

Conservation Effects Assessment Project

CEAP Highlights

CEAP Session at USDA Agricultural Outlook Forum

USDA's annual Agricultural Outlook Forum this year included a CEAP session, "Conservation Effects Assessment Project—Cropland Studies." The 90-minute session comprised three presentations:

- **Bob Kellogg discussed the river basin studies for the CEAP-Cropland national assessment**, with a focus on the draft Upper Mississippi River Basin study. Kellogg is an Agricultural Economist and CEAP-Cropland component leader.
- **Mark Walbridge discussed the effects of conservation practices on environmental quality in small watersheds**, focusing on the ARS-CEAP benchmark watershed projects. Walbridge is Division Chief for Renewable Energy, Natural Resources and Environment; Research, Education and Extension Office (REEO); USDA/Office of the Under Secretary for Research, Education, and Economics.
- **Mike O'Neill spoke on measuring the effects of agricultural conservation practices on water quality at the watershed scale**, focusing on the CSREES-CEAP competitive grants watershed studies. O'Neill is National Program Leader for Water Resources in the Cooperative State Research, Education, and Extension Service.

UMRB Report Being Readied for Scientific Peer Review

The Upper Mississippi River Basin (UMRB) cropland study is being prepared for external scientific peer review. The peer review period is expected to extend from early April through May, after which comments will be evaluated and the report updated for USDA policy review. Publication of the final report is projected for early fall 2009.

Assessment techniques and preliminary findings are presented in a draft report, "Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Upper Mississippi River Basin." The report describes the National Resources Inventory (NRI)-CEAP Cropland Survey results used to estimate current conditions and comparisons with a "no-practice" scenario in which neither structural nor management conservation practices were in place. Additional scenarios will be presented to show further gains that could be made through applied conservation in the basin, including enhanced nutrient management on higher risk acres. The assessment methodology was developed as part of the cropland component of the CEAP national assessment.

Preliminary findings from model simulations for the region indicate that existing conservation practices have significantly reduced sediment, nitrogen, and phosphorus loadings within the basin and that opportunities exist for additional progress in reducing concentrations of these materials in local waters.

The UMRB assessment is the first in a planned series of cropland assessments that will cover all of the major river basins and water resource regions in the lower 48 states. Peer reviewers will be invited to comment on the scientific assessment.

This study was limited by design to assessment of the effects of conservation practices and the associated issue of the potential gains that could be realized from additional conservation treatment. While many of the results in this report have implications for other important policy questions, separate model simulations and scenarios that account for the specific goals of policy would need to be constructed to properly address other policy issues. Examples of conservation policy issues that could be further explored with the CEAP cropland modeling system to evaluate policy options and alternatives include—

- simulation of additional conservation treatment required to meet specific water quality goals, including the extent to which conservation treatment can be used to meet nitrogen and phosphorus reduction goals for the region;
- assessment of the impact of climate change on the performance of existing conservation practices and additional conservation treatment required to maintain the level of water quality in future years;
- determination of the number and kind of acres that would provide the most cost-effective approach to meeting regional conservation program goals, given constraints in budget and staff;
- experimentation with alternative conservation initiatives and the environmental benefits that could be attained, such as a more aggressive nutrient management initiative in the region or prospects for widespread drainage management;
- evaluation of potential future options for Conservation Reserve Program (CRP) enrollments; and
- evaluation and assessment of treatment alternatives for specific agri-environmental issues to meet regional water quality goals, such as treatment needs for tile-drained acres, treatment requirements for acres receiving manure, or treatment alternatives to reduce soluble phosphorus loss.

Grazing Lands National Assessment

NRCS is working with the U.S. Forest Service and Bureau of Land Management to develop a standardized method for assessing rangelands across all land ownerships. A number of groups have requested this effort, including—

- the Sustainable Rangeland Roundtable (SRR), which has established criteria and indicators that provide a framework for standardized monitoring of rangelands;
- the Society for Range Management (SRM), which advocates a consistent Federal inventory and assessment approach; and
- Congress and NGOs, which need nationally consistent, credible data when considering policies and program funding.

The three agencies have developed common procedures for five indicators based on NRI and FIA (Forest Inventory and Analysis) survey approaches, using a core set of SRR indicators as a guide to

data needs. The agencies have developed a pilot project to test definitions, protocols, and operational capabilities for conducting a national assessment. The pilot project covers a 13-county area in central Oregon that includes 31 million acres of Federal, state, private, and tribal lands. This area was selected because of the mix of ownership and range types, the existence of baseline soils and ecological site information, and good working relationships across agency boundaries. The pilot is assessing socioeconomic as well as ecological indicators. Field data gathered on 450 ground plots were complemented by data obtained through interpretation of aerial photography.

The pilot is designed to help develop a national assessment of rangeland sustainability. If successful, it will help the agencies engage policymakers and the public in discussions about changing rangeland conditions and the effect of these changes on local communities.

A draft report—*Oregon Pilot: Working Towards a National Inventory and Assessment of Rangelands*—was released for internal review within the three agencies and cooperating organizations on December 1, 2008. The report describes the survey design and methodology, presents survey results for land use and invasive species, outlines lessons learned during the pilot, recommends next steps, and identifies significant and emerging issues.

Following is a comment from one of the reviewers of the draft report. “A detailed national recurring survey would be extremely useful, especially if permanent plots were established Rangelands are subject to changes in land use and grazing intensity, changes in fire regimes, climate change, and invasive species.... Certainly for public land management more detailed information would be helpful in managing the lands and responding to public demands for information and accountability.”

Wetlands National Assessment

ILM Modeling Effort Broadens

A demonstration of modeling change in ecosystem services due to a variety of drivers—such as land use change, climate change, economic factors, and conservation practices—via use of the Integrated Landscape Model (ILM) is tentatively scheduled to be developed by December 2009. The demonstration ILM will serve to brief NRCS leadership, OMB, and others on status and application of the ILM as a monitoring/simulation and forecasting tool by NRCS and potentially to provide information for Resources Conservation Act (RCA) products.

At a minimum, the demonstration will attempt to model ecosystem services—regulation of greenhouse gas emissions, habitat support, biodiversity support, and sediment deposition—that are common in the Prairie Pothole Region (PPR), Mississippi Alluvial Valley (MAV), The High Plains (THP), California Central Valley (CCV)/Klamath, and Mid-Atlantic Region (MIAR). The demonstration will also include region-specific

ecosystem services if funding allows, including nutrient and contaminant regulation, groundwater regulation, and water storage/floodwater regulation.

Regional algorithms are under development to model the common services for depressional wetlands in the PPR, THP, CCV, and MIAR. Investigations are under way to determine the feasibility of modeling these services for all depressional wetland types at a national scale. Similar algorithms are being developed for riverine wetlands in the MAV. These algorithms will model effects at a scale where landscape effects can be discerned for conservation management planning and application.

The ILM framework has the potential to integrate riverine and depressional wetland algorithms and other CEAP modeling results so that cumulative and offsite effects can be modeled (e.g., cumulative effects of conservation treatment on cropland, adjacent wetlands, and uplands for simultaneous changes in nutrient regulation, carbon sequestration, and

wildlife habitat support). Because the ILM is still under development and there is little time available to produce the demonstration model and RCA product, a single geographic area where CEAP components' results overlap will be selected to demonstrate the integrative potential of the ILM.

CEAP-Wetlands Modeling Steering Committee

A new committee made up of PIs from the PPR, MAV, THP, CCV/Klamath, and MIAR/Choptank regional projects has been established to coordinate the work of the CEAP-Wetlands regional study teams and ILM modelers to ensure consistency in their efforts.

An Integrating Team will resolve issues identified by the modeling committee; coordinate briefings on the demonstration ILM to NRCS and USGS leadership, including leveraging of resources as appropriate; identify funding needs and potential sources of funds; and guide overall progress and direction of the demonstration ILM.

Wildlife National Assessment

The wildlife component continues to work with partner organizations to carry out an array of regional assessments. These assessments are beginning to yield tangible results that quantify the effects of various conservation practices and programs on select fish and wildlife species and groups. As these regional assessments are completed, CEAP products (Science Notes and Conservation Insights) are being generated to make findings readily available to conservation planners and program managers. The following wildlife component products released to date are available on the CEAP Web site:

Science Note—

- “Using NatureServe Information to Assess Effects of Conservation Practices on At-Risk Species”

Conservation Insights—

- “Ecological Monitoring Insights from the Wetlands Reserve Program in Missouri”
- “Estimated CRP Benefits to Mixed-Grass Prairie Birds”
- “WRP Supports Migrating Waterfowl in Nebraska’s Rainwater Basin Region”
- “The Conservation Reserve Program Enhances Landscape-level Grassland Bird Diversity”

In this issue of CEAP Highlights, we present emerging findings from the second year of a 3-year assessment involving bird response to the Habitat Buffers for Upland Birds (CP33) conservation practice. Findings presented here are based on interim reports and will inform a future CEAP Conservation Insight.

Bird Response to CP33 Habitat Buffers

The Habitat Buffers for Upland Birds (CP33) conservation practice is being implemented as part of the Conservation Reserve Program Continuous Signup in 35 states associated with the range of the northern bobwhite. Under the protocols developed by the Southeast Quail Study Group and with the support of a multi-state grant from the Association of Fish and Wildlife Agencies, bobwhite and songbird response to CP33 enrollments is being monitored by state wildlife agency personnel and others in 20 states.

With the support of CEAP and other partners, researchers at Mississippi State University (MSU) are working closely with the 14 states that contain the bulk of CP33 enrollments to discern landscape-scale bird response to this buffer practice.

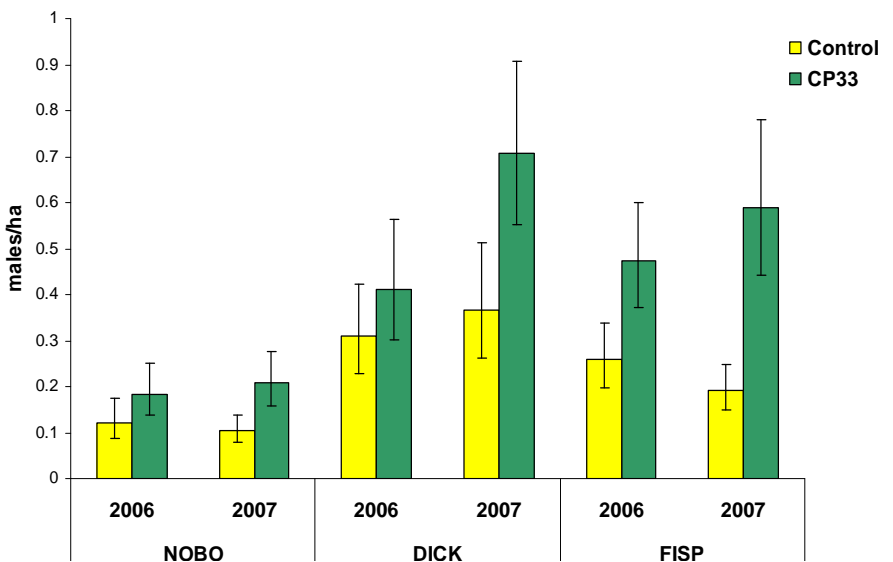
Comparative abundances of bobwhite and other priority bird species on CP33 and control fields were estimated for the 2006 and 2007 breeding season and fall using a 3-tiered approach (across bobwhite range [program-wide], within each Bird Conservation Region [BCR], and within each state).

Breeding season bobwhite densities were 50 percent greater in 2006 and 99 percent greater in 2007 on CP33 fields than on control fields, representing a program-wide increase in effect in the second year of monitoring. This increasing effect was prevalent in the Central Mixed-grass Prairie and Eastern Tall-grass Prairie BCRs and in 7 out of 11 states. Similar to the breeding season, the program-wide trend in relative effect size for overall fall bobwhite covey densities nearly doubled from 2006 to 2007, with a strong response in the Southeast Coastal Plain and Central Hardwoods BCRs, and a decline in effect in the Eastern Tallgrass Prairie BCR.

Researchers observed a program-wide increasing positive response to CP33

buffers by dickcissels, field sparrows, and eastern meadowlarks, the latter exhibiting an overall reversal from greater densities on control fields in 2006 to greater densities on CP33 fields in 2007. Program-wide, there was nearly a two-fold greater dickcissel density on CP33 than on control fields in 2007. This represents a more than threefold increase in effect size compared to 2006. Field sparrow densities were more than three times greater on CP33 than on control fields in 2007, and effect size nearly doubled from 2006. Most other songbirds showed similar response, although not so great. Area-sensitive species that require large blocks of grassland, such as grasshopper sparrow, showed little response to buffer habitat.

The CP33 monitoring program affords a rare opportunity to evaluate populations of grassland birds at a large geographic scale, and has revealed that the addition of CP33 upland habitat buffers in an otherwise agricultural landscape provides critical habitat and invokes a positive and rapid response by populations of bobwhite and several priority songbird species. Presuming increases in abundance represent net population increases rather than redistribution of existing populations from the surrounding landscape, the CP33 upland buffer practice may have the capacity to affect large-scale population changes in many declining species.



Program-wide year-specific breeding season northern bobwhite (NOBO), dickcissel (DICK) and field sparrow (FISP) density (males/ha) on all surveyed CP33 buffer fields and control fields. Error bars represent 95% confidence intervals.

STEWARDS Database Supports Conservation Research

The USDA and Agricultural Research Service (ARS) have supported watershed research since the 1930's with sites added periodically to meet evolving needs. Historically, data from ARS watersheds have been managed and disseminated independently at each research location, hindering accessibility and utility of these data for policy-relevant, multi-site analyses. Comprehensive, long-term data for watershed systems across diverse locations are essential for interdisciplinary hydrologic and ecosystem analysis and model development, calibration, and validation.

An ARS team within the CEAP-Watershed Assessment Studies has developed a Web-based data delivery system to provide access to soil, water, climate, land-management, and socio-economic data from the 14 ARS CEAP Benchmark Watersheds. The system, STEWARDS—Sustaining the Earth's Watersheds, Agricultural Research Data System—allows users to search, visualize, and download data via the Internet.

STEWARDS consists of—

- a centralized site with Web/SQL/ArcGIS servers and application soft-



ware, including a database management system (DBMS) and a geospatial data access portal;

- data, including measurement data, imagery/GIS, and metadata;
- those who use the data; and
- research watershed sites that are data sources.

STEWARDS has interactive maps of watersheds that allows users to see the topography of the watersheds, see instrument locations, and download data. STEWARDS data includes information on pesticides, nitrogen, and phosphorus in streams, rivers, lakes, and drinking water reservoirs. The Web site also has data on daily stream discharge levels, air and soil temperature, and other weather data.

Anticipated benefits of STEWARDS include preservation of data, increased data use, and facilitation of hydrological research within and across watersheds with diverse collaborators. STEWARDS

information will not only be available to people involved in the CEAP research but also will expand the usefulness of the information gathered at each watershed for nationwide analyses.

The STEWARDS system will provide access to a broad spectrum of watershed data at an easily accessible central site and provides an invaluable resource for conducting the national assessment.

For more information about the system, see the two papers on STEWARDS that appear in the November-December 2008 [Journal of Soil and Water Conservation](#).

- "Sustaining the Earth's Watersheds—Agricultural Research Data System: Overview of development and challenges," pages 569–76. J.L. Steiner et al. describe the challenges in coordinating data on disparate ARS watershed research projects.
- "Sustaining the Earth's Watersheds—Agricultural Research Data System: Data development, user interaction, and operations management," pages 577–89. Steiner et al. describe the data in STEWARDS, describe the process of accessing watershed data and provide an overview of system management.

The Conservation Effects Assessment Project Translating Science into Practice

The Conservation Effects Assessment Project (CEAP) is a multi-agency effort to quantify the environmental benefits of conservation practices and develop the science base for managing the agricultural landscape for environmental quality. Project findings will guide USDA conservation policy and program development and help farmers and ranchers make informed conservation choices.

The three principal constituents of CEAP—the national assessments, the watershed assessment studies, and the bibliographies and literature reviews—contribute to the evolving process of building the science base for conservation. That process includes research, monitoring and data collection, modeling, assessment, and outreach.

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