

INTEGRATING ADAPTIVE MANAGEMENT INTO THE CONSERVATION EFFECTS ASSESSMENT PROJECT (CEAP) – WETLANDS NATIONAL ASSESSMENT COMPONENT

A PILOT INVESTIGATION IN THE PRAIRIE POTHOLE REGION

S. Diane Eckles (USDA, Natural Resources Conservation Service)
 Ned H. Euliss (USGS, Northern Prairie Wildlife Research Center)
 Murray Laubhan (USGS, Northern Prairie Wildlife Research Center)



CEAP-WETLANDS PURPOSE

- Quantify effects of conservation practices and resource management systems on ecosystem services provided by wetlands and associated uplands in agricultural landscapes
- Document and assess change in wetland functional condition over time

CEAP-WETLANDS OBJECTIVES

- Conduct collaborative regional assessments (Figure 1) to quantify ecosystem services provided by wetlands and associated uplands on agricultural landscapes:
 - with implementation of conservation practice/resource management systems
 - without implementation of conservation practice/resource management systems
- Develop regional multi-scale Indicator Models that include factors that influence temporal changes in functional condition for a population of wetlands and associated uplands

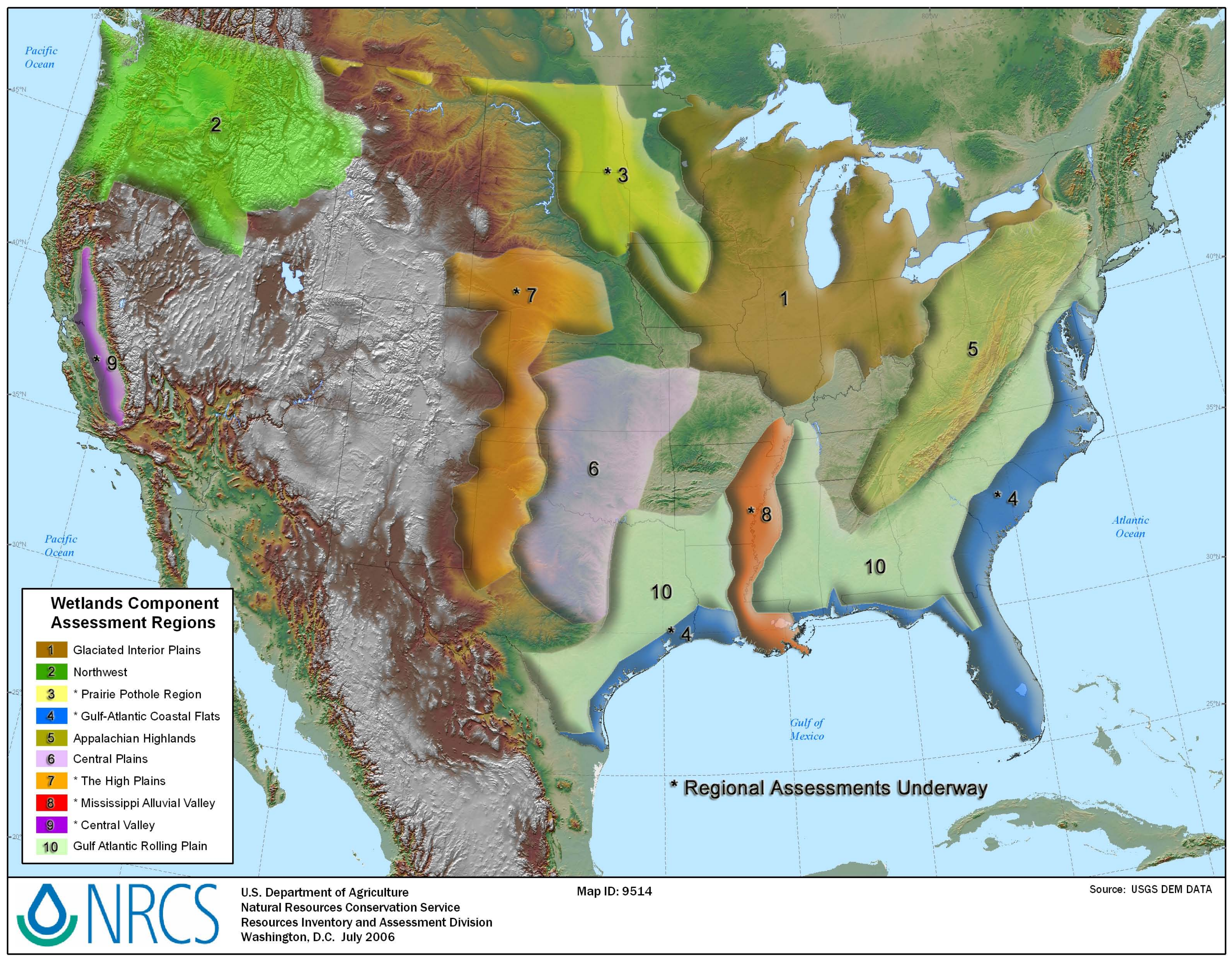


Figure 1. CEAP-Wetlands regional assessment areas. Five regional assessments are underway: Prairie Pothole Region, Mississippi Alluvial Valley, The High Plains, Central Valley of California, and the Gulf-Atlantic Coastal Flats and Rolling Plain Regions. See the CEAP-Wetlands web page for more information: <http://www.nrcs.usda.gov/technical/NRI/ceap/wetlands.html>

MODELING VARIABILITY

ISSUE:

CEAP estimates of ecosystem services produced by wetlands and uplands vary in time and space due to both conservation practice implementation and natural climatic drivers.

SOLUTION:

Develop a modeling framework that accounts for natural climatic drivers, hydrogeochemical processes, and biotic interactions, as well as anthropogenic drivers and stressors that affect ecosystem services.

Author to contact: diane.eckles@wdc.usda.gov; 301/504-2312

INTEGRATING ADAPTIVE MANAGEMENT

ISSUE:

A science-based, cost-effective monitoring design is needed to periodically quantify ecosystem services, assess changes in wetland functional condition, improve conservation applications, and refine monitoring approaches.

SOLUTION:

- Develop and implement an adaptive management approach for CEAP-Wetlands that includes the following (Figure 2):
- Collect monitoring data to identify factors influencing ecosystem services and functional condition of wetlands in agricultural landscapes
 - Apply multi-scale temporally and spatially explicit regional models to quantify ecosystem services and functional condition to address conservation questions
 - Disseminate results to multiple audiences for the purpose of:
 - Developing technical products, techniques, and management activities by NRCS National Technology Support Centers to improve conservation practices
 - Providing information to policy-makers regarding benefits of conservation activities under various scenarios
 - Establishing more effective conservation partnerships involving USDA
 - Improving information quality and delivery to landowners and the general public
 - Providing information necessary to evaluate and improve subsequent monitoring

The CEAP-Wetlands adaptive management approach will be developed and refined in collaboration with the U. S. Geological Survey (USGS) Integrated Landscape Monitoring Initiative (ILM). The USGS has initiated four ILM pilots: Prairie Pothole Region ILM (PPR ILM), Lower Mississippi Valley ILM (LMV ILM), Great Basin ILM, and Puget Sound ILM. The PPR and LMV ILM pilots will develop spatially and temporally explicit landscape models based, in part, on data gathered through the CEAP-Wetlands PPR and Mississippi Alluvial Valley (MAV) Regional Assessments. The modeling framework developed from the PPR and LMV pilots will provide templates for riverine and depressional wetland systems in the remaining CEAP-Wetlands regions. Data gathered through the CEAP-Wetlands assessments in the remaining regions will be used to train and evaluate the ILM models for application as regional models. The set of regionally explicit models can then be evaluated for application beyond the CEAP-Wetlands regions. Ultimately, a national modeling framework composed of regional, temporally-explicit models is envisioned as a critical component of the CEAP-Wetlands adaptive management approach.

THE PRAIRIE POTHOLE INTEGRATED LANDSCAPE MONITORING PILOT MODELING FRAMEWORK

The USGS PPR ILM pilot is a collaboration between the USGS, U. S. Fish and Wildlife Service (USFWS), Farm Service Agency and Natural Resources Conservation Service to investigate the development and efficacy of a modeling system to periodically estimate ecosystem services that result from implementing conservation practices in the PPR. The PPR ILM goal is to develop a modeling framework to estimate change in ecosystem services resulting from anthropogenic stressors and drivers within the context of dynamic climatic variation. The modeling framework will blend the Aquatic Ecosystem Continuum Conceptual Model (Figure 3) that describes the spatial and temporal hydrogeochemical influences on biota with the Anthropogenic Drivers-Stressors Model (Figure 4) that describes the linkages between human activities and other ecosystem components. Integration of these two models will allow the effects of conservation practices to be differentiated from natural drivers. Initial model development will be based on data collected as part of the 2004 CEAP-Wetlands PPR Assessment that included 475 sites, a 30-year dataset from the USGS Cottonwood Lake Study Area in ND, and USFWS 4-mi² plot data on 1300 wetlands.

REFERENCES:

Eckles, S. D. In review. Conservation Effects Assessment Project – Wetlands Component (CEAP-Wetlands) Draft Work Plan. USDA, NRCS.
 Euliss, N. H., Jr., N. Bliss, S. Bristol, W. Dean, R. Gleason, M. B. Goldhaber, K. Kermes, M. Laubhan, S. Liu, D. M. Mushet, M. Starbuck, L. Tieszen, K. Vining, R. Wenzl, T. Winter, C. Wright, and B. Wylie. 2006. The Efficacy of a National Model to Assess and Quantify the Ecosystem Services Provided by USDA and USDOI Conservation Programs: The Prairie Pothole Region as a Regional Pilot. Integrated Landscape Monitoring Initiative 2006 Report (draft). U. S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, ND. 29 pages plus Appendices.

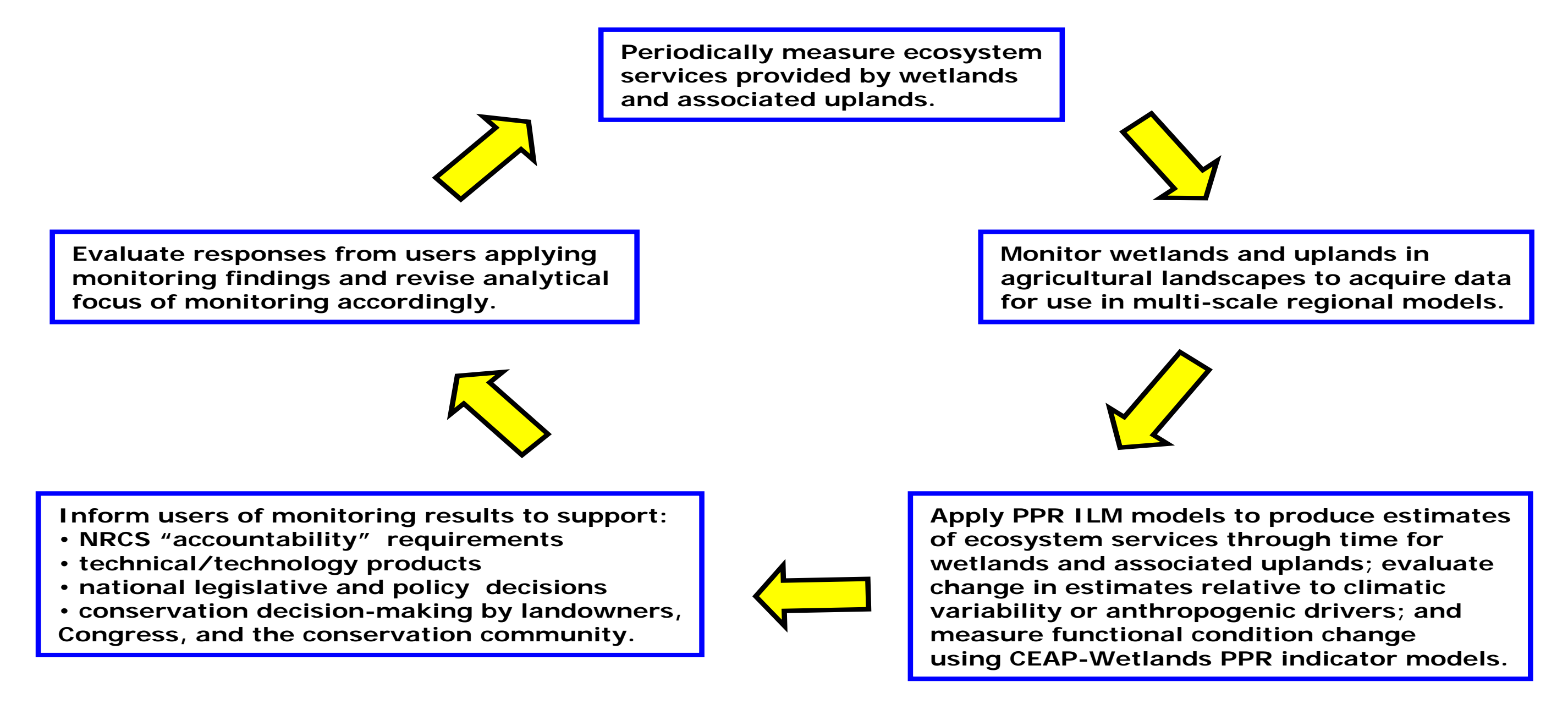


Figure 2. CEAP-Wetlands adaptive management components, incorporating the USGS Prairie Pothole Region Integrated Landscape Monitoring pilot approach (Eckles, In review).

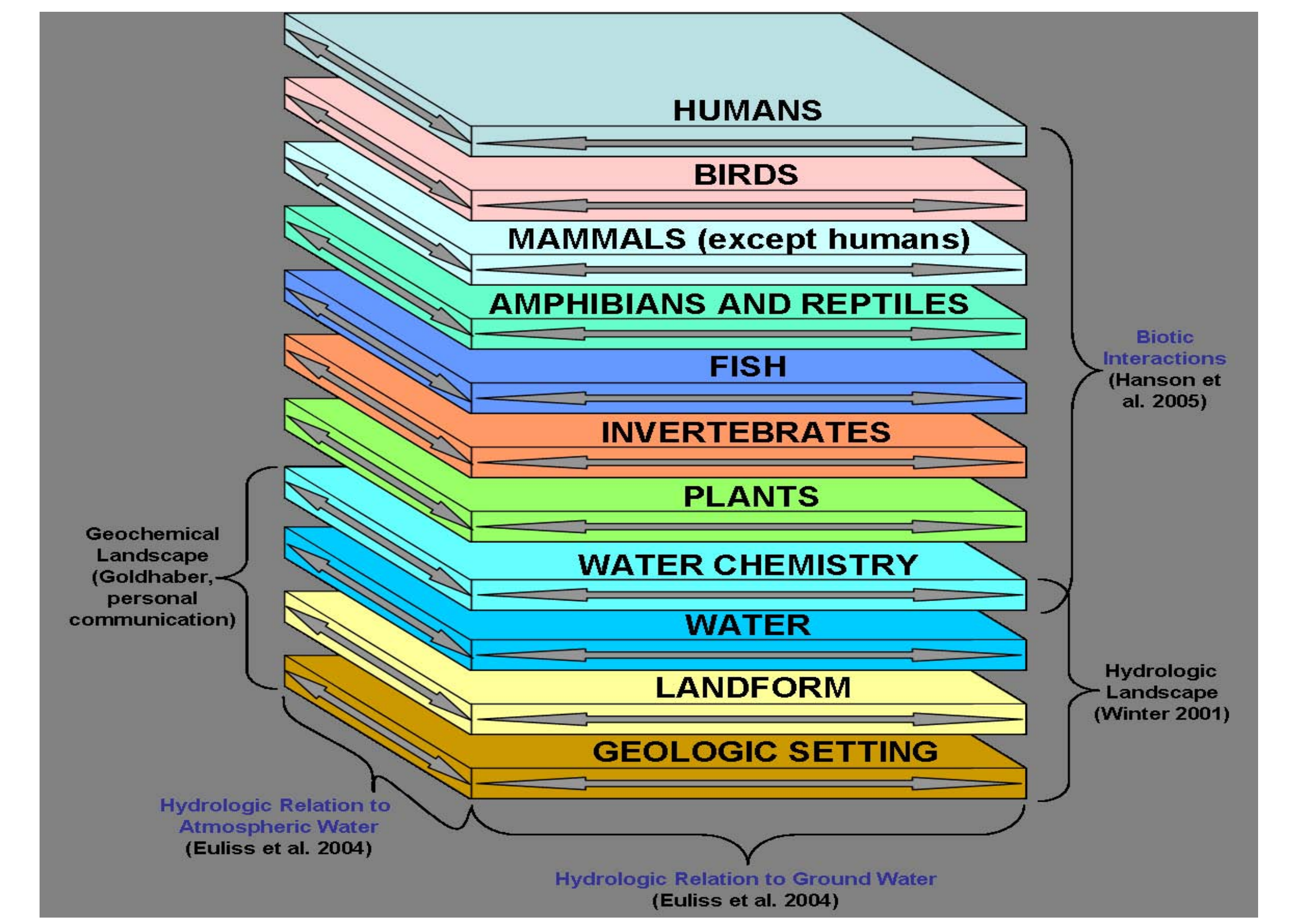


Figure 3. The Aquatic Ecosystems Continuum Conceptual Model with natural drivers in blue (Euliss et al., 2006).

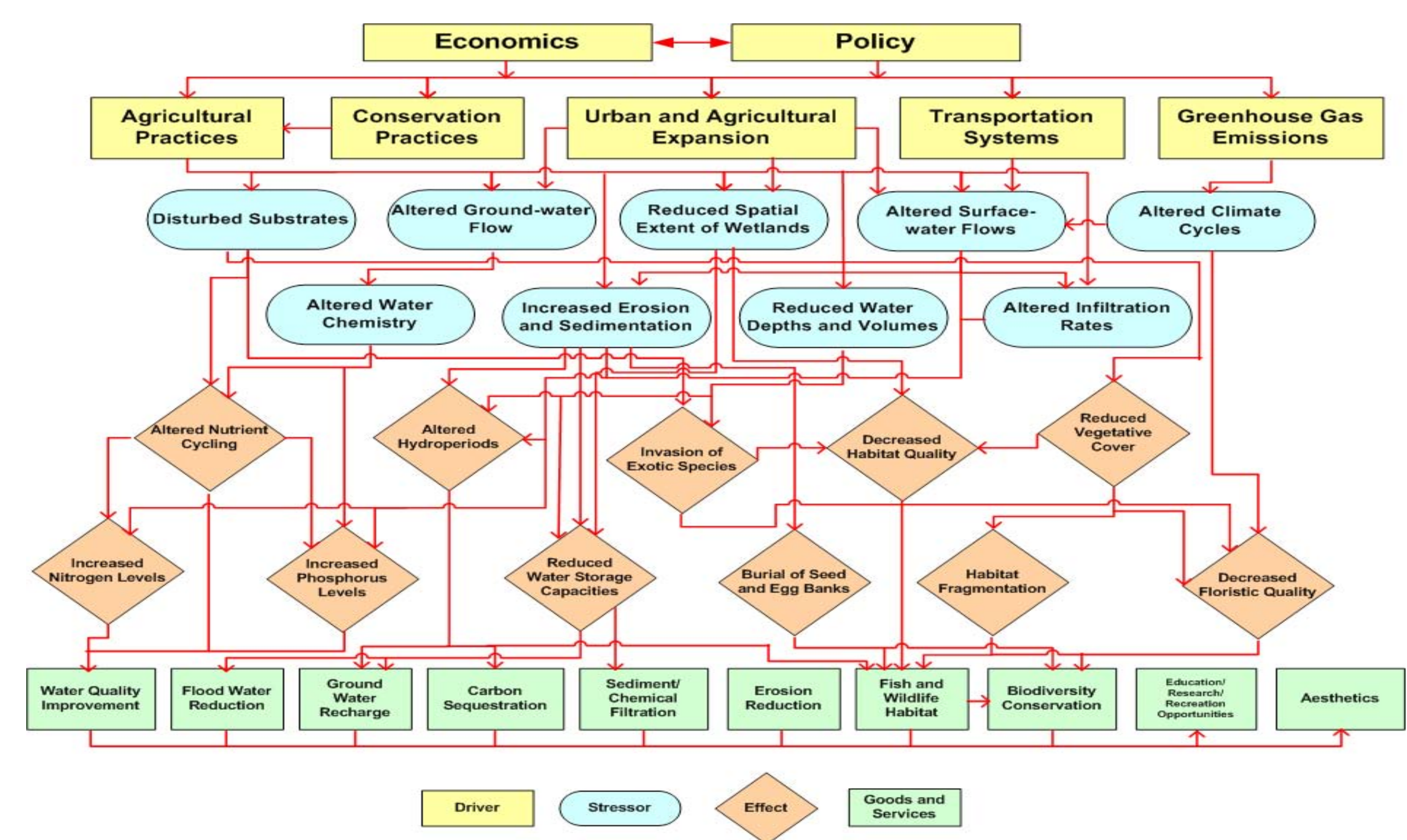


Figure 4. The Anthropogenic Drivers-Stressors Conceptual Model. Conservation practices and programs are drivers that influence production and sustainability of ecosystem goods and services provided by wetlands and associated uplands (Euliss et al., 2006).