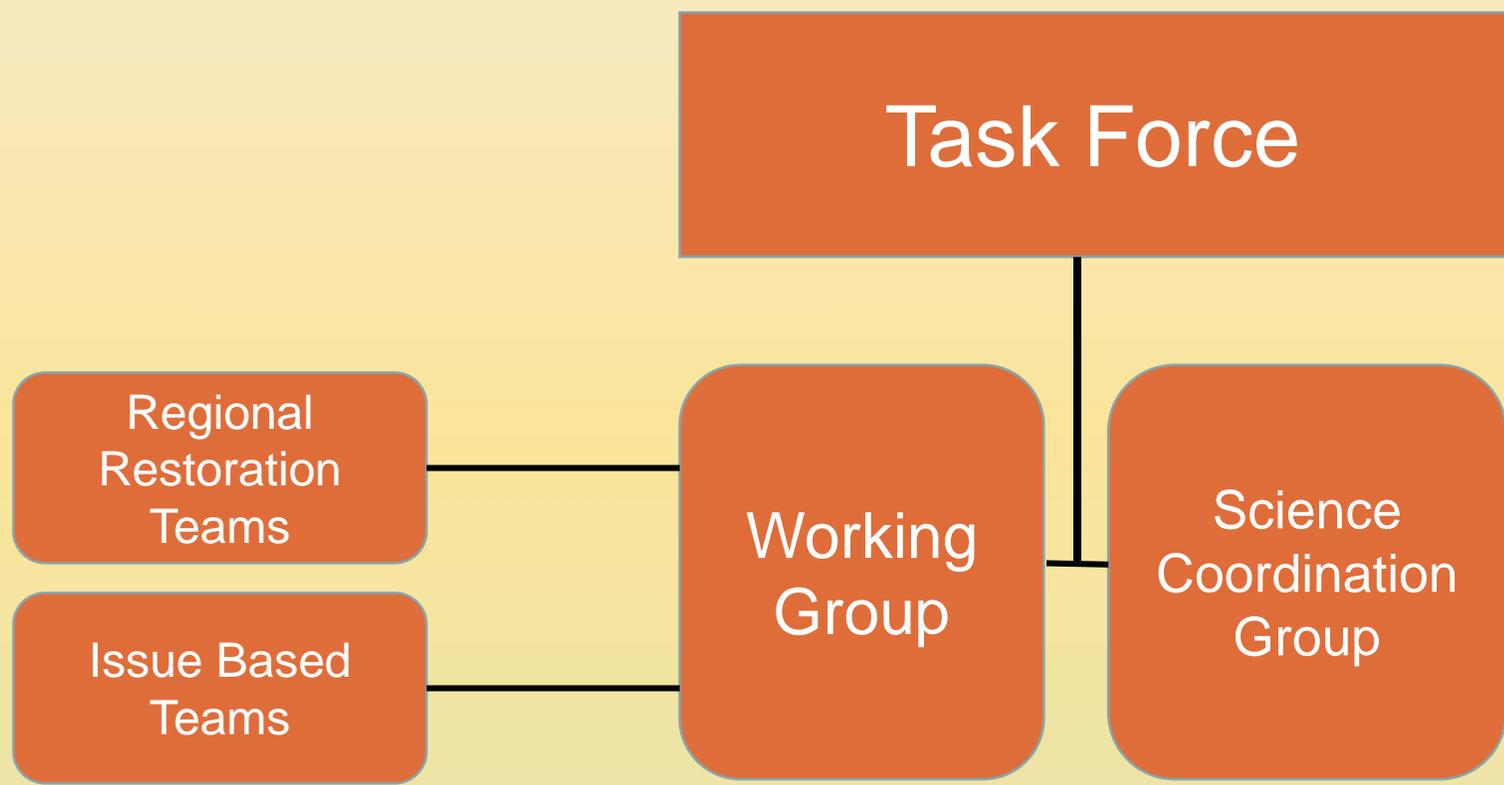
# South Florida Ecosystem Restoration Task Force

- Established by the Water Resources Development Act (WRDA) of 1996
- Membership: – 7 federal agencies – 5 state and local agencies – 2 tribal representatives



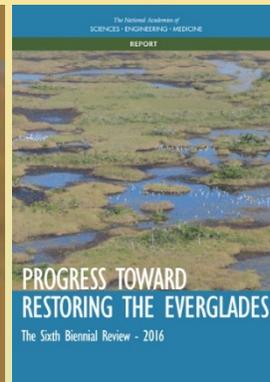
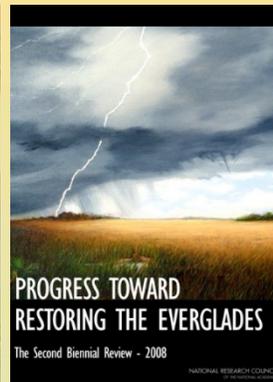
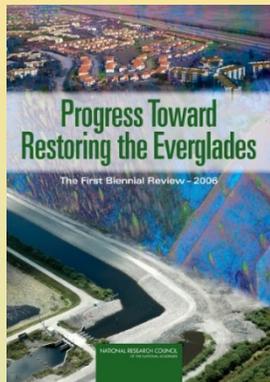
- Chaired by the Secretary of the Interior with support from the Office of Everglades Restoration Initiatives
- Duties: Coordinate policies, projects, and research; Exchange information to promote ecosystem restoration; Facilitate conflict resolution; Assist members

# South Florida Ecosystem Restoration Task Force Organization



# CISREERP Studies

- Progress Toward Restoring the Everglades: The First Biennial Review, 2006 (*incremental adaptive restoration*)
- The Second Biennial Review, 2008 (*Lake Okeechobee, Mod Waters*)
- The Third Biennial Review, 2010 (*water quality and quantity*)
- The Fourth Biennial Review, 2012 (*ecosystem trajectories*)
- The Fifth Biennial Review, 2014 (*CEPP, climate change, invasive species*)
- The Sixth Biennial Review, 2016 (*knowledge gained, CERP update*)
- The Seventh Biennial Review, 2018 (*monitoring, mid-course assessment*)



# CISREERP Statement of Task **DRAFT**

The committee will produce biennial reports providing:

1. An assessment of progress in restoring the natural system
2. Discussion of significant accomplishments of the restoration
3. Discussion and evaluation of specific scientific and engineering issues that may impact progress in achieving the natural system restoration goals of the plan
4. Independent review of monitoring and assessment protocols to be used for evaluation of CERP progress



# Committee Membership

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- WILLIAM BOGGESS(*Chair*),\* Oregon State University
- MARY JANE ANGELO, University of Florida
- CHARLES DRISCOLL, Syracuse University
- SIOBHAN FENNESSY, Kenyon College
- WENDY GRAHAM, University of Florida
- KARL HAVENS, University of Florida
- FERNANDO MIRALLES-WILHELM, Univ. of Maryland
- DAVID MOREAU, University of North Carolina, Chapel Hill
- GORDON ORIAN, University of Washington
- DENISE REED,\* University of New Orleans
- JAMES SAIERS, Yale University
- ERIC SMITH, Virginia Polytechnic Institute & State University
- DENICE WARDROP, Pennsylvania State University
- GREG WOODSIDE, Orange County Water District

NRC Staff:

Stephanie Johnson,\* David Policansky, and Brendan McGovern

*\*Attending briefings*

# Study Process

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- Five in-person committee meetings (May 2017 - May 2018)
  - 4 information gathering meetings
  - 7 web conferences
  - 2 field trips
  - Presentations or public comment from ~ 90 individuals (federal/state/local agencies, universities, NGOs, individuals)
- Peer-reviewed consensus report

# 2018 Biennial Report Focal Areas **DRAFT**

- Review of restoration progress
- Restoration monitoring
- Lake Okeechobee
- CERP mid-course assessment

# CERP Restoration Progress

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- One CERP project completed
  - Melaleuca biocontrol mass rearing facility
- One CERP project nearing completion
  - C-111 Spreader Canal (#6)\*
- Four CERP projects ongoing
  - Picayune Strand (#2)\*
  - Biscayne Bay Coastal Wetlands (#7)\*
  - C-44 Reservoir (#4)
  - C-43 Reservoir (#8)
- Impressive efforts in project planning  
(4 projects; #10, 12, 14, 15: EAA Reservoir now authorized)

\* Focused committee review of progress and monitoring



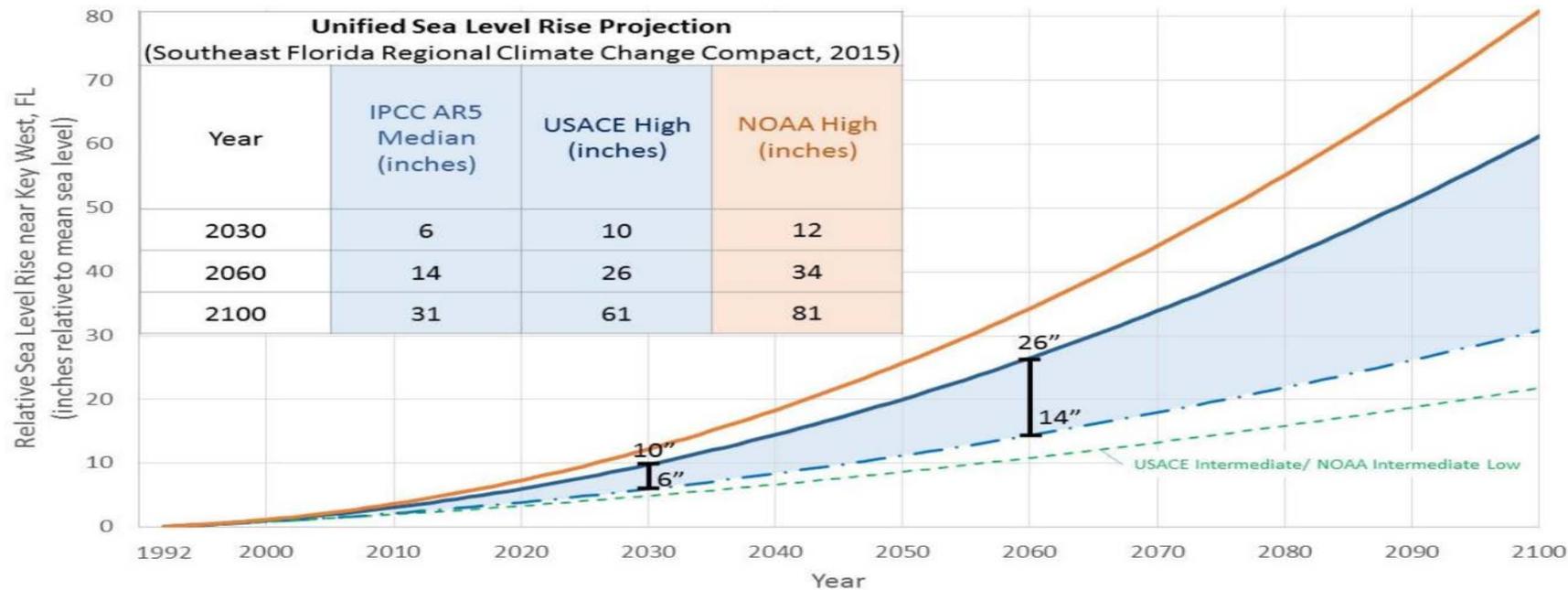
# CERP Restoration Progress

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- Natural system response:
  - Picayune Strand - Increased water levels, and early indicators of habitat response
  - BBCW – wetland vegetation responses but no near-shore salinity changes
- Incremental restoration progress from early CERP projects difficult to evaluate
  - Lack of rigorous assessment of outcomes relative to goals/expectations

# CERP Planning

- Planning efforts have advanced the vision for CERP storage, but a holistic understanding of combined benefits systemwide are lacking
  - Does not adequately examine their resilience to changing climate and sea level rise



# Non-CERP Restoration Progress **DRAFT**

- Recent completion of Mod Waters and C-111 South Dade expected to provide important restoration benefits to Everglades National Park
  - Benefits dependent on final operational plan
  - Expected to increase operational flexibility for managing high water events in remnant Everglades
- Impressive advances toward water quality objectives
  - Lowest mean outflow (15 ppb) concentrations in 23 years

# Project Monitoring

- Committee examined monitoring and analysis for:
  - Picayune Strand, C-111 Spreader Canal, Biscayne Bay Coastal Wetlands
- Early CERP projects vary in the extent to which they have implemented effective monitoring plans
- Challenges determining project benefits include:
  - Rainfall variability
  - Confounding effects of other projects
  - Lag times of ecosystem response
  - Lack of clear reference conditions

# Project Monitoring

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## Recommendations:

- Develop quantitative project objectives
- Include an evaluation of the ability to detect restoration success given natural variability
- Use modeling and statistical tools to analyze data
- Revisit project-level monitoring plans periodically
- Develop multiagency assessment and reporting of project-level results
  - Many ways to improve efficiency and effectiveness within existing budget

# Lake Okeechobee Context

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- Largest component of water storage in South Florida ecosystem (~1 ft = 460kAF)
- Lake regulation is central to Everglades restoration benefits and conditions systemwide
- Completion of Herbert Hoover Dike rehabilitation may facilitate more storage (pending risk analysis)
- Changes to the regulation schedule necessitate consideration of systemwide tradeoffs



# Ecological Effects of Higher Water Levels DRAFT in Lake Okeechobee

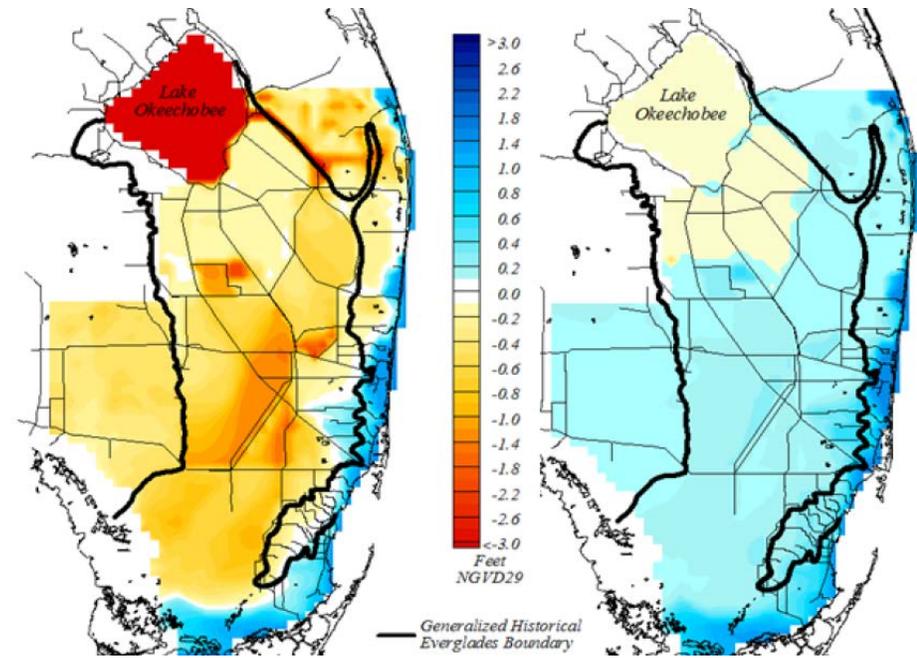
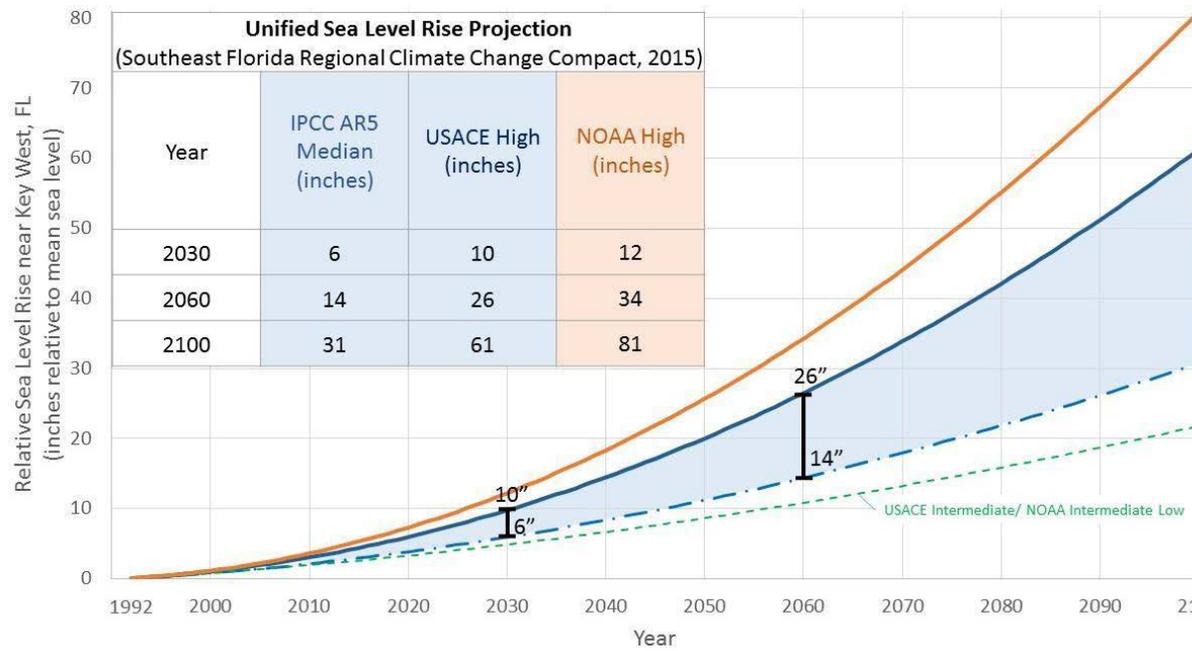
- Ecological conditions in lake adversely affected by high water levels (>~16 ft) and multiple years without low levels (~12 ft)
  - Near-shore emergent plants impacted by extended inundation
  - High water brings high phosphorus water into littoral zone, leading to cattail expansion
  - Erosion, berm formation at littoral fringe
  - Periodic low water levels important to health of SAV

# Ecological Effects of Higher Water Levels DRAFT in Lake Okeechobee

- Magnitude of ecological impacts of high water depend on antecedent conditions
- Real-time optimization may be able to reduce impacts associated with higher water levels and provide more flexibility
  - Refinements to monitoring (e.g., SAV) could inform real-time management
- Monitoring and modeling can support regulation schedule review and assessment of systemwide tradeoffs

# Context for Mid-course Assessment **DRAFT**

- Vision for CERP storage becoming clear
- Everglades of 2050 and beyond will differ from what was originally envisioned when CERP was developed



# CERP Mid Course Assessment

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- CERP agencies should conduct a mid-course assessment that rigorously considers the future of the South Florida ecosystem
  - Systemwide modeling of all authorized and planned projects
  - Examine near- and far-term performance under future possible climate and sea level rise conditions
- Results will document the benefits provided by CERP and inform robust decisions about planning, sequencing, adaptive management

# Supporting Sound Decision Making for a Future Everglades

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- Requires a science program that can bring the latest information and tools into CERP planning and implementation
  - Research needed to understand systemwide issues affected by future change, including peat collapse, saltwater intrusion, invasive species
  - May be best championed by an independent Everglades Lead Scientist empowered to coordinate and promote needed scientific advances

# Summary

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- Impressive project planning in last 2 years; two major non-CERP projects completed
- Vision for CERP storage becoming clear; storage in Lake Okeechobee remains unresolved
- Mid-course assessment should be conducted to analyze the projected CERP outcomes in context of future stressors
  - Rigorous assessment of latest CERP plans to examine their integrated performance under future climate and SLR scenarios
  - Time is right; Needed to inform robust decisions on planning, sequencing, adaptive management
- Improvements recommended for monitoring to provide more useful information from monitoring investments

# SFWMD Comments on CISREXP Recommendations

- Storage in Lake Okeechobee is complicated, will require information on how the HDD rehabilitation affects the dike risk assessment and analysis of tradeoffs
- Project monitoring issues are being addressed through multiple venues:
  - Annual review of project performance and review of monitoring requirements as permits are renewed
  - The Science Coordination Group has proposed a review of performance metrics
  - It is doubtful that there are efficiencies that could address all concerns without additional resources
- Mid-course assessment cannot be something that delays, or hampers ongoing progress
  - Has the potential to take resources away from other efforts
  - Systemwide modeling of all authorized and planned projects is being conducted
  - RECOVER is conducting a vulnerability assessment of sea level rise and climate change on performance metrics
  - Research is ongoing on the cause and effects of peat collapse
- Creation of an independent Science Coordinator would require funding and may lead to duplication of effort