



United States Department of Agriculture
Natural Resources Conservation Service

Helping People Help the Land

July 2008

Conservation Effects Assessment Project

CEAP Highlights

Wetlands National Assessment

CEAP-Wetlands Symposium Held at Society of Wetland Scientists

A two-session CEAP-Wetlands symposium was held at the 2008 Society of Wetland Scientists annual meeting May 29–30 in Washington, DC. Symposium presentations covered—

- an introduction to CEAP and CEAP-Wetlands, and an overview of the scientific foundation and connection among the CEAP-Wetlands objectives and activities underway or proposed;
- preliminary findings from the Prairie Pothole Region (PPR) and Mississippi Alluvial Valley (MAV) regional studies;
- findings from an amphibian study in the PPR, highlighting species richness and occupancy in prairie depressional wetland catchments;
- preliminary findings from analysis of soil properties (e.g., bulk density, soil organic carbon, total nitrogen) and their similarities/differences among wetland catchments distributed across physical (e.g., climate, topographic) and alteration gradients (i.e., land cover and hydrology) as part of the PPR study;
- status and preliminary findings from the High Plains regional study regarding the effects of playa wetlands present on land enrolled in CRP on recharge of the Ogallala Aquifer in the Southern High Plains;
- overview of the sampling methodology for the California Central Valley portion of the California Central Valley/Upper Klamath River Basin regional study, including criteria

used to select wetlands established/managed on lands enrolled in WRP based on management intensity;

- an overview of the Mid-Atlantic regional study goals, collaborations and challenges;
- findings from three of the CEAP-Wetlands literature synthesis regional manuscripts addressing conservation practice effects on wetland ecosystem services;
- an overview and preliminary findings from Duke University economic analyses valuing selected ecosystem services measured in the MAV regional study;
- an overview of the components and methodology of the CEAP-Wetlands Choptank River (MD) Watershed Study, which is investigating connections between wetland alteration and stream function and structure, the effects of wetland conservation practices on nutrient reduction, development of a groundwater flow model for testing within the Mid-Atlantic region, and investigating the use of various remote sensing tools to monitor various wetland ecosystem service metrics via hydrologic connections or relationships; and
- an overview and demonstration of the prototype Integrated Landscape Model, a component of a National Wetlands Monitoring Process under development through CEAP-Wetlands.

Contact Diane Eckles (diane.eckles@wdc.usda.gov) for more information.

Understanding the Effects of Conserving Playa Wetlands on the Ogallala Aquifer of the Southern High Plains

Playas are focused sites of groundwater recharge throughout the Southern High Plains (SHP), an area of intense agricultural production made possible by irrigation. These local depressional recharge wetlands are distributed approximately one per square mile or two, and the amount and quality of runoff they receive is related to their surrounding land uses. Water table declines within the Ogallala Aquifer have been noted by local conservation districts, but the variable rates of change have not been correlated to above-ground land use, except for irrigation.

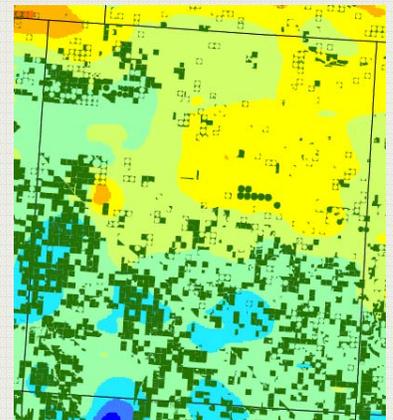
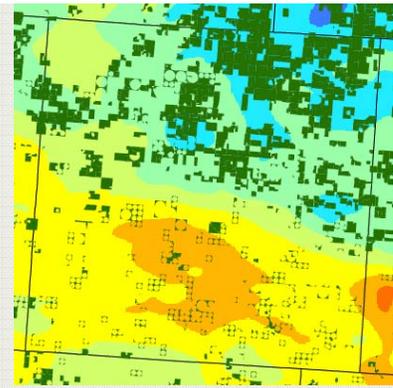
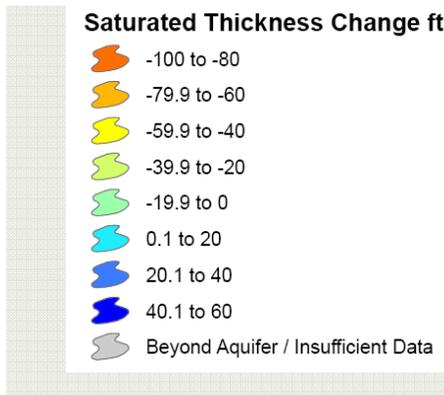
Scientists with Texas Tech University (TTU) and Oklahoma State University (OSU), led by Ken Rainwater and Loren Smith, respectively, are investigating recharge through playa wetlands across different catchment land uses: cropland, Conservation Reserve Program (CRP) enrolled lands, and native grassland. The team includes Kevin Mulligan, Lucia Barbato, Richard Zartman, and Wayne Hudnall, all with TTU, and Dennis Gitz of the USDA-ARS. The SHP study is part of the current CEAP-Wetlands regional investigation in the High Plains to quantify ecosystem services provided by playa wetlands and the effects of conservation practices and programs on those services.

The team uses GIS to assemble preliminary maps which illustrate that CRP lands tend to overlie areas with relatively slower water table declines than irrigated cropland, and in some areas the water table is rising under CRP lands. In the absence of groundwater pumping, the rising water table can be used to quantify local recharge, which is largely focused in the playas.

These maps demonstrate that significant density of CRP lands tends to correlate with little change or actual increases in water table elevation. The figure at right shows an overlay of CRP-enrolled areas (shown in dark green) with changes in groundwater level in the underlying Ogallala Aquifer from 1990 to 2004 for two SHP counties, which are unnamed to protect ownership identities. Overlaying the CRP layer on an aerial photograph shows that the greatest water table declines are typically beneath intensive irrigation.

The map of CRP locations allows certain identification of large and small areas with no pumping for irrigation. This information will be useful, with play density data, for estimating local aquifer recharge rates because the uncertainty of irrigation pumping amounts and locations will not affect the calculations. Further statistical analyses of these data continue.

Dr. Rainwater's team is currently performing statistical analyses at the individual county level within the study area to further understand trends and correla-



Overlays of CRP and Saturated Thickness Change for County A (top) and County B (bottom)

tions among a variety of variables using agricultural statistics, estimated pumping, and precipitation for the 1990-2004 time period. Those results should be available September 2008.

The study plan for the CEAP-Wetlands High Plains Regional Investigation is available at: ftp://ftp-fc.sc.egov.usda.gov/NHQ/nri/ceap/thp_research_plan.pdf

Acknowledgement: Dr. Ken Rainwater, Director of the TTU Water Resources Center, contributed this article. Thanks are also extended to Dr. Loren Smith, OSU, for review and comments on the draft.

Wildlife National Assessment

Working with the Playa Lakes Joint Venture, CEAP-Wildlife has released a new *Conservation Insight*, "Estimated CRP Benefits to Mixed-Grass Prairie Birds." The new publication provides a fresh look at how enrolling cropland in the Conservation Reserve Program affects habitat for priority bird species of the south-central Great Plains.

Summary Findings

- The 3.4 million acres enrolled in the Conservation Reserve Program (CRP) in the mixed-grass prairie regions of Nebraska, Kansas, Oklahoma, and Texas provide important grassland habitat for priority bird species associated with this landscape.
- Geospatial land cover analysis tools and species-specific habitat models developed by the Playa Lakes Joint Venture provide a means to quantify the contribution of CRP habitats to meeting population goals for important grassland birds.

- Species showing the greatest benefit from CRP were dickcissel, eastern meadowlark, and grasshopper sparrow, where CRP contributes more than 15 percent of the population goal for the mixed-grass prairie portion of at least two of the four states assessed.
- Some species benefit little from CRP (e.g., Swainson's hawk), whereas others benefit substantially. The most extreme example is where CRP habitat supports over 61 percent of the population goal for dickcissel in the mixed-grass prairie region of Texas.
- The occurrence of CRP enrollments in the vicinity of existing grassland improved the quality of these existing grasslands by increasing the size of large blocks of grass. This improvement contributes over 6 percent of the population goal for lesser prairie-chickens in the mixed-grass prairie portion of Kansas.

Recommendation

- Strategically planning CRP enrollments spatially and managing cover on enrolled lands have the potential to improve the ability of conservationists to support priority grassland bird populations in the Great Plains.

This publication is available online at <http://www.nrcs.usda.gov/technical/nri/ceap/library.html>.



Grazing Lands National Assessment

Grazing Lands RFA Closes

A CSREES Request for Applications (RFA) for studies on ecosystem health on grazing lands has closed. Nine applications were received—eight for range-land and one for pasture. At least two of the applications include significant ARS contributions.

A panel to review the submissions will be convened, probably during August. About \$2 million is available to support the research, and two or three projects are expected to be funded.

Preparation Continues for Pastureland NRI Pilot

The second year of the Pastureland NRI Pilot began in Columbia, MO, June 10-12, 2008. Twenty-one NRCS employees from 12 of the 13 participating states, the three National Technology Support Centers, and NHQ participated to review the objectives; data collection protocols; instructions and equipment lists for the revised Pastureland NRI Pilot.

The team practiced and revised protocols in pastures at three locations near Columbia. The complete protocol set required more than 2 hours to finish. Participants were confident that the completion time will be shortened significantly as data collection protocols are streamlined and become routine without need to consult the handbook of instructions.

Computer Assisted Survey Instruments (CASI) were distributed to each state. The handbook of instructions will be updated and made available on the NRI Web site later this summer. A schedule of implementation for each state was established.

States participating in the Pastureland NRI Pilot are Alabama, Colorado, Florida, Illinois, Kentucky, Minnesota, Missouri, Nebraska, Ohio, Pennsylvania, Texas, Washington, and Wisconsin.

Cropland National Assessment

Model runs for the first of ten planned reports on the effects of conservation practices on the environment—on the Upper Mississippi River Basin (UMRB)—are now complete. The long-awaited UMRB report is nearing completion and is expected to be ready for review by NRCS leadership late this summer, with extensive peer review to follow.

Below is the working outline for the report. The outline will be supplemented by box insets that highlight key issues and topics, including—

- a literature review on pesticide and nutrient loadings into the Gulf of Mexico from the UMRB;

- estimates of the use of conservation practices;
- explanations of selected methods, such as the need for adjustment of nitrogen use; the effects of specific practice sets: structural practices only, residue management practices only, nutrient management practices only, and CRP only;
- case studies of watershed-level research findings on effects of practices relevant to the UMRB; and
- what conservation practices sets work best and where on the basis of model simulations.

Assessment of the Effects and Benefits of Conservation Practices on Cultivated Cropland in the Upper Mississippi River Basin (UMRB) Draft Outline

Executive Summary

Regional overview of conservation effects and treatment needs.

Agriculture and Conservation Resource Concerns in the UMRB

Land use summary, agricultural cropping systems, and conservation resource concerns in the region.

Conservation Practices Currently in Use on Cultivated Cropland

Summary of practices from CEAP survey and other sources, with estimates of acres and percent of acres currently being treated. Practice set includes structural soil erosion control practices, residue management practices, cover crops, nutrient management practices including land application of manure, pesticide management practices to reduce environmental risk, and enrollment in CRP.

Estimating the Effects of Conservation Practices—

A Sampling and Modeling Approach

Overview of model simulation approach for estimating onsite and offsite effects; simulation of the current conservation condition (baseline) scenario; simulation of a no-practices scenario.

Onsite Effects (Field-Level) of Conservation Practices Currently in Use

Edge-of-field and bottom-of-root zone effects of the full suite of practices combined; effects on water yield, sediment loss, phosphorus loss, nitrogen loss, pesticide loss, wind erosion, and soil organic carbon.

Offsite Water Quality Effects of Conservation Practices Currently in Use

In-stream effects associated with the full suite of practices combined; reductions in stream flow, sediment, nitrogen, phosphorus, and atrazine.

Conservation Treatment Needs

Conservation treatment needs will be estimated by comparing model output for the baseline scenario to field-level criteria for acceptable levels of wind erosion, sediment loss, nutrient loss, and pesticide loss. Acres in need of additional conservation treatment will be reported.

Appendices

Summary of NRI-CEAP Cropland Survey Results for the UMRB

Summary of Integrated Pest Management Scores for the UMRB

Calibration of CEAP-HUMUS (Hydrologic Unit Model for the United States) for the UMRB

Watershed Projects

Local Partnership Works to Conserve Coastal Waters, Habitats, and Coral Reefs in Jobos Bay

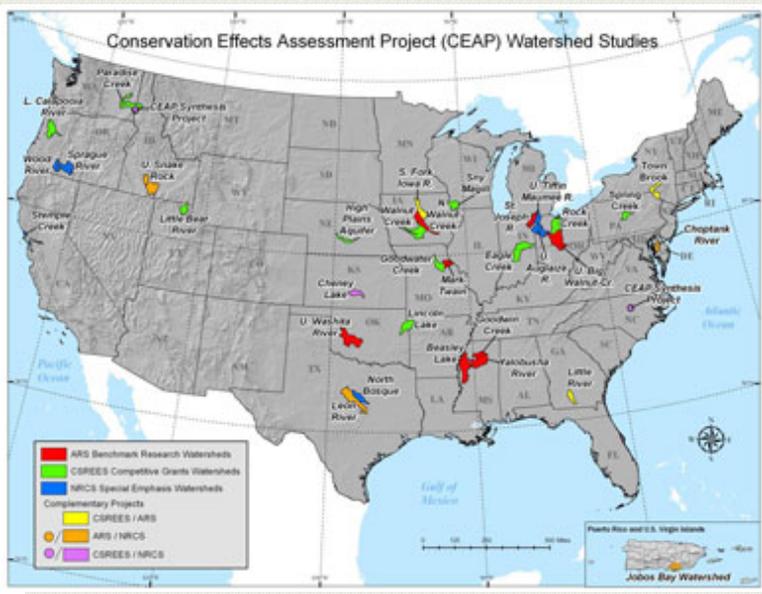
A newly signed partnership agreement among NRCS, Puerto Rico government agencies, and others will lead to cooperative management of natural resources in Puerto Rico's Jobos Bay Watershed.

The watershed is the second largest estuarine area in Southeastern Puerto Rico. It encompasses a chain of 15 tear-shaped mangrove inlets and is home to the endangered brown pelican, peregrine falcon, hawksbill sea turtle, and West Indian manatee. It is also important for marine recreation, commercial and recreational fishing, and ecotourism.

The agreement emphasizes the roles of Federal and state agencies, local groups, and academia working together to determine the environmental effects of agricultural conservation practices on coastal waters and associated habitats, on tropical marine ecosystems, and ultimately on coral reef conservation.

The \$1.3 million CEAP watershed project is expected to span 3 years and is partially funded by USDA and NOAA. The partnership seeks to establish a long-term research and monitoring program for Jobos Bay with the results used to manage agricultural landscapes for environmental quality.

Signing the local partnership agreement were representatives of the NRCS Caribbean Area; Puerto Rico Department of



Agriculture; Puerto Rico Department of Natural Resources and Environment; University of Puerto Rico (UPR) College of Agricultural Sciences, and UPR-Sea Grant. Also signing were representatives from ARS, USEPA, USGS, USFWS, NOAA Estuarine Reserve Division, Salinas Forage Farm, Inc., and the Sudeste Soil Conservation District.

CSREES Competitive Grants Synthesis Report Teams at Work

Teams of researchers from North Carolina State University (NCSU) and the University of Idaho are developing synthesis reports on the 13 CSREES Competitive Grants Watershed Projects, as reported in the April *CEAP Highlights*. During the period April–June, represen-

tatives of both teams conducted site visits at the Idaho, Iowa, and Utah projects. The NCSU team has begun conducting and summarizing informant interviews, while the University of Idaho team continued its analysis of Best Management Practices (BMPs) and BMP systems.

NRCS Special Emphasis Watersheds Reporting

The leaders of 10 of the 11 NRCS Special Emphasis Watersheds (all except for Jobos Bay, which was initiated later than the others) are expected to submit draft reports this fall. The NRCS Resources Inventory and Assessment Division is planning to develop *Science Notes* or *Conservation Insights* from the reports as appropriate.

CEAP

Translating Science into Practice

Science-based conservation is the key to managing agricultural landscapes for environmental quality. 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, and assessment.

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