Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Missouri

Agricultural BMPs Reduce Herbicide Concentrations in Five Drinking Water Lakes Cameron Lakes, Mark Twain Lake, and Smithville Lake, Missouri

Waterbody Improved

Herbicide application to row crop agriculture and subsequent storm runoff impaired the water quality of five lakes in northern Missouri that were used as sources of drinking water. In 1998 the three Cameron Lakes, Mark Twain Lake, and Smithville Lake were placed on the 303(d) list of impaired waters for periodic high-atrazine concentrations. The project partners used a science-based approach to identify priority watersheds with the highest pollutant loading contributions. Through an outreach program, farmers were encouraged to measure and time atrazine applications more carefully, which allowed all five lakes to successfully meet water quality standards and to be removed from the 303(d) list in 2003.

Problem

In 1998 the Missouri Department of Natural Resources placed five lakes in northern Missouri (three Cameron Lakes, Mark Twain Lake and Smithville Lake) on the 303(d) list because they exceeded state water quality standards for atrazine. All had periodic atrazine concentrations above the Maximum Contaminant Level (MCL) of 3 parts per billion (ppb) established for public drinking water supplies.

Atrazine is a low-cost herbicide used for combating grass and broadleaf weeds in corn and is widely used. Farmers were concerned that they would have to greatly restrict use of the herbicide in their corn and soybean operations. The Environmental Resources Coalition (ERC), a nonprofit organization, used 319 funding and, with partners, formed the Watershed Research, Assessment and Stewardship Project (WRASP) to put together a strategy to improve water quality without negatively affecting farmers' business profits.

Project Highlights

Monitoring was conducted from 1999 through 2004 to evaluate the origin and quality of the water running into the affected lakes.

Lake monitoring was conducted before and throughout the growing season.

Approximately 50 automatic monitoring samplers were placed at field edges and in large and small streams that flowed into the lakes. Strategically sited monitoring stations measured the relative contribution of smaller subwatersheds into the lakes. Stream flow was taken into account at each sampling location. Each station had instrumentation that allowed simultaneous sampling and flow measurements during peak rainstorm flow events. The lakes themselves were sampled in late March (before seasonal atrazine applications) and continued every 3 weeks until September. The

Edge-of-field runoff monitoring equipment

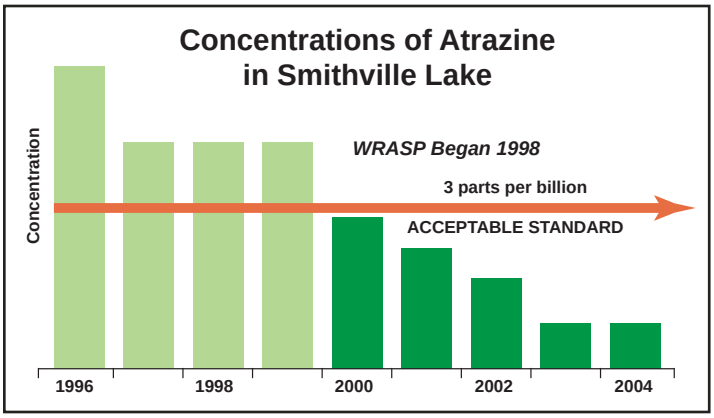
resulting data identified subbasins that contributed disproportionately to pollutant loads into the lakes.

Farmers were encouraged to voluntarily install best management practices (BMPs) to cost-effectively reduce pollutant runoff. Two tillage practices—no-till and minimum-till—were combined with selected atrazine application methods. Atrazine was applied at one of two rates—0.75 lb/acre or 1.5–2 lb/acre—using one of three methods: incorporation into the soil before planting, surface application before planting, or surface application after crop emergence. Grass buffer strips were also planted to retard and capture field runoff before it entered waterways. To promote these voluntary farmer practices, WRASP conducted field demonstrations, informational meetings, and one-on-one consultations with farmers from 2002 to 2004.

The Missouri House Interim Committee on Water Quality visit a WRASP site.

Results

Levels of atrazine (and other contaminants in the lakes) began to decrease after the first year of the project. The lakes' average levels of atrazine dropped below the MCL of 3 ppb for drinking water, and the Missouri Department of Natural Resources removed the lakes from the 303(d) list in late 2003.



Collaboration under the WRASP project led to reduced concentrations of herbicide in Smithville Lake.

Partners and Funding

ERC managed the WRASP project and administered the 319 funding. They formed a partnership with the Missouri Corn Growers Association who put together an alliance of business and governmental organizations including the Missouri Department of Natural Resources, U.S. Department of Agriculture—Agricultural Research Service, Environmental Protection Agency, Syngenta Crop Protection, Inc., and Bayer Crop Sciences. Funding for the 319 portion of the project was $1,000,000, while the total project cost was $5,000,000 over 5 years. To ensure future longevity of protective water quality practices, an ongoing Stewardship Implementation Project has been put in place. It continues the water-monitoring component of WRASP and extensively expands the one-on-one work with farmers to implement BMPs on larger, field-scale sites in the watersheds.

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