NATIONAL ACADEMIES Sciences Engineering Medicine

Adaptive Management and Use of New Information in Decision Making

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

John Callaway, University of San Francisco

Acknowledgments

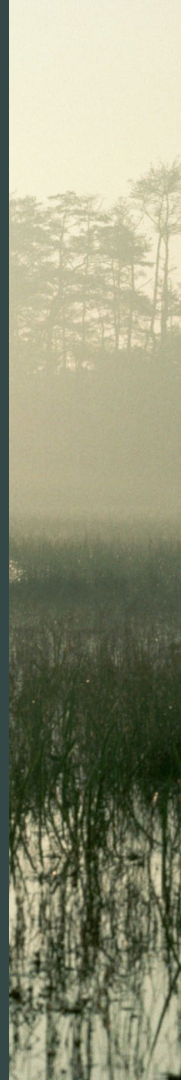
National Academies Staff

Stephanie Johnson
Noel Walters
Emily Bermudez
Sam Kraft

Entire CISRERP Committee

and especially:

Matt Harwell
Jeff Walters
Dave Wegner



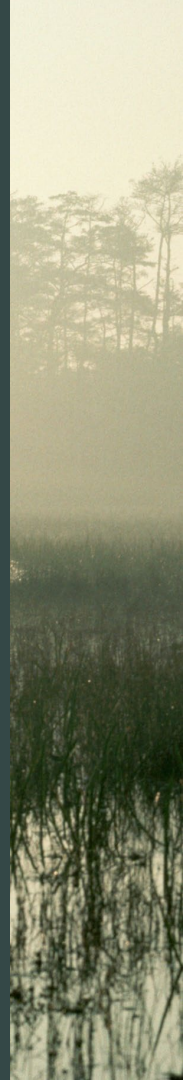
NATIONAL ACADEMIES *Sciences Engineering Medicine*

Adaptive Management

- Application of AM has been embraced in large restoration projects, including CERP
- AM implementation is an on-going challenge
- AM is of growing importance with increased uncertainty associated with climate change

Effective AM requires:

- Governance authority and policy-level support
- Clear and agreed-upon AM processes and objectives



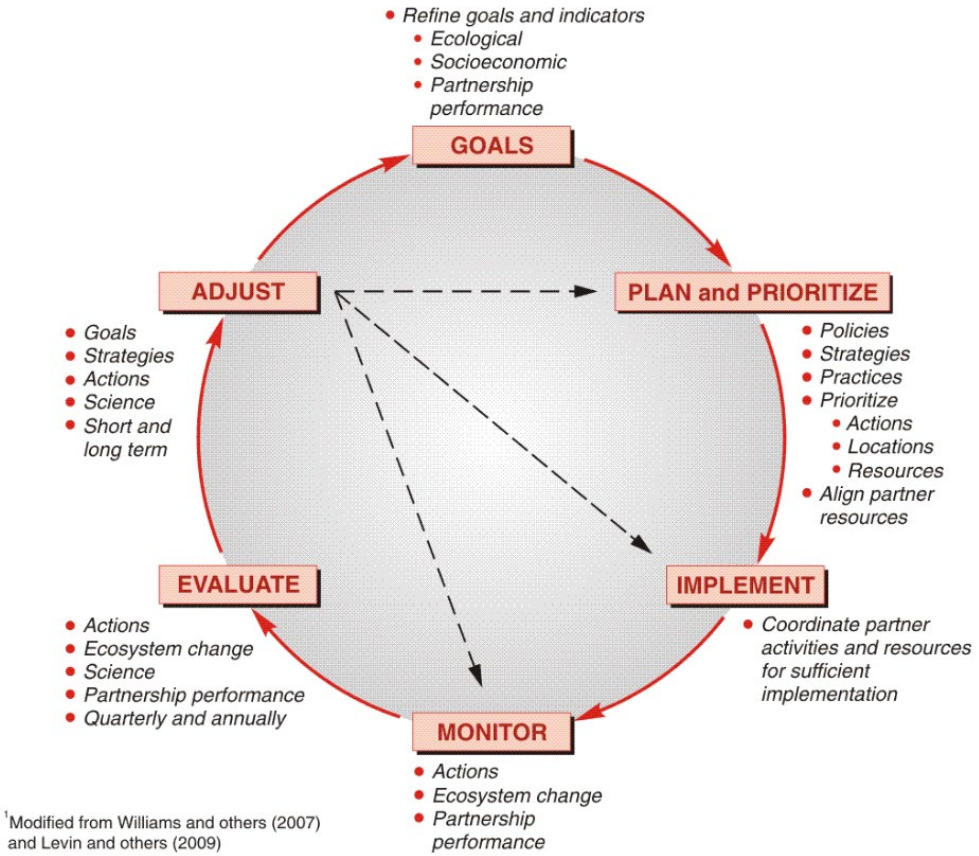
NATIONAL ACADEMIES Sciences Engineering Medicine

Adaptive Management

Considered broadly in our review:

- The formal AM process, plus
- Incorporation of new information in decision making

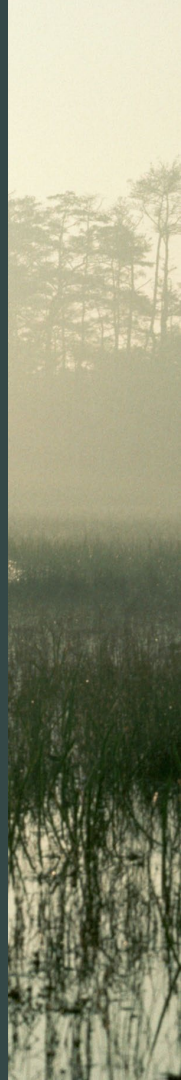
- Substantial AM guidance has been developed by RECOVER; this guidance incorporates key features of effective AM
- Major issue with CERP AM is not the development of plans, but how effectively plans can be implemented



[1]Modified from Williams and others (2007) and Levin and others (2009)

We evaluated the incorporation of new information at four stages

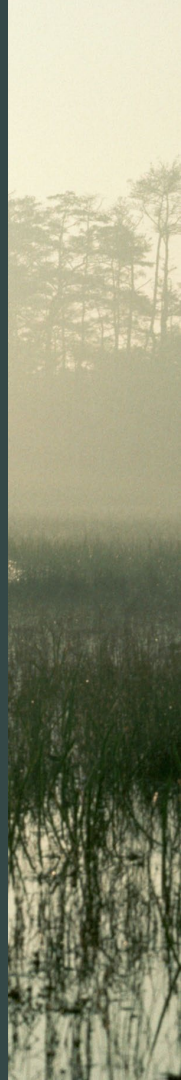
- Project-level adaptation during design and construction
- Project-level adaptive management after operations begin
- Operational adaptation at regional scales
- Program-level adaptive management



NATIONAL ACADEMIES Sciences Engineering Medicine

Project-level adaptation during design and construction

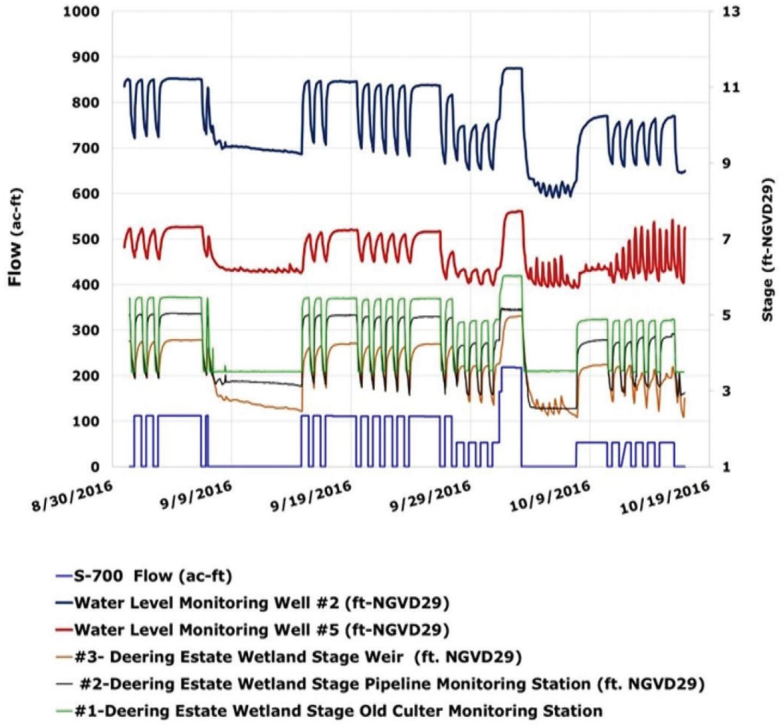
- Valuable project-level guidance has been developed for AM
- Effective modifications at Picayune Strand and CEPP North
- Leverage of endangered species has been important
- Process has been time-consuming and burdensome, and this limits the effective application of AM



NATIONAL ACADEMIES Sciences Engineering Medicine

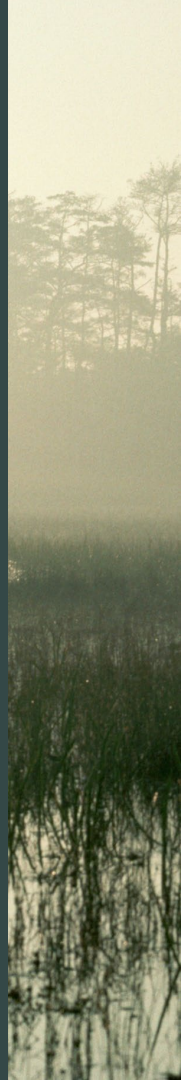
Project-level AM after operations begin

- We found only a few examples of post-operations AM
- Deering Estates Flow-way modifications: relatively simple but time consuming
- Real need to improve timeliness and approval process



Operational adaptation at regional scales

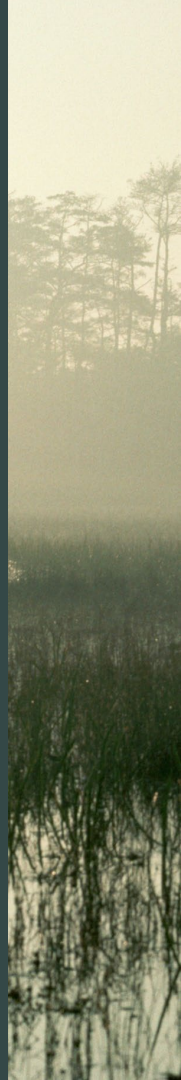
- Operational adaptation has been a strength of water management for restoration
- Regular and transparent communications between scientists and decision-makers are key
- Regional system operations manuals are valuable, in particular the use of conditions-based operations
- We recommend more widespread use of conditions-based operations, such as the Lake Okeechobee System Operating Manual



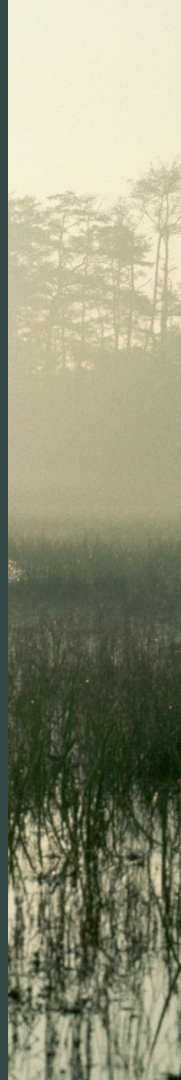
NATIONAL ACADEMIES Sciences Engineering Medicine

Program-level adaptive management

- Program-level AM has not been implemented in detail
- RECOVER identified “mission-critical” uncertainties in 2015, but these have not been evaluated systematically
- Second Periodic CERP Update is a valuable opportunity to address Program-level AM



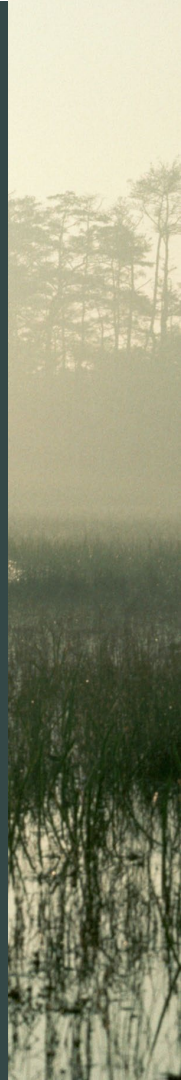
Adaptive Management Recommendations



NATIONAL ACADEMIES *Sciences Engineering Medicine*

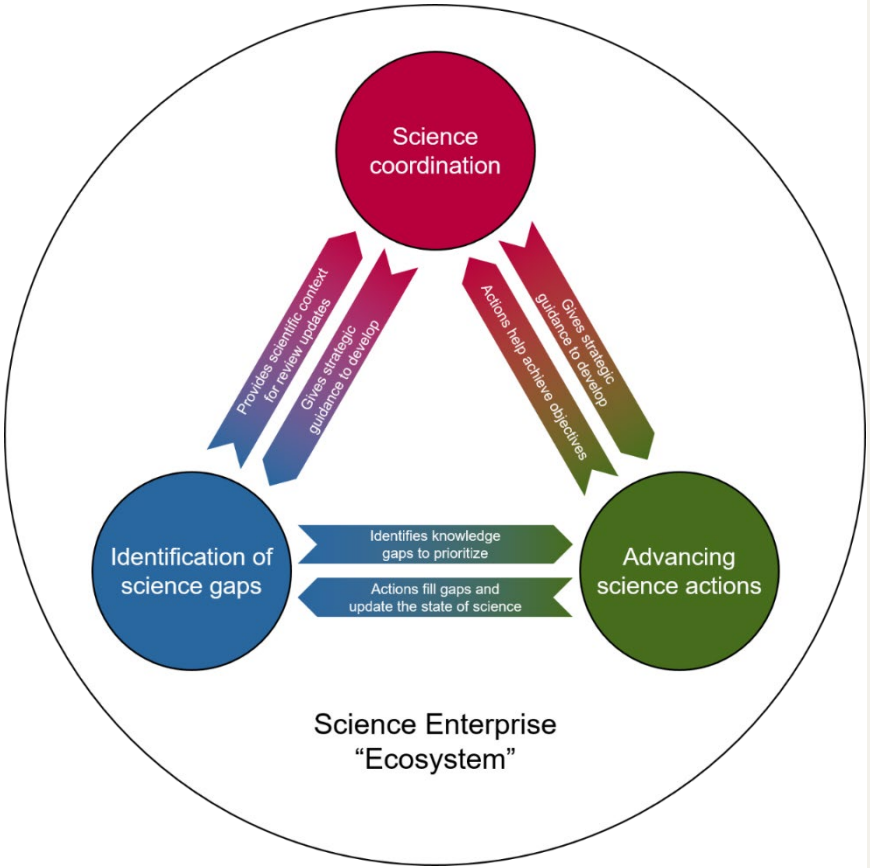
Prioritize building expertise and a culture of Adaptive Management

- Clear endorsement of AM from leadership
- Build expertise and bring in experienced AM practitioners from other restoration programs
- Establish an annual AM Workshop or other regular AM-focused meetings



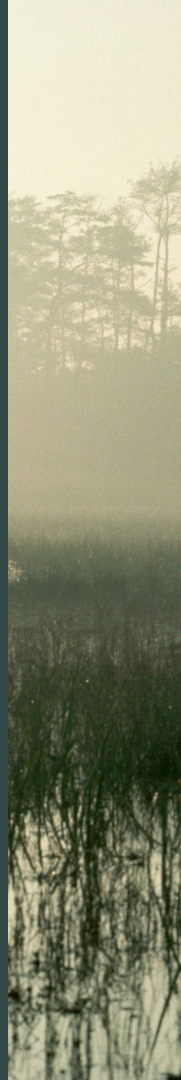
Develop a robust, integrated science enterprise

- Integrate monitoring, modeling, synthesis, and research
- Include ITEK
- Build adequate staffing of appropriately trained scientists
- Expanded project implementation requires expanded AM capacity
- CERP Science Plan would facilitate coordination and effective AM

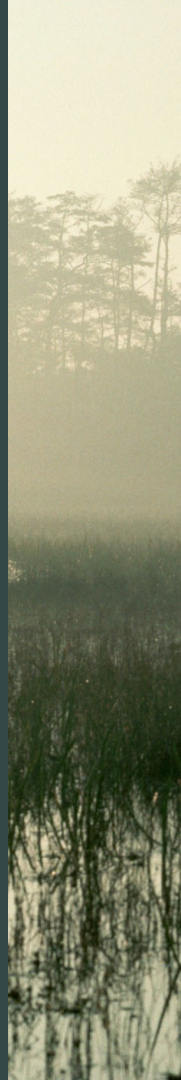


Improve communication of restoration performance

- AM must be timely and this requires data and knowledge sharing within and across projects
- CERP dashboard or a similar tool could effectively communicate the response of the system to restoration actions
- Communication efforts need to address multiple audiences, including both decision makers and the public



These efforts will require strong direction from USACE and SFWMD leadership that Adaptive Management is a CERP priority



NATIONAL ACADEMIES Sciences Engineering Medicine

USACE processes

USACE headquarters should review processes for incorporating new information

- Ensure timely use of new information
- Determine whether efforts to gain approval for modifications is appropriate for the level of risk

Such an effort would benefit not only CERP but all USACE restoration projects