Towards a National Evaluation of Compensatory Mitigation Sites

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Today's Presentation

Part 1: A Proposed Study Methodology

Eric Stein

Part 2: Results of Pilot Studies

Siobhan Fennessy

Study Authors

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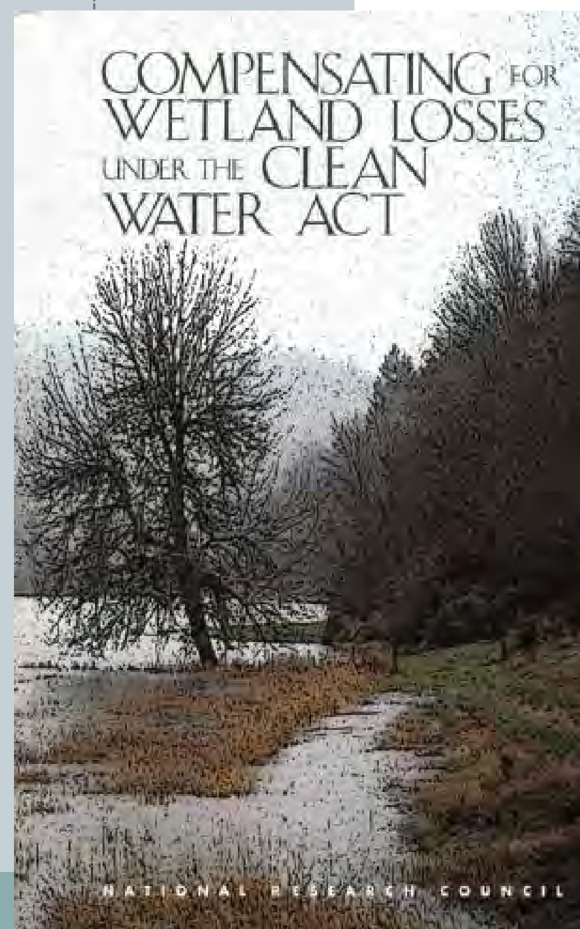
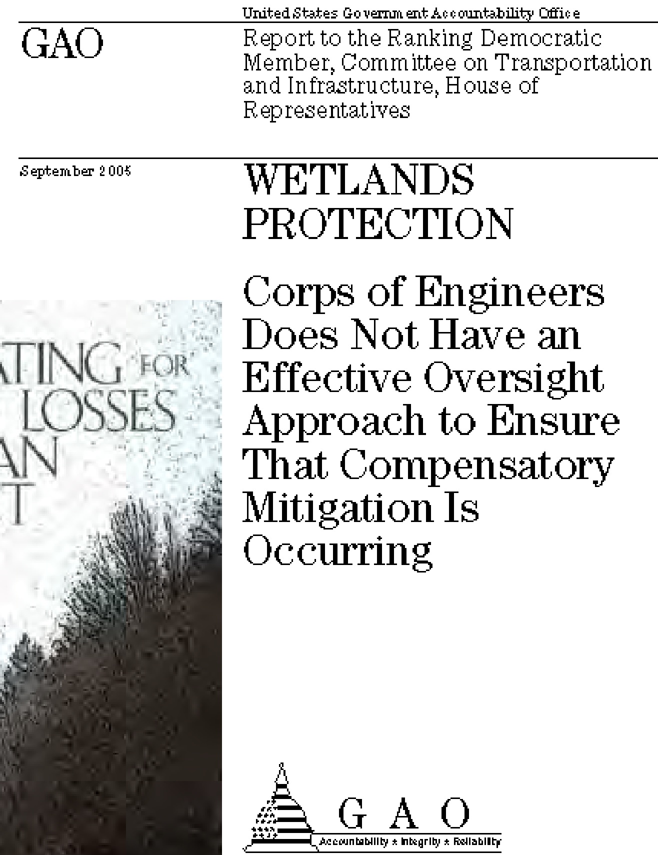
Past Mitigation Success

- 20,000 acres permitted annually
- 40,000 acres of mitigation required
- Well documented lack of success due to a variety of factors
  - Non-compliance
  - Non-performance




United States Government Accountability Office

GAO

Report to the Ranking Democratic Member, Committee on Transportation and Infrastructure, House of Representatives

September 2005

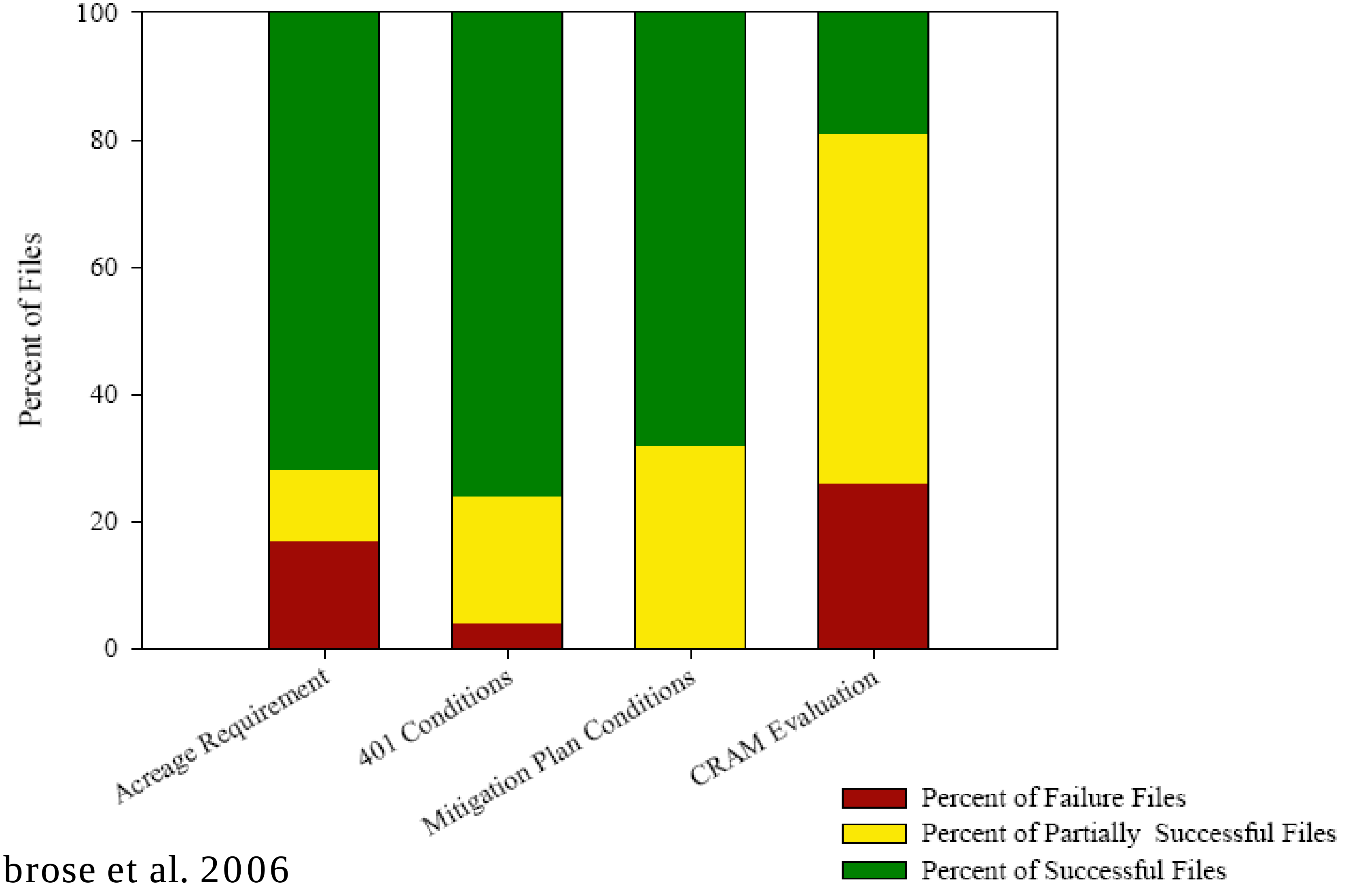
WETLANDS PROTECTION

Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring

GAO

Accountability * Integrity * Reliability

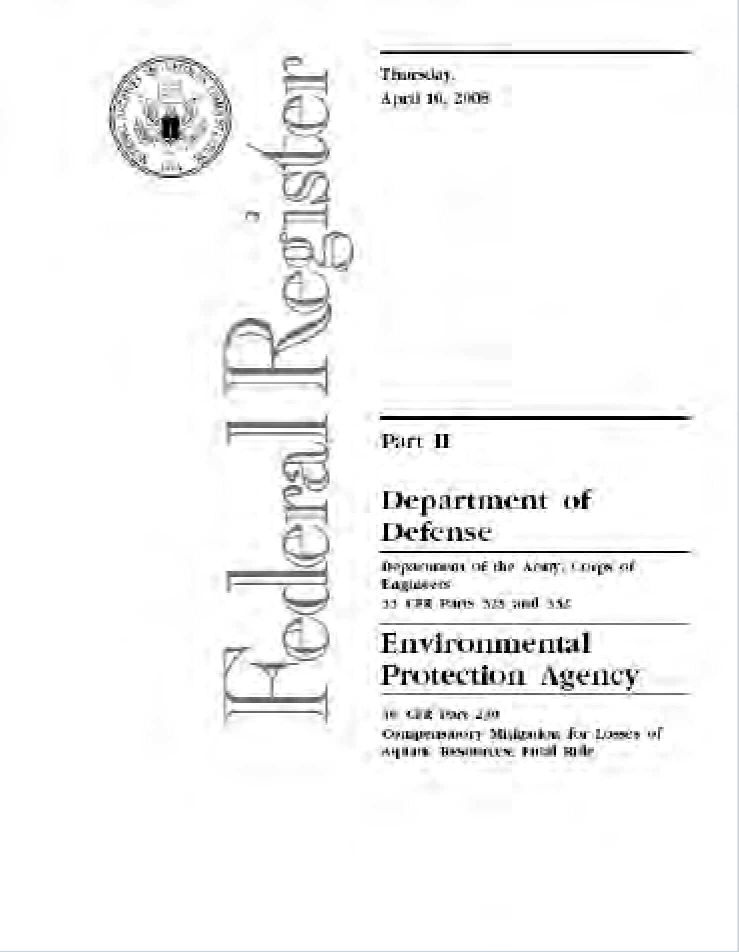
Successful Mitigation??



Ambrose et al. 2006

Corps-EPA Mitigation Rule

- Improve sustainability
- More effective performance standards/monitoring
- Watershed approach
- More emphasis on 3rd party mitigation
  - Mitigation banks
  - In-lieu fee programs


Federal Register

Thursday,
April 10, 2008

Part II

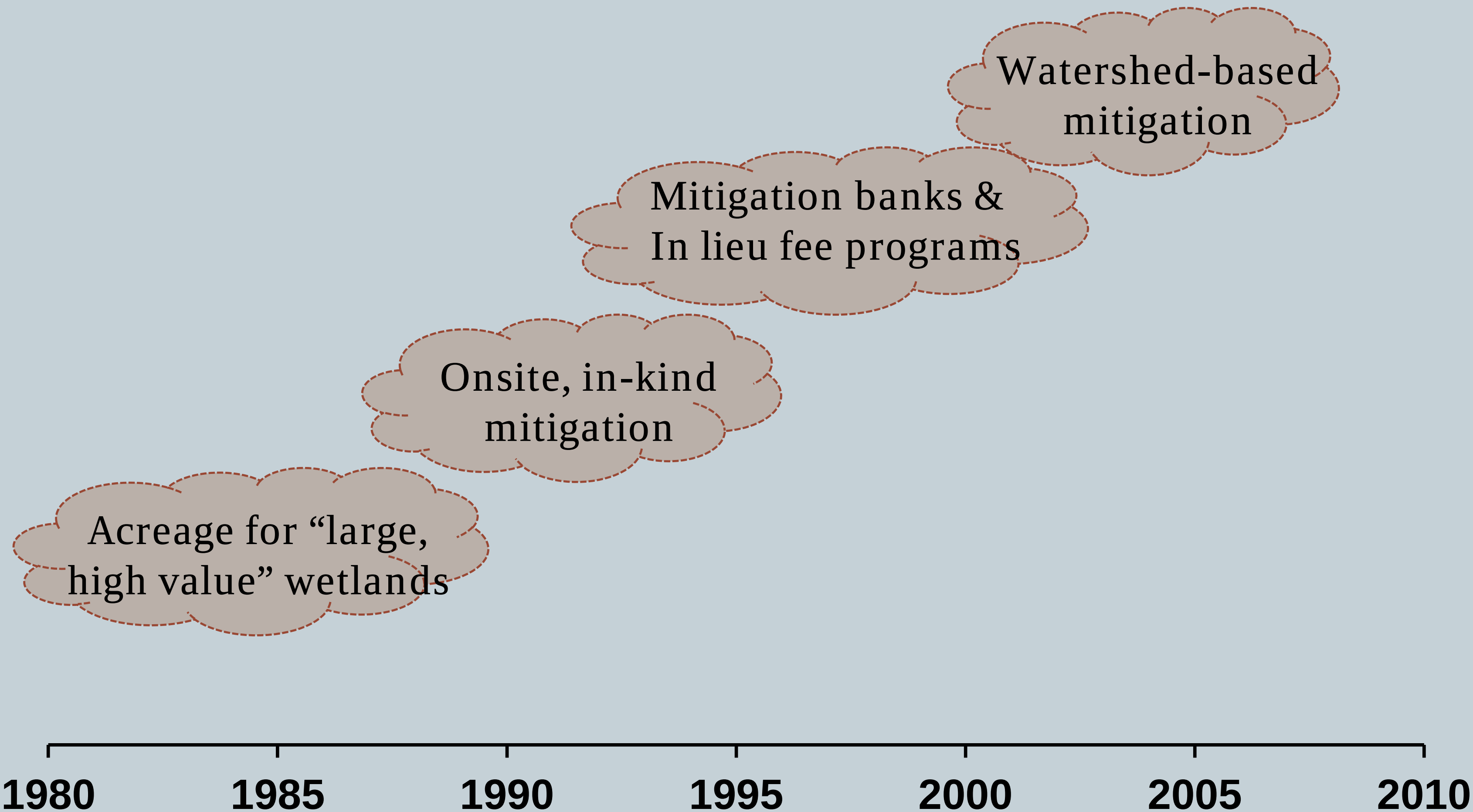
Department of Defense

Department of the Army, Corps of Engineers
33 CFR Parts 325 and 332

Environmental Protection Agency

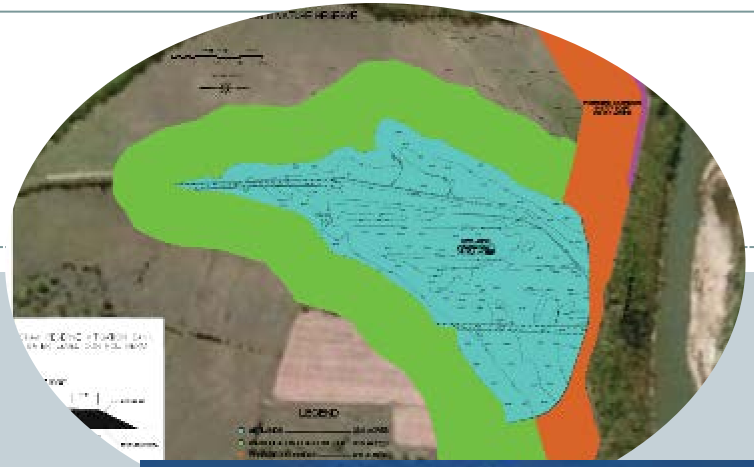
40 CFR Part 230
Compensatory Mitigation for Losses of Aquatic Resources; Final Rule

Mitigation History



Types of Mitigation

- Permittee-responsible (PRM)
  - Typically occurs after impacts
  - Often small, isolated sites
- Mitigation banks (MB)
  - Initiated in advance of impacts
  - Larger more integrated sites
- In-lieu fee mitigation (ILF)
  - Initiated after impacts
  - Often involve larger, ongoing restoration efforts



Preferred Hierarchy

Mitigation Banks (MB)

In-lieu fee (ILF)

Permittee responsible mitigation (PRM)

Mitigation rule encourages use of MB and ILF

- Between 2010 and 2014, for projects requiring mitigation, 41% used mitigation bank credits, 11% used in-lieu fee program credits, 37% did on-site permittee-responsible mitigation, and 11% conducted off-site permittee-responsible mitigation

Past studies of mitigation success focus mainly on PRM

Study Goals

- Compare performance of three types of compensatory mitigation – PRM, ILF, MB
  - Area
  - Condition
- Develop protocol for ongoing assessment

Questions

- Is condition in mitigated sites different than least-disturbed reference condition?
- How does the condition of mitigated sites compare to the current ambient population of wetlands?
- Does the condition of mitigated sites differ as a function of the three mitigation *mechanisms* (PRM, MB, ILF)?
- Does the condition of mitigated sites differ as a function of the four mitigation *methods* (restoration, establishment, enhancement, preservation)?

Two-phased Approach

- Pilot study
  - Data rich area
  - 50 sites per mitigation type
  - 150 total sites

- National study
  - Leverage national condition assessment
  - 400 sites per mitigation type
  - 1,200 total sites

Leveraging the National Condition Assessments

- Utilize the network of reference sites being developed for the NWCA
- Capitalize on the efforts of the NWCA to develop sampling, logistics and data analysis protocols
- Build on the efforts of the NWCA to develop capacity in state and tribal wetland programs
- Interpret the results of the mitigation study relative to overall wetland condition
  - This will provide context for interpreting this results of a study

General Design

- Evaluate condition of mitigation sites only
  - Assume impacts occurred as permitted
- Probabilistic selection of mitigation sites
  - Stratify by mitigation type
- File review
- Reconnaissance
- Field assessment

Condition Assessment

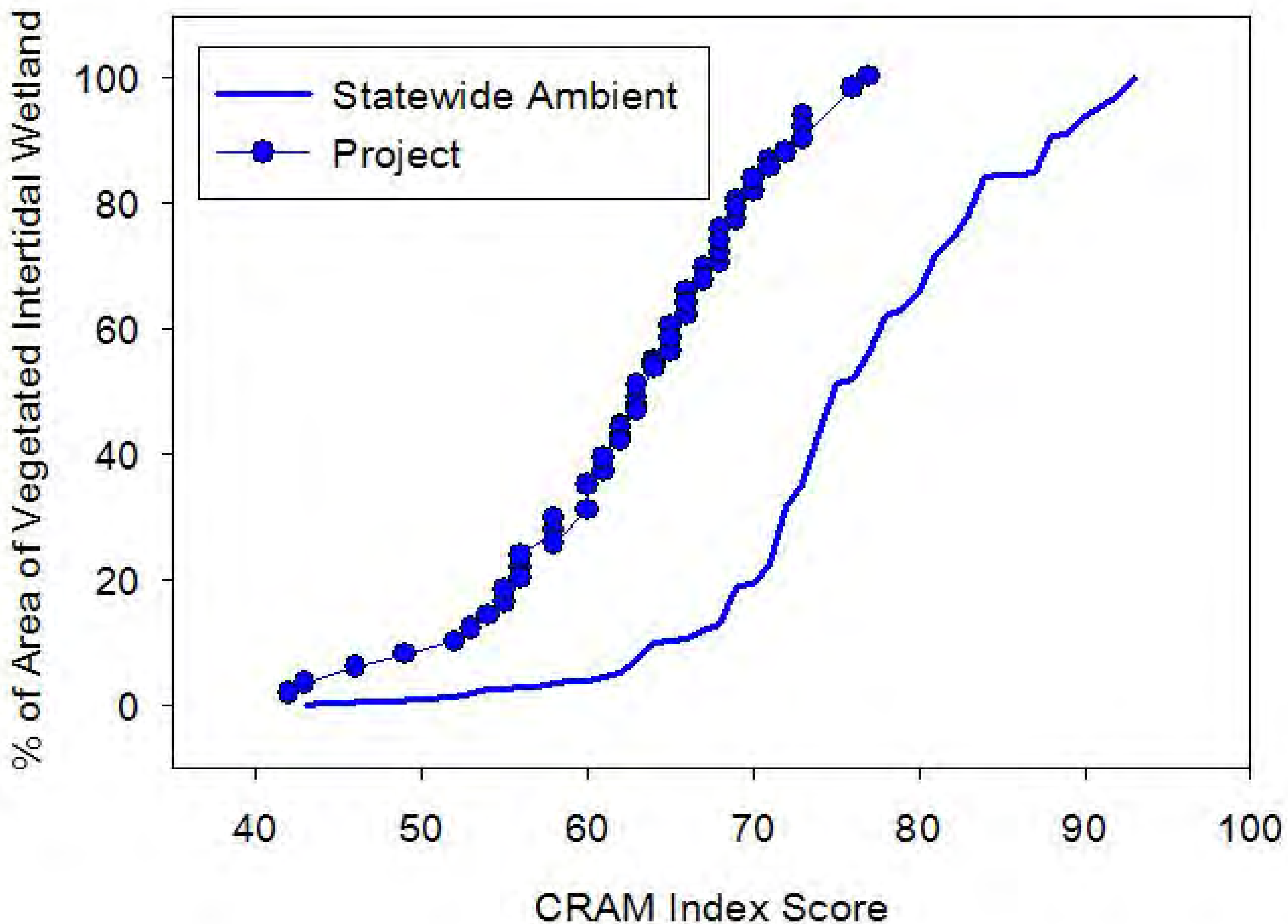
- Ideal evaluation of no net loss would use
  - Pre vs. post
  - Impact vs. mitigation

Impact site	Pre-project	Post-project
Mitigation site	Pre-mitigation	Post-mitigation

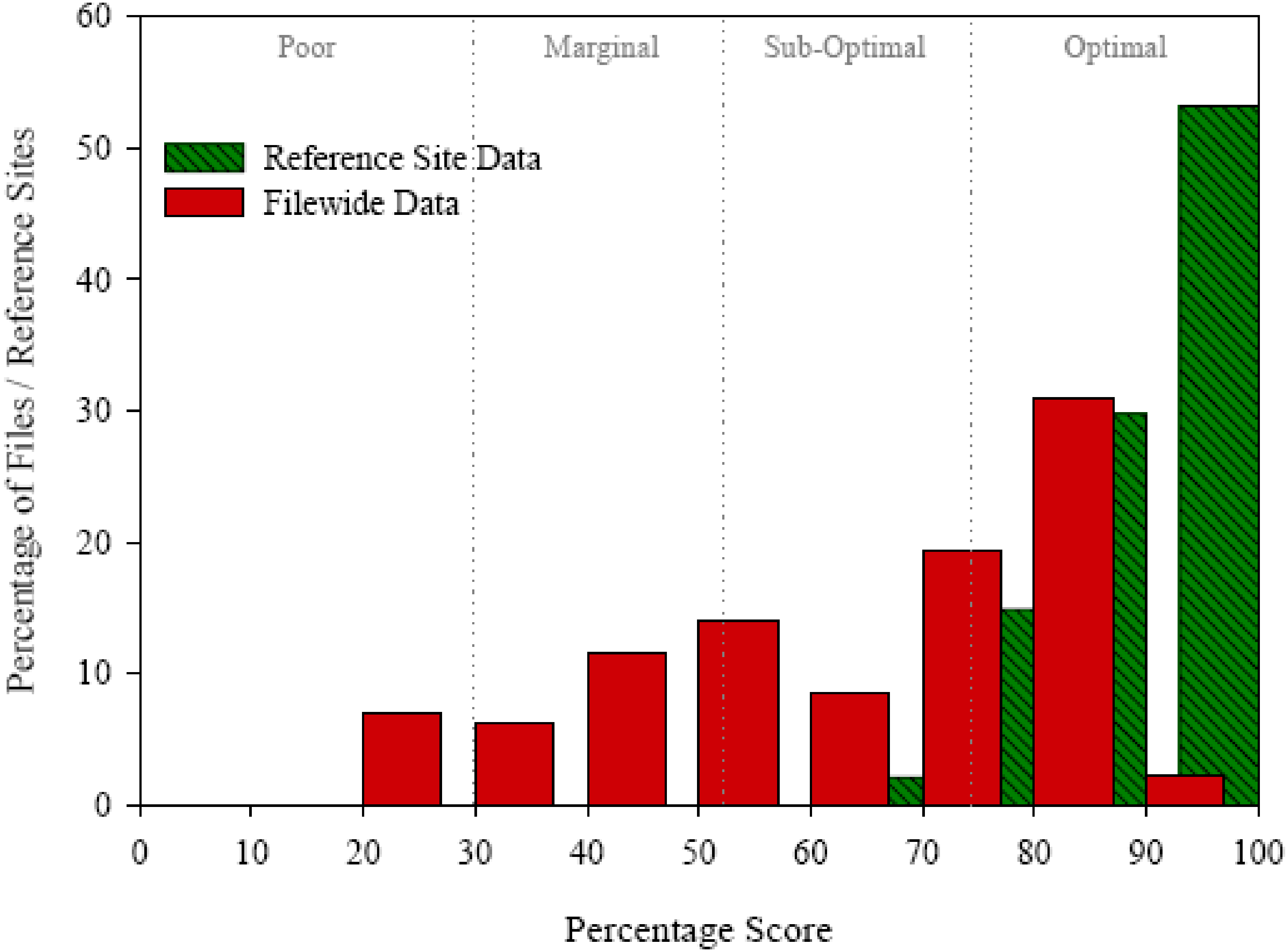
- Data is not available to support this assessment

- Compare to:
  - Ambient
  - Reference

Comparison to Ambient Condition



Comparison to Reference

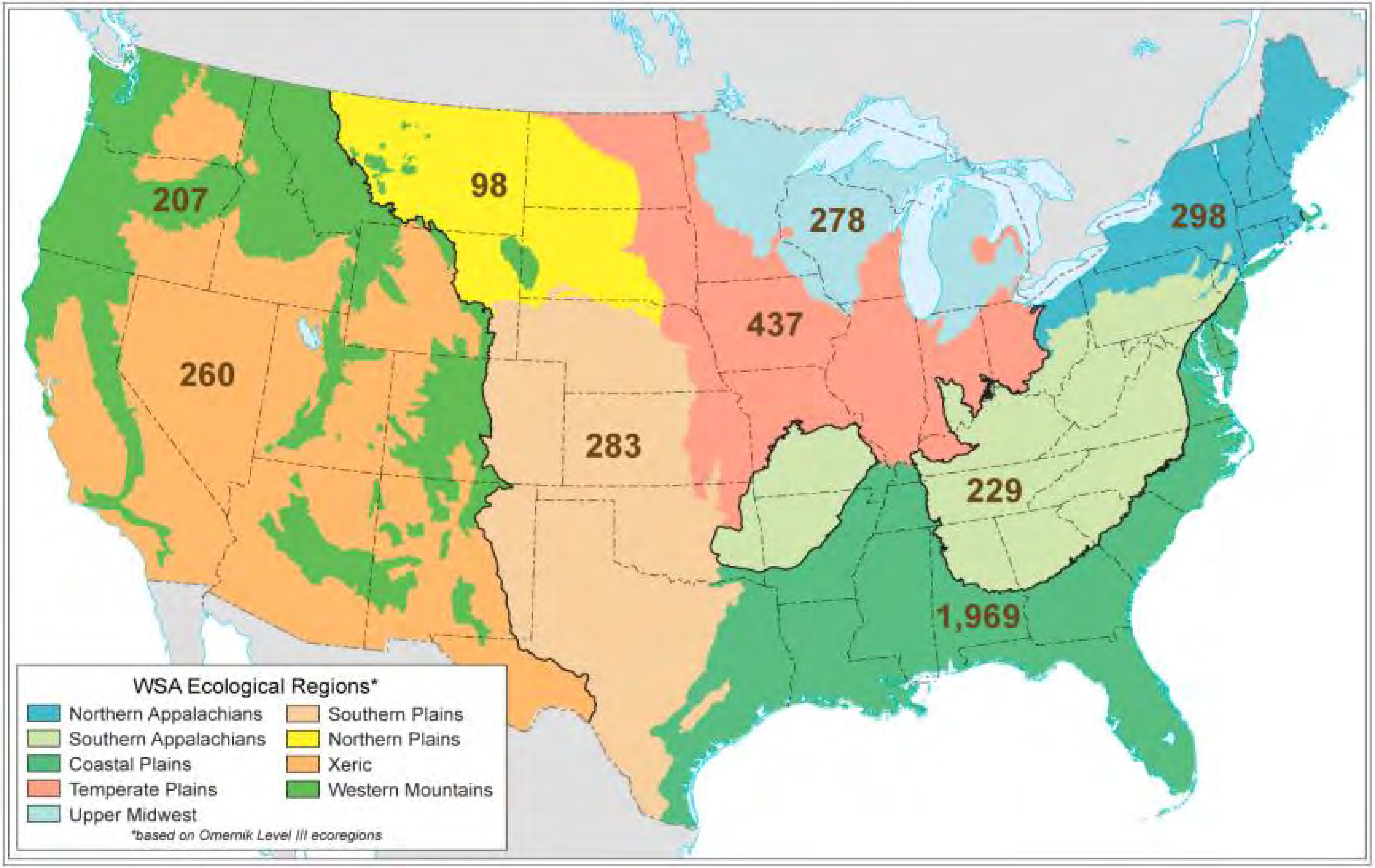


Ambrose et al. 2006

Site Selection (target population)

- Permitted after 2002
- Monitoring period complete
- Corps district has determined that project has met permit requirements
- Ambient and Reference sites from NWCA by State and aggregated ecoregion

Number NWI S&T Plots by Ecoregion



From USEPA

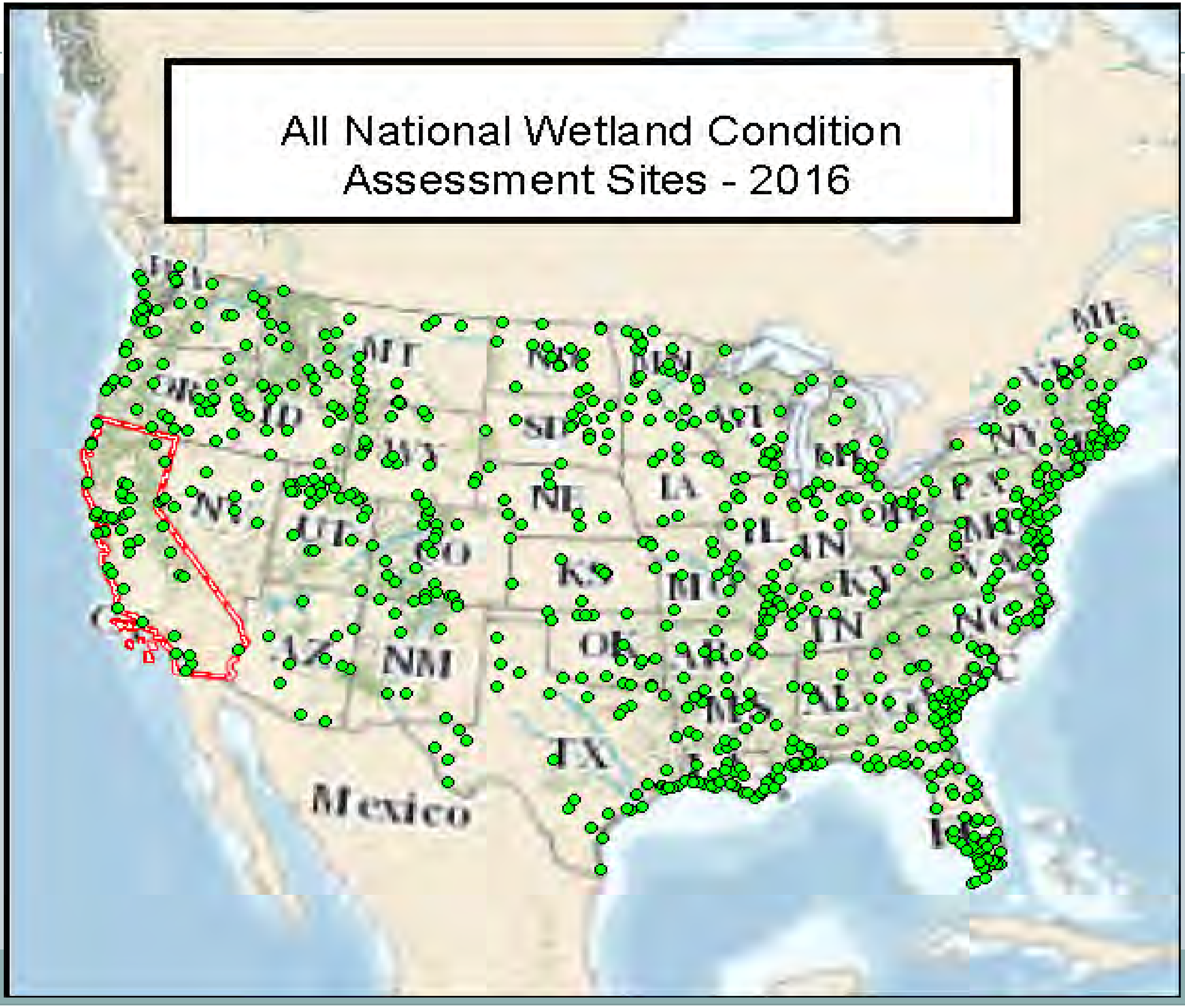
Where along the continuum do mitigation wetlands fall?

Least
Impacted/ Reference

Most
disturbed

Range of Natural Wetland Condition

Opportunities Through NWCA

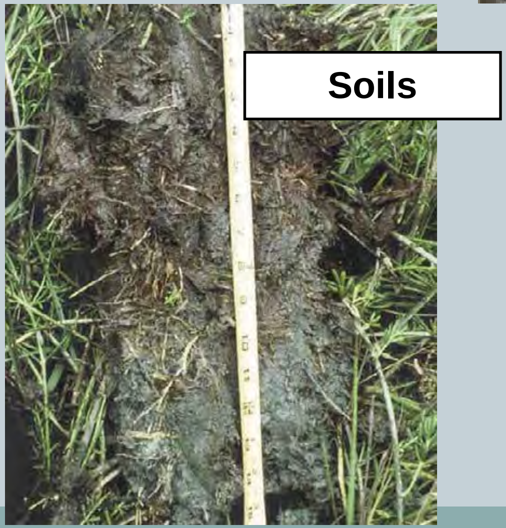


File Review

- Location information
- Aerial photographs
- Mitigation plan and performance standards
- Information on what was done on the site

Assessment Indicators

- Jurisdictional Area
- Hydrology
- Soils
- Vegetation



(Photos from Kentula, 2008)

Hydrology

- Water source
- Water depth
- Areal extent of surface water
- Hydrologic alterations or stressors

Soils

4 soil pits

- Thickness, color, texture
- Bulk density of clod
- Cation exchange capacity, base cation (Ca, Mg. K, Na), electrical conductivity
- Total organic C, total N, S, P, extractable P

Vegetation

100 m^2 plot

- NWI class
- Cover (by stratum, life form and species)
- Number of species
- Wetland indicator status
- Number of stems (trees)
- Height (by life form, species)
- Data integrated into vegetation based mmi

Expected Products

1. Produce a national report that describes the ecological condition of the nation's mitigation wetlands, comparing MB, ILF, and PR to reference and ambient wetland condition

2. Help States and Tribes implement wetland monitoring and assessment in (401/404) mitigation programs

3. Advance the science of wetlands monitoring and assessment through study design and data collection protocols.

Thank You

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Stein Recommendations

Cause of Failure	Recommendation	Selected Measures
Poor site selection and design	Incorporate landscape ecology and historical ecology understanding into design	Analyze historical distributions of wetlands at the watershed scale. Create templates for watershed-scale restoration based on this understanding. Mitigation projects must select and design sites consistent with the overall watershed plan
Failure to investigate and understand hydrology to a sufficient level to inform restoration design	Conduct analysis of historic, current, and model anticipated future hydrologic conditions prior to design.	Several seasons of surface and subsurface hydrologic monitoring should occur at the proposed site AND an appropriate reference site, prior to restoration design. Modelling should demonstrate ability to maintain hydrology under expected future conditions. Include adaptive hydrologic monitoring to correct errors and unanticipated events early in the restoration process.
Inadequate or poorly conceived monitoring	Monitor broad suite of structure and functional indicators at project and reference site using a BACI design	Standardized monitoring procedures, indicators/indices, and data templates should be used. Pre-restoration monitoring at the project and reference site should occur for several years before design in approved. Post-restoration adaptive monitoring should occur for a minimum of 20 years. Permittees could pay into regional monitoring entities for this
Lack of data sharing and dissemination to allow lessons to be shared	Create and enforce standard data templates, web services, and apis to facilitate information sharing	Regional data exchange networks would allow better sharing of lessons learned and would provide broader access to data from past sites that could be used to improve the science of wetland restoration.