

CEAP-Wetlands

The High Plains Regional Assessment

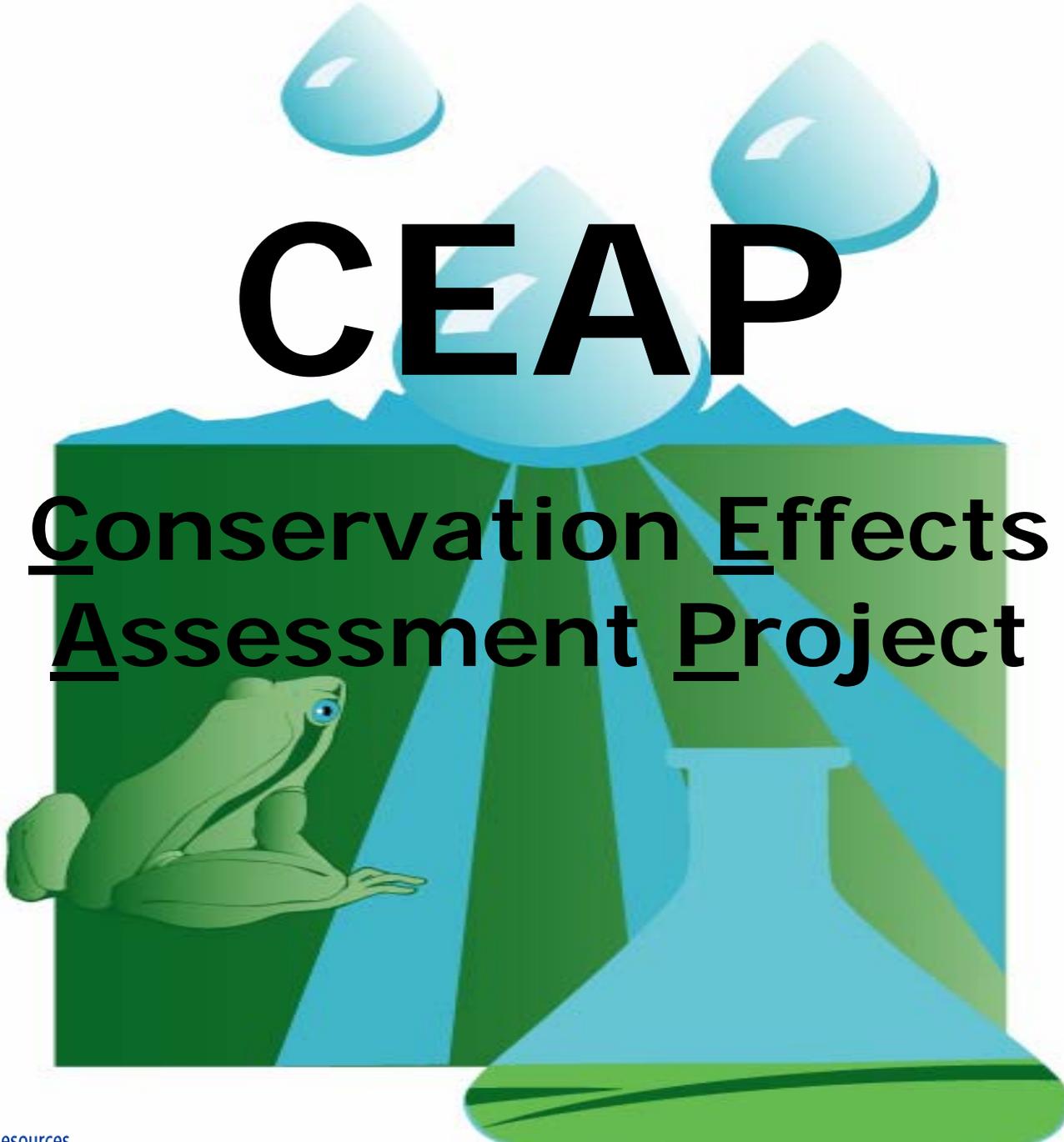
Scoping Meeting

June 6 - 7, 2006
Texas Tech University
Lubbock, TX



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USDA, NRCS





CEAP

Conservation Effects
Assessment Project

CEAP DESCRIPTION

Purpose

- ❖ Quantify environmental **effects** of conservation practices and resource management systems used by private landowners participating in selected U.S. Department of Agriculture (USDA) conservation programs

Scope

- ❖ Water Quality and Quantity
- ❖ Soil Quality
- ❖ Wildlife Habitat
- ❖ Wetland Ecosystem Services

Components

- ❖ Bibliographies/Literature Reviews
- ❖ National Assessment
- ❖ Watershed Assessments

CEAP Drivers

- **OMB**

- ❖ PART requests for outcome reporting

- **2002 Farm Bill**

- ❖ Increased demand for accountability reporting in Conference Report

- ❖ Increasingly, government and non-government entities identify needed improvement in accountability with increases in conservation funding

- **NRCS Strategic Planning**

- ❖ New performance reporting system that includes effects of conservation practices by program

National Assessment

- **Cropland**

- ❖ Sampling and modeling approach to estimate field-level and off-site effects

- **Wildlife**

- ❖ Cooperative effort with wildlife conservation community

- **Wetlands**

- ❖ Collaborative regional assessments to quantify ecosystem services for wetlands on agricultural landscapes and develop functional condition indicator models

- **Grazing Lands**

- ❖ Just initiated – literature synthesis underway

Watershed Assessments

- **12 Agricultural Research Service (ARS) Benchmark Watersheds**
- **9 Special Emphasis Watersheds (NRCS)**
 - ❖ Livestock manure and nutrient issues
 - ❖ Irrigated cropland and water conservation
 - ❖ Drainage management
- **8 Competitive Grants Watersheds (Cooperative State Research, Education and Extension Service)**
 - ❖ Involves university researchers in CEAP
 - ❖ 3-year projects
 - ❖ All projects have socio-economic and outreach components

What Do We Know?

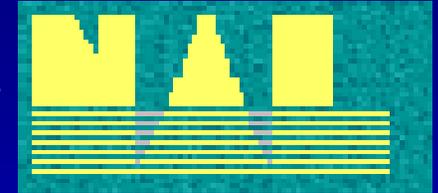
- **Bibliographies**

- ❖ General Bibliography — 4 volumes

- ❖ Dynamic Bibliography

- Automatic search, current literature

- ❖ Wetlands Bibliography — September 2006



- **Literature Reviews**

- ❖ Cropland Literature Review -- April 2006

- ❖ Wildlife Literature Reviews

- Program-based -- on-line

- Practice-based -- Spring 2006

- ❖ Wetlands Literature Review - Winter 2007/2008

For More Information

CEAP Website

<http://www.nrcs.usda.gov/technical/nri/ceap/>

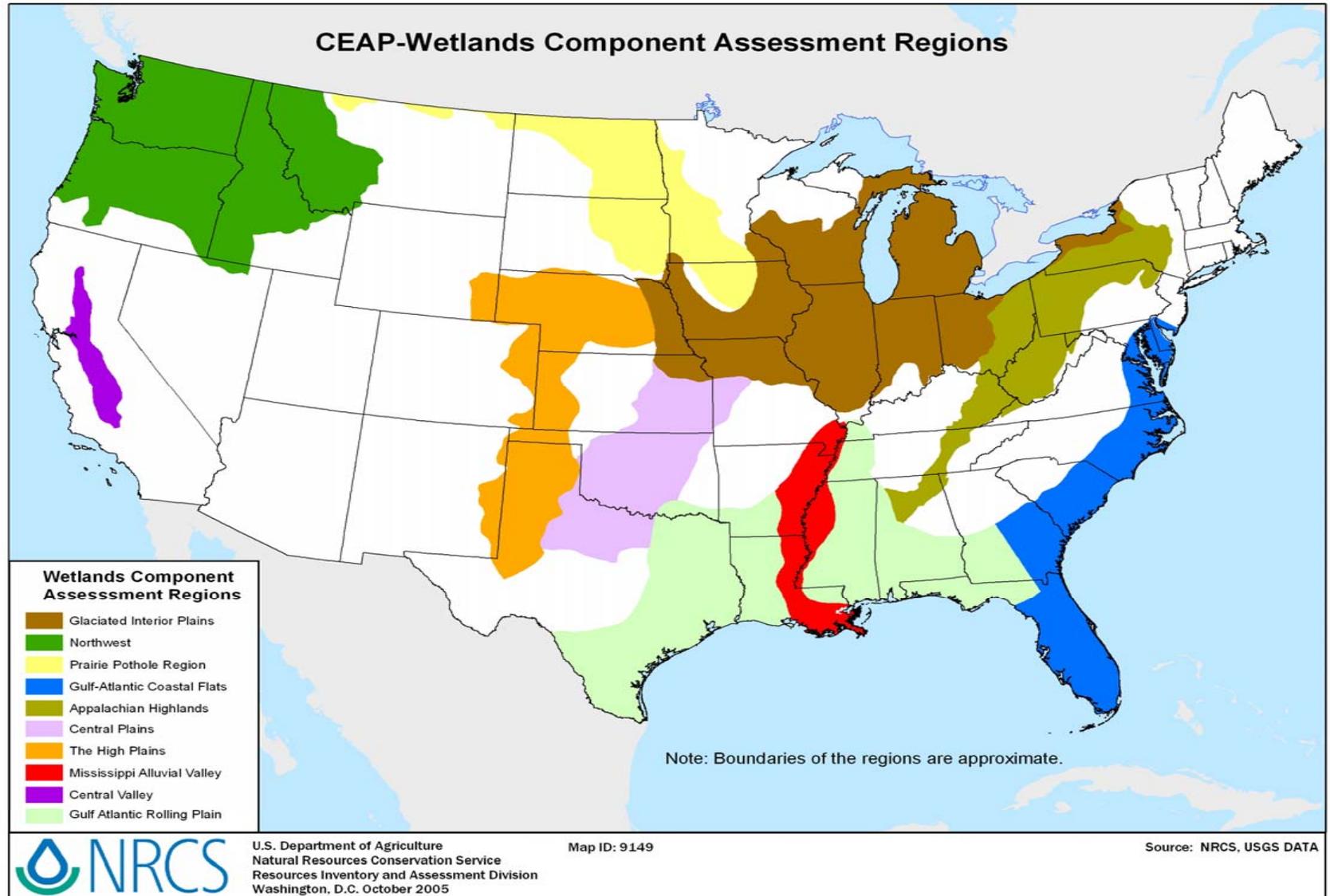
CEAP Workshop

- Managing Agricultural Landscapes for Environmental Quality
- October 11-13, 2006, Kansas City, MO
- http://www.swcs.org/en/swcs_international_conferences/managing_agricultural_landscapes/

The Conservation Effects Assessment Project (CEAP) National Assessment: Wetlands Component



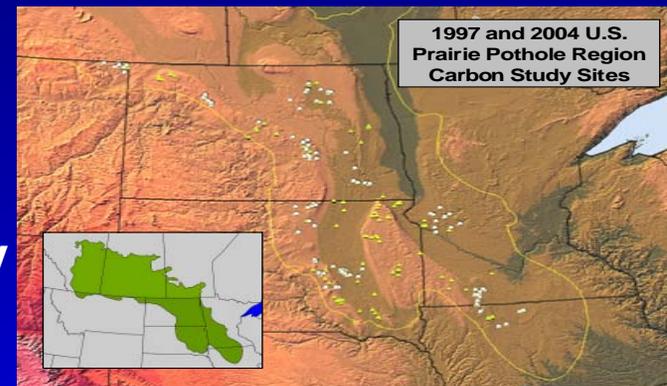
CEAP-Wetlands Regional Assessment Locations



CEAP-Wetlands Collaborators



Natural Resources Conservation Service



U. S. Geological Survey



Farm Service Agency

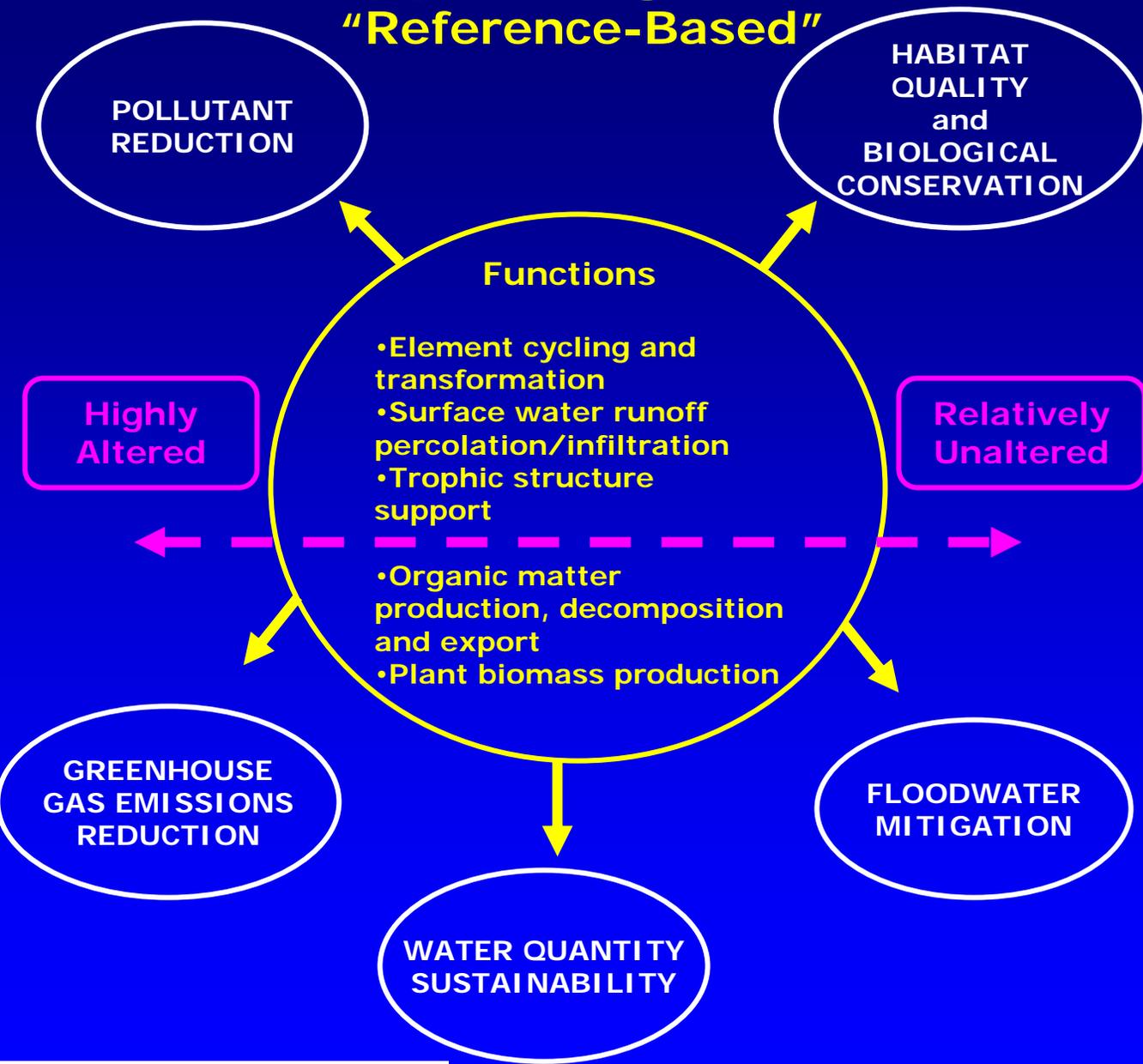
U. S. Fish and Wildlife Service



Agricultural Research Service

Supporting Model

"Reference-Based"



Ecosystem Services Provided by Wetlands and Associated Uplands On Agricultural Landscapes



Habitat Quality

**Biological Conservation
and Sustainability**

**Pollutant
Reduction**

Floodwater Mitigation

**Water Quantity
Sustainability**

**Greenhouse Gas
Emissions Reduction**



WITHOUT



WITH



CEAP-Wetlands

Primary Goal 1

Conduct *collaborative* regional assessment to quantify conservation practice/resource management systems effects on ecosystem services provided by wetlands and associated uplands along an alteration gradient.

- Quantify ecosystem services for categories of wetlands along the alteration gradient, e.g., farmed wetlands, program wetlands, and native 'reference' wetlands
- Quantify change in ecosystem services with and without conservation practice implementation

CEAP-Wetlands Regional Assessment Primary Goal 2

Develop validated *Wetland Functional Condition Indicator Models* to identify multi-scale factors influencing wetland ecosystem service levels to track changes in condition over time

Predictive Functional Condition Indicator Models For

Habitat Quality

Functional Condition Categories

1
2
3
4
5

- CLUSTER ANALYSIS
- CORRELATION ANALYSIS
- MULTIVARIATE ANALYSIS
- LOGISTIC/MULTIPLE REGRESSION

Predictive Models

$$\begin{aligned} X_1 &= y_1 + y_2 + y_3 \\ X_2 &= z_1 + z_2 + y_3 \\ X_3 &= y_1 + y_2 + z_2 \\ X_4 &= y_1 + z_1 + z_2 \\ X_5 &= y_2 + y_3 + z_2 \end{aligned}$$

PREDICTIVE FUNCTIONAL CONDITION INDICATOR MODELS TRACKING APPROACH (CONCEPTUAL)



Comparison

Database of Regional Predictive Indicator Models

Condition Gradient Categories

Estimated Value

Variable Values

Numerical Range

Measures of Central Tendency

Variance

Results

First Generation Product

Baseline of ecosystem services as a function of the condition gradient

Second+ Generation Products

Changes from baseline conditions

Secondary CEAP-Wetlands Regional Assessment Goals

- Provide simulated estimates under various program or environmental scenarios
- Develop analytical tools for selected ecosystem services
- Provide information in a format for NRCS *technology transfer* products

CEAP-Wetlands Peer Review Panel

- Meeting held May 5, 2005, intended to be scientific review
- Participants: Primarily research scientists with expertise in wetland ecology and functional condition assessment methods
- Purpose: Provide feedback on the scientific merits of the CEAP-Wetlands approach and whether the approach is designed to meet its intended purpose, and assist USDA in developing a strategy that identifies methodologies to quantify conservation effects over the long-term
- Meeting Results: Participants identified strengths and weaknesses of the CEAP-Wetlands approach
 - e.g., strength = approach is well designed
 - e.g., weakness = need to use contemporary functional assessment terminology where it is appropriate so as not to confuse audiences
- Meeting Results: A meeting summary is posted on the CEAP-Wetlands web page

Integrating Adaptive Management into CEAP-Wetlands: A USGS-led landscape monitoring pilot in the Prairie Pothole Region

- Collaborative USDA-USDI effort – NRCS, FSA, USGS, and FWS
- Goal: distinguish conservation practice/program and land management effects from climatic effects on ecosystem services provided by wetlands and associated uplands
- Five-year proposal, initiated in 2006 with feasibility investigation to determine project scope
- Results will be used to refine the initial CEAP-Wetlands PPR Assessment estimates and models, and provide the basis to evolve CEAP-Wetlands as an adaptive management approach



GEOGRAPHIC SCOPE

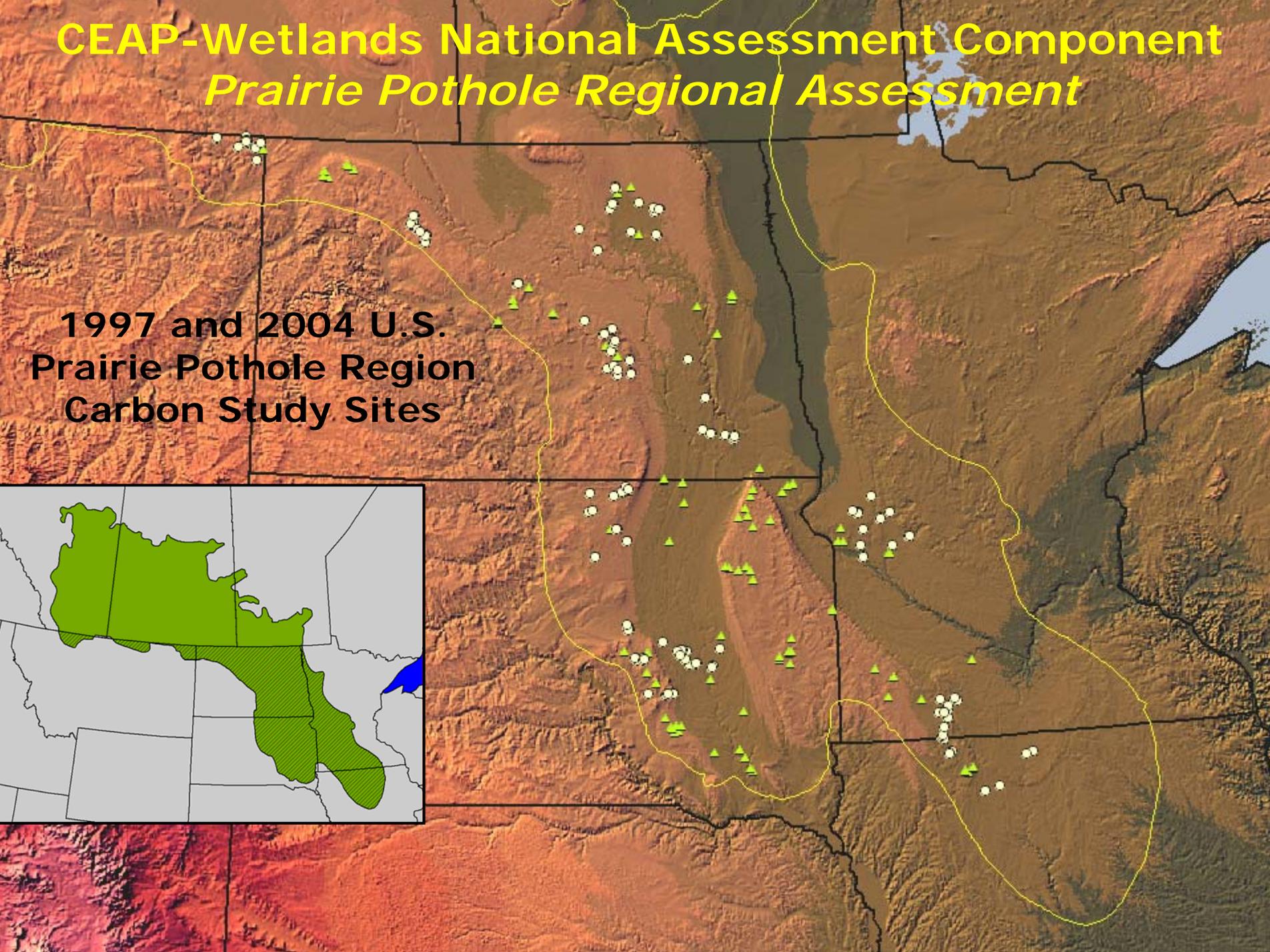
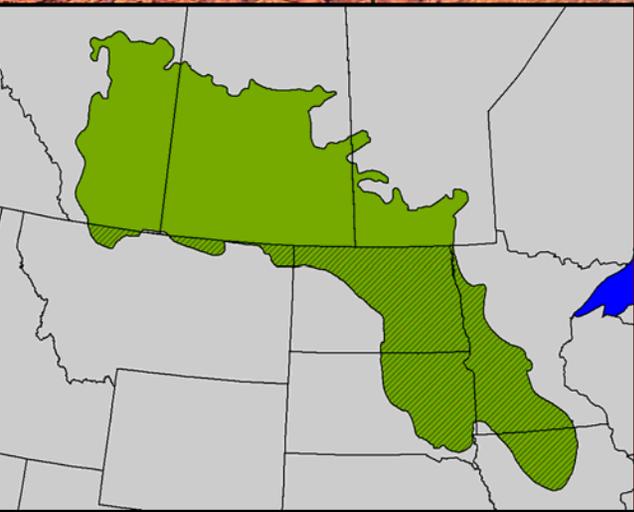


- Sampling extent and physiography
- Configured for wetland type of interest
- Scale and methods of sampling

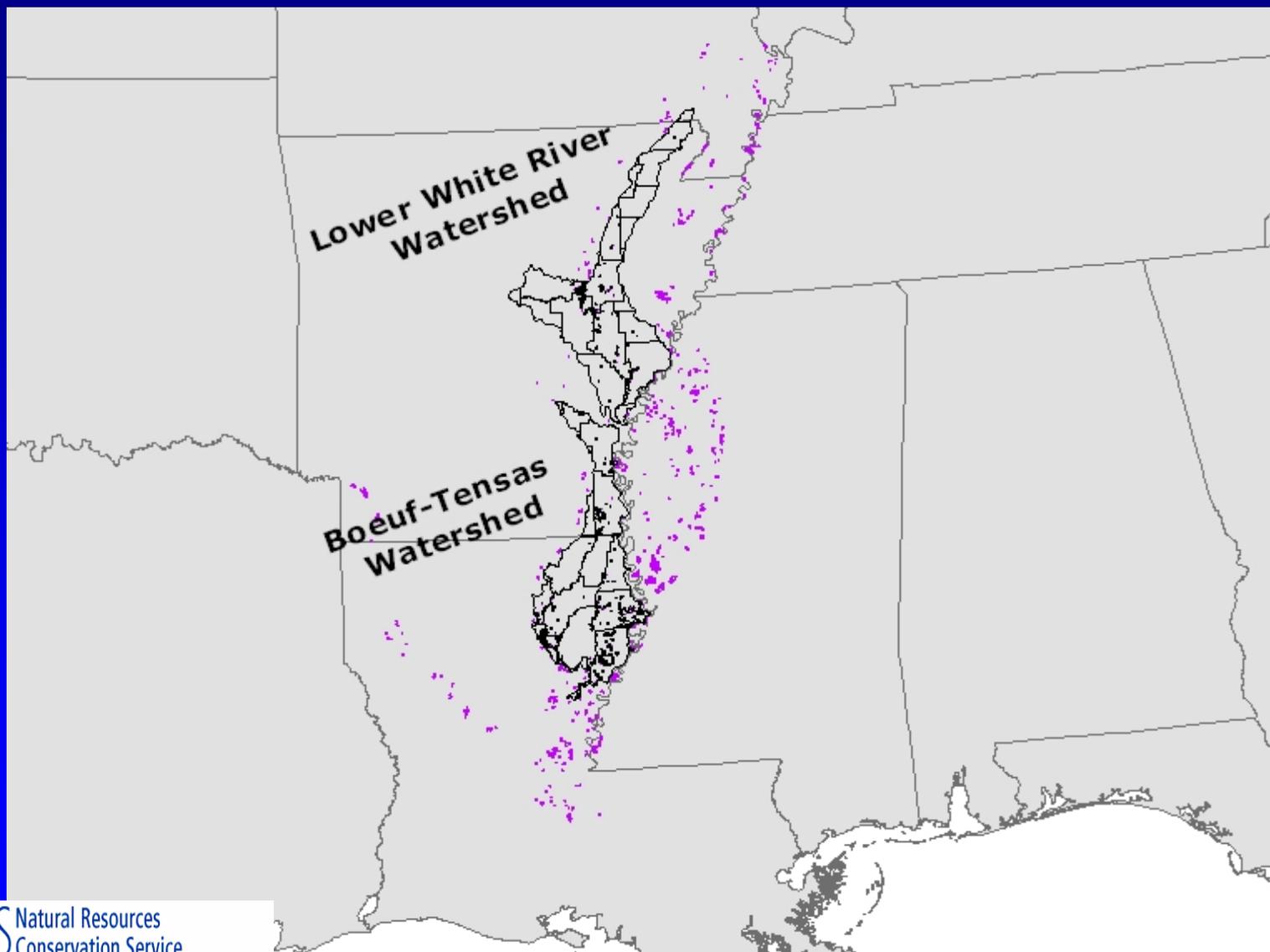
CEAP-Wetlands National Assessment Component

Prairie Pothole Regional Assessment

**1997 and 2004 U.S.
Prairie Pothole Region
Carbon Study Sites**



MAV Regional Assessment Watersheds Showing Distribution of WRP Easements Within the Watersheds and Throughout the MAV





SAMPLE POPULATION

- Stratify wetlands along alteration gradient *a priori* (landuse and hydrologic alterations)
- Identify wetland class and zones
- Identify types of conservation practices/activities to include in sample population

Distribution of Sample Sites in the PPR



Highly Altered

Relatively Unaltered



Condition Gradient

Drained Wetlands on Cropland

Nondrained Wetlands on Cropland

Hydrologically Restored Wetlands - Grassland

Nondrained Restored Wetlands - Grassland

Native Prairie Wetland

Distribution of Sample Sites in the MAV



Highly Altered

Relatively Unaltered



Condition Gradient

Drained and farmed wetlands on cropland

USDA Program Wetlands, Hydrologic restoration

USDA Program Wetlands, Non-hydrologic restoration

Mature Bottomland Hardwood Wetlands



ECOSYSTEM SERVICES

- Identify ecosystem services to quantify for regional wetland class(es)
- Identify measures of ecosystem services
- Identify multiple-scale variables to collect for ecosystem service measures

Prairie Pothole Regional Assessment

Service

Floodwater Storage

Habitat Quality/Biotic Conservation and Sustainability

Erosion, Sedimentation and Nutrient Loading Potential



Carbon Sequestration

Greenhouse Gas Emissions Reduction

Measure

Estimate of water storage potential

Floristic quality, Taxon richness, Habitat suitability

Nutrient loading potential for wetlands in cropland, restored grassland and native prairie

Sedimentation potential for wetlands in cropland, restored grassland and native prairie

Estimates of soil and wetland vegetation carbon stocks

Comparison of rates of greenhouse gas emissions from wetlands in cropland restored grassland and native prairie

MAV Regional Assessment

Service

Measure

Biological Conservation and Sustainability and Habitat Quality



Migratory and breeding bird richness, probability of site use, migrant songbird density, waterfowl abundance, duck-use day habitat capacity, breeding anuran species metrics and site quality , Louisiana black bear corridor expansion and connectivity

Carbon Sequestration

Carbon storage in soils and vegetation

Erosion, Sediment, Nutrient and Pesticide Reduction

Average annual soil erosion, nutrient loading potential, denitrification potential

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