

Committee on Independent Scientific Review of Everglades Restoration Progress

National Research Council

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

The Study

- **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 ecological indicators and other measures of progress in restoring the ecology of the natural system, based on the Plan.”
- **Study funded under a 5-yr contract with the USACE, with funding support from DOI and SFWMD**

Statement of Task

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

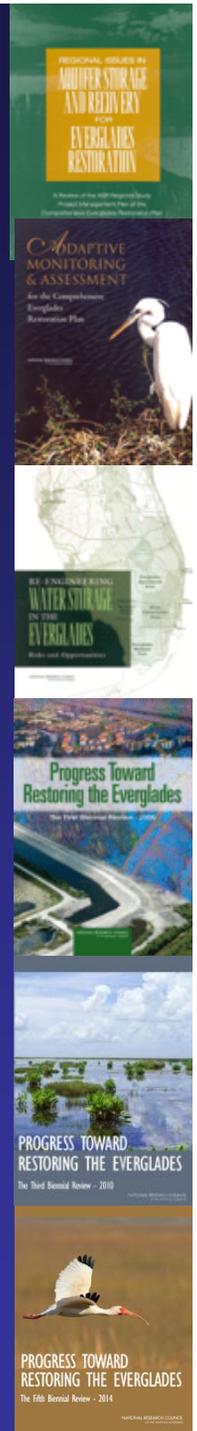


NRC Everglades Studies 1999-2014

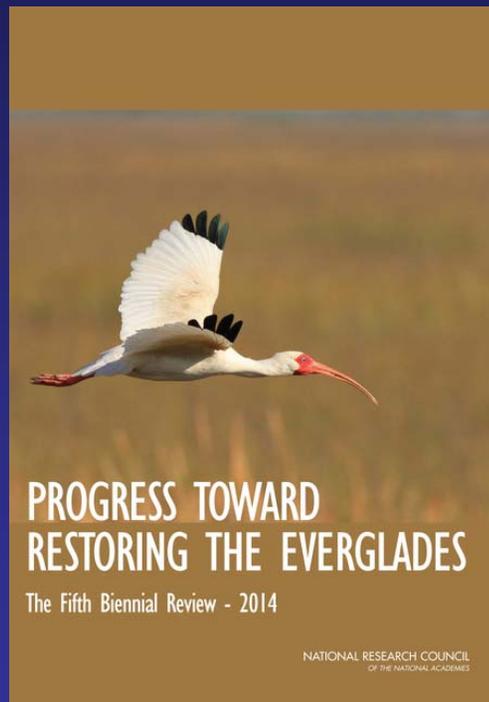
- Aquifer Storage and Recovery (2001)
- Regional Issues in ASR (2002)
- Florida Bay Research Programs (2002)
- Adaptive Monitoring and Assessment (2003)
- Does Flow Influence Everglades Landscape? (2003)
- Re-Engineering Water Storage (2005)

- Assessment of the CESI science program (2003)

- Progress Toward Restoring the Everglades: The First Biennial Review, 2006 (*Incremental adaptive restoration*)
- The Second Biennial Review, 2008 (*Lake O., Mod Waters*)
- The Third Biennial Review, 2010 (*Water quality and quantity*)
- The Fourth Biennial Review, 2012 (*Ecosystem trajectories*)
- The Fifth Biennial Review, 2014 (*Climate change, invasive sp.*)



2014 Biennial Report Focal Areas



- Review of Restoration Progress
- Central Everglades Planning Project
- Climate Change, Sea Level Rise, and Implications for Restoration
- Invasive Species
- Science and Decision Making



Committee Members:

- **JEFFREY WALTERS**, *Chair*, Virginia Tech
- **MARY JANE ANGELO**, University of Florida
- **DAVID ASHLEY**, University of Nevada, Las Vegas
- **LORETTA BATTAGLIA**, Southern Illinois University, Carbondale
- **WILLIAM BOGGESS**, Oregon State University
- **CHARLES DRISCOLL**, Syracuse University
- **PAUL H. GLASER**, University of Minnesota
- **WILLIAM GRAF**, University of South Carolina
- **STEPHEN MONISMITH**, Stanford University
- **DAVID MOREAU**, University of North Carolina, Chapel Hill
- **RAMESH REDDY**, University of Florida
- **HELEN REGAN**, University of California, Riverside
- **JAMES SAIERS**, Yale University
- **DANIEL SIMBERLOFF**, University of Tennessee, Knoxville

5 meetings (3 in FL, 1 in DC)

Restoration Progress

During the past two years, lack of authorizations has impeded restoration Progress

Six CERP projects now under construction:

- Three 1st generation projects (Picayune Strand*, Site 1*, IRL-S); WRDA 2007.
- Two 2nd generation (C-111 SC, Biscayne Bay Coastal Wetlands); WRRDA 2014.
- One 3rd generation (Loxahatchee River)

One CERP project completed (Melaleuca)

WRRDA 2014 authorizes 4 new projects

* Facing 902 limits, require reauthorization.



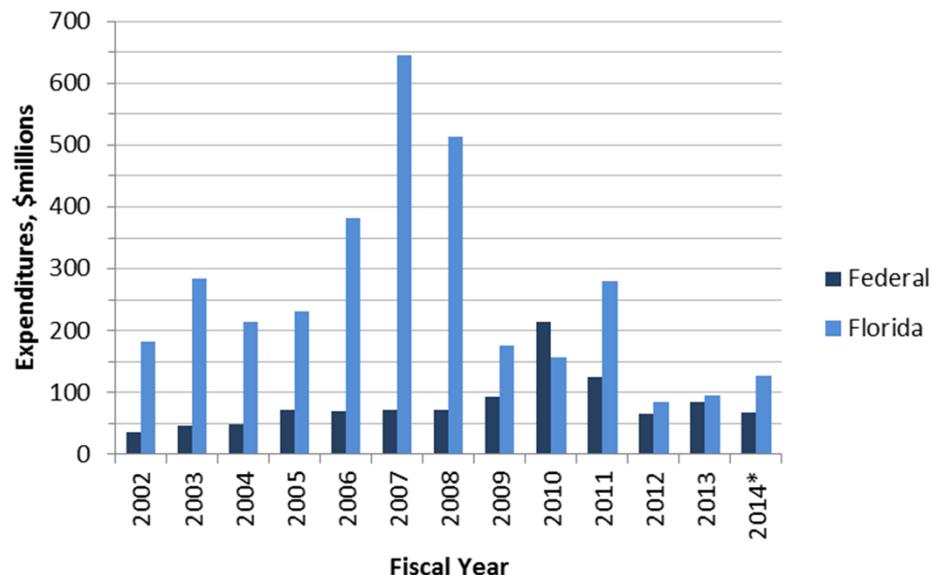
Funding Issues

Cost-sharing challenges have impeded progress

- Although Florida has outspent the federal government, credits for authorized projects only
- State CERP spending has declined over past 5 years, narrowing the cost-sharing balance
- In past 2 years, federal spending declined to maintain 50-50 cost-share balance

WRRDA 2014 provides a near-term solution.

- Could allow ~\$400 million in additional state cost-sharing credits



Restoration Progress

CERP restoration progress remains modest

- Ecosystem responses small in scale
- Largest restoration benefits evident from non-CERP projects

Non-CERP: Bureaucratic/policy issues have hindered restoration progress (Kissimmee, C-111SD)

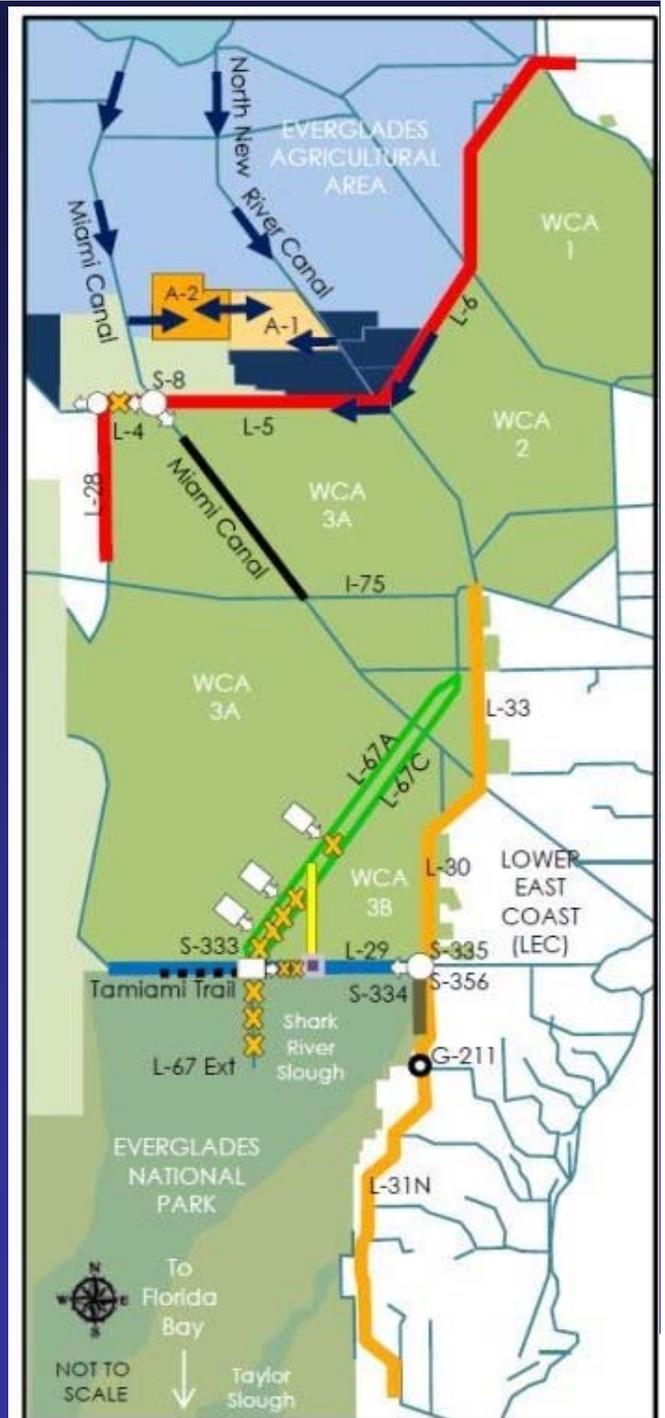
- Large potential restoration benefits



Central Everglades Planning Project (CEPP)

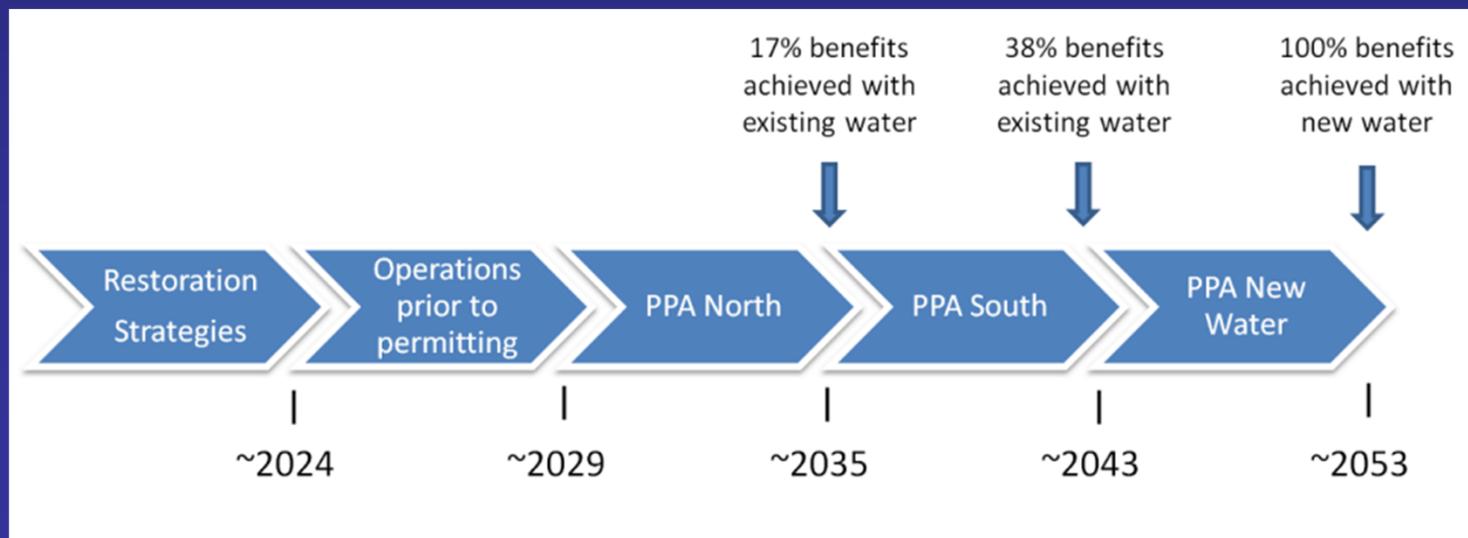
Impressive planning achievement under challenging time constraints

- Plan seems reasonable, thoughtfully developed
- Sizeable benefits to avert ecosystem degradation in central Everglades
- Extensive stakeholder engagement, model for future projects



Central Everglades (CEPP)

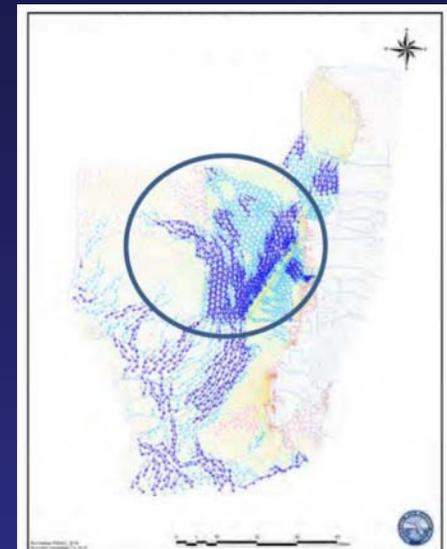
- Lack of WRRDA authorization disappointing, but impacts of delay likely to be small if dependent projects are advanced and CEPP is authorized in next few years.
- **Project funding and water quality permitting are the largest barriers to timely implementation**



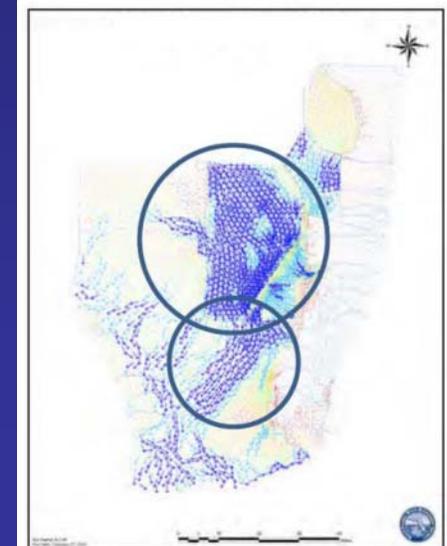
CEPP Implementation

To avert ongoing ecosystem declines, CEPP should be expedited despite hurdles

- Authorization and construction of project dependencies are near-term steps
- Creative implementation and water quality permitting strategies may be necessary
 - Move increments of treated water as feasible
 - Otherwise, could be 4 decades or longer until CEPP completed



EXISTING FLOW

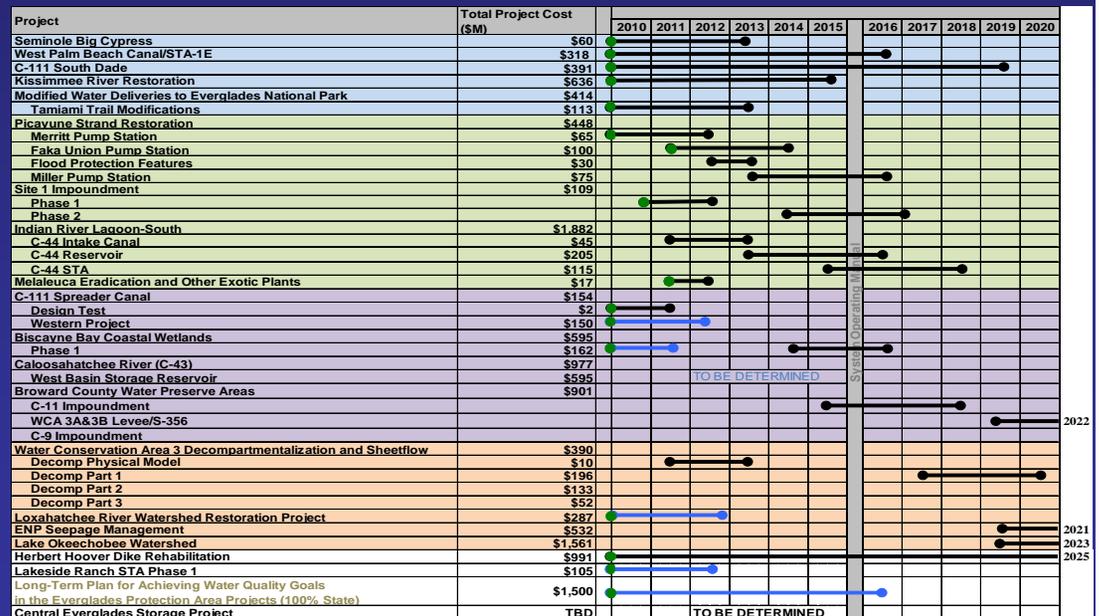


FUTURE WITH PROJECT FLOW

Scheduling

Integrated Delivery Schedule should be revisited with urgency to advance projects with greatest potential to avert ongoing degradation and promise the largest restoration benefits

- Difficult decisions, all projects cannot be advanced equally
- Climate change and sea level rise should be considered in project prioritization



- Projects are currently federal construction.
- Projects are currently non-federal construction, subject to change based on further authorization and funding.
- Construction has started on these projects.
- Foundation Projects
- Generation 1 Projects
- Generation 2 Projects
- Generation 3 Projects
- Other Projects

Scientific Foundation for Decision Making

- Useful, long-term systemwide monitoring requires stable funding
- A comprehensive reevaluation of restoration-related monitoring is needed
 - Assess adequacy considering budget, extended CERP implementation, and climate change/sea level rise
- Renewed attention to science coordination is warranted



Climate Change and Sea-Level Rise

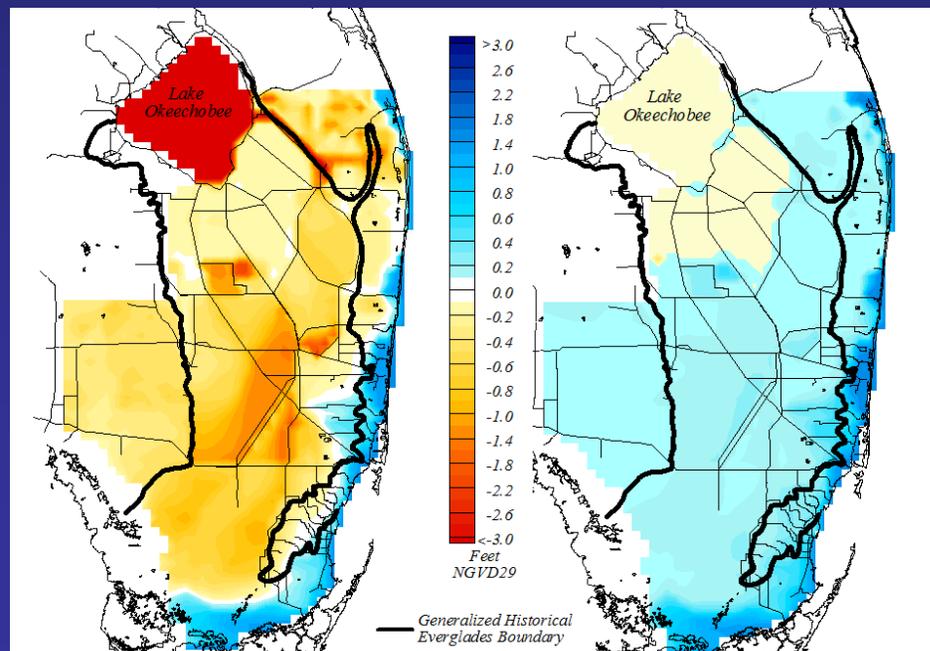
- Climate change provides a strong incentive for accelerating the CERP, because restoration:
 - increases freshwater availability;
 - increases water depths, which may enhance peat accretion and mitigate salt water intrusion; and
 - improves ecosystem resilience to future change.



Climate Change and Sea-Level Rise

Precipitation projections are uncertain, but changes in climate and sea level have important implications for CERP

- Increasing temperature, decreasing precipitation scenario is most challenging
- Impacts of sea level rise are already being felt



Climate Change and Sea-Level Rise

- Climate change is not adequately considered in CERP planning
 - Many climate change and sea-level rise risks, and related CERP benefits, are currently overlooked
 - CERP goals based on past 50 yrs, not future
- Where feasible, planners should design for flexibility
 - As projections improve, implications should be assessed and the CERP adjusted, in an adaptive management framework
- Sea-level rise and hydrologic change should contribute to system-wide planning and project prioritization

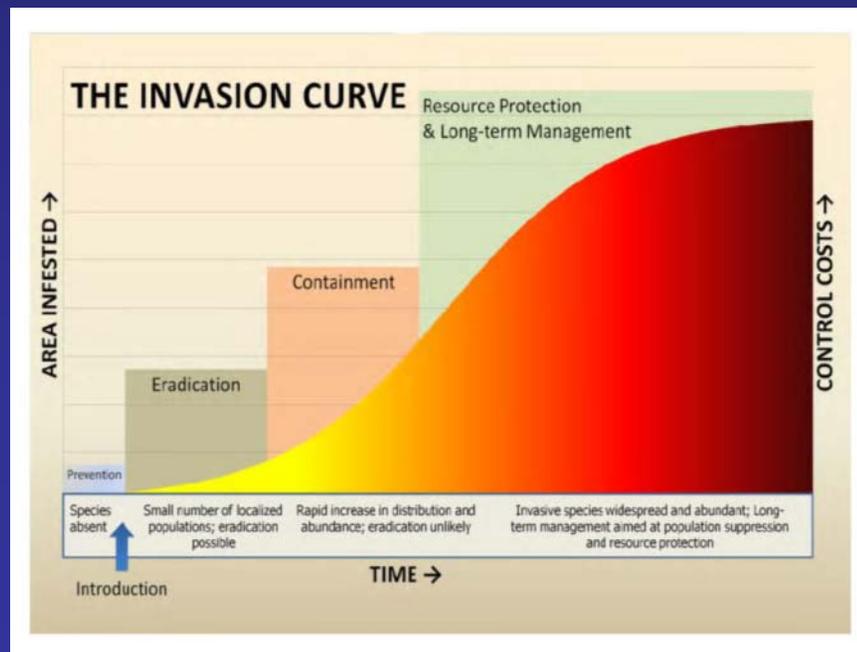
Invasive Species

- Excellent progress coordinating invasive species management at an operational level BUT lack of coordination at a strategic level
 - Efforts typically driven by single agency need; locally focused; funding insufficient
 - Effort underway by Task Force to improve strategic coordination
- No systemwide mechanism for prioritizing research or management of invasive species
 - Research lacking to support management decisions



Invasive Species

- Strategic, aggressive early detection and rapid response system needed
 - Current EDRR efforts insufficient for geographic range, threats
 - Costs of early detection need to be weighed against benefits of detection and early removal



Invasive Species

- Maintenance management and long-term control may be an appropriate goal if eradication proves impossible
- CERP planners should consider the implications of restoration activities for nonnative species
 - Recent CERP guidance and developing USACE policy should improve attention to these issues



Overall Summary

- Over past 2 years, exceptional central Everglades planning accomplishments, coupled with financial, procedural, and policy constraints that have impeded progress.
- Timely authorization, adequate funding, and creative policy and implementation strategies needed to expedite restoration of the central Everglades
- Climate change and invasive species add further challenges, and necessitate additional research. Sea level rise adds particular urgency to restoration efforts.

CISRERP VI

- Next biennial report due 2016.
- Next steps:
 - Renew 5-year contract
 - Appoint CISRERP VI members
- Suggestions for focal topics welcome

