CONSERVATION EFFECTS ASSESSMENT PROJECT (CEAP)

UPPER MISSISSIPPI RIVER BASIN CROPLAND STUDY

BACKGROUND

Purpose

The U.S. Department of Agriculture will release the first of several studies on the effects of conservation practices on cultivated cropland in the United States. The first study focuses on the Upper Mississippi River Basin (UMRB). The CEAP studies are being prepared by the USDA Natural Resources Conservation Service, working in conjunction with the Agricultural Research Service and Texas AgriLife Research, part of the Texas A&M University system. The other CEAP studies will cover the major river basins and water resource regions in the lower 48 states.

What does this report tell us? – Key Findings of the Report

Here's what our model simulation shows:

87 percent of cropped acres have sediment loss of 2 tons per acre per year or less; only 53 percent of cropped acres would have that level of sediment loss if conservation practices were not applied.

85 percent of cropped acres have total phosphorus loss of 4 pounds per acre per year or less; only 56 percent of cropped acres would have that level of phosphorus loss if conservation practices were not applied.

35 percent of cropped acres have total nitrogen loss of 40 pounds per acre per year or less; 53 percent of cropped acres would have that level of nitrogen loss if conservation practices were not applied.

Conservation practices on cropland

Here's what our model simulation shows:

Implementation of conservation practices in the UMRB has reduced sediment losses by 69 percent; total phosphorus losses by 49 percent; and total nitrogen losses by 18 percent. These practices have also resulted in a 51 percent reduction in risk to aquatic ecosystems and a 48 percent reduction in human health risk from pesticide residues.

These results show NRCS has much opportunities to reduce phosphorus and nitrogen losses in the UMRB.

Using Suites of Conservation Practices

Here's what our model simulation shows:

Total nitrogen losses have been reduced by 18 percent. Yet the 46 percent reduction in nitrogen lost with overland flow has been partially offset by a slight reduction (5 percent) in the loss of soluble nitrogen through the soil before reaching surface water supplies.

The reason for this is that by reducing runoff—and consequently reducing erosion and sediment—erosion control practices have encouraged the infiltration of water and the movement of soluble nitrogen through the soil where it is more difficult to treat.

To address this concern, nutrient management that optimizes the timing, rate, form and method of application is needed along with the erosion control practices.

Use of conservation practices relating to erosion and sedimentation

Here's what our model simulation shows:

The use of conservation practices in the UMRB has reduced average annual sediment loss from water erosion by 69 percent on cropped acres; in-stream sediment loads have been reduced 37 percent due to the application of conservation practices.

Forty-five percent of the cropland has structural practices.

Use of Nutrient Management in the UMRB

Here's what our model simulation shows:

Opportunities for improvement in the use of nutrient management in the basin:

45 percent of the acres received nitrogen and 41 percent receive phosphorus in the fall for spring-planted crops.

Nitrogen is applied at rates greater than 1.4 times nitrogen removal at harvest on 67 percent of the cropland.

Few farmers account for the nutrient value of manure when applying commercial nitrogen or phosphorus fertilizer.

Soil quality

Here's what our model simulation shows:

The cropland in the Upper Mississippi River Basin sequesters about 7.5 million tons of carbon dioxide equivalents annually.

This offsets the combustion of 0.75 billion gallons of gasoline, enough gasoline to power about 1.3 million cars for one year.

The greatest gains in soil organic carbon content occur where structural practices are used in combination with reduced tillage practices.

General Information About CEAP-UMRB Study

The Upper Mississippi River Basin study uses a science-based modeling approach to assess the impacts of conservation practices applied or installed by agricultural producers.

The study used a statistical sample drawn from the National Resources Inventory to simulate, through computer modeling, real-world conditions based on actual weather conditions and information on farming practices derived from a survey conducted by the National Agricultural Statistics Service.

These regional cropland studies are part of the Conservation Effects Assessment project—CEAP—a larger effort to assess the effects of conservation practices on the nation's grazing lands, wetlands and wildlife. Some studies will be conducted at the watershed scale.

USDA-NRCS prepared this study in conjunction with the Agricultural Research Service and Texas Agri-Life Research, part of the Texas A&M University system.

Land Use and Agriculture in the Upper Mississippi River Basin

The Upper Mississippi River Basin covers about 190,000 square miles—121.5 million acres—between northern Minnesota and the confluence of the Mississippi and Ohio Rivers.

The basin includes large portions of Illinois, Iowa, Minnesota, Missouri and Wisconsin and small areas in Indiana, Michigan and South Dakota.

About half the area of the UMRB is in crops such as corn and soybeans.

Eight percent of the UMRB is urban. The major metropolitan areas are Chicago, Minneapolis-St. Paul, St. Louis, Des Moines and the Quad Cities of Illinois and Iowa.

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