



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Improvement of Surface and Ground Water Quality

Waterbody Improved

Lake Creek, in Caddo County, is in one of Oklahoma's most intensive agricultural areas. Conducting educational programs and implementing best management practices (BMPs) decreased loading of pesticides, nutrients, and sediment to the creek. As a result, fish communities improved enough to allow removal of Lake Creek from Oklahoma's 303(d) list in 2002 for pesticides and unknown toxicity. Further water quality improvements are ongoing in this region as part of the Fort Cobb Watershed Based Plan.

Problem

Lake Creek is a 16-mile-long gaining stream fed by shallow ground water that seeps out continuously along the stream banks. Approximately 92 percent of the Lake Creek watershed is used for producing peanuts, cotton, wheat, alfalfa, and other small grain and row crops. Excessive and improper fertilization and pesticide use, along with shallow ground water and very permeable and highly erodible sandy soils led to creek impairments. High levels of nutrients and unknown toxicity thought to be related to pesticides were detected in surface and ground water. Approximately 12 pesticides and the fungicide Botran were detected in surface water and streamside seepage samples. Fish samples at two sites along Lake Creek in 1990 revealed very poor biological conditions relative to area reference streams, based on IBI (Index of Biological Integrity) scores. Because of these results, Oklahoma placed Lake Creek on the 303(d) list in 1998 as not supporting its Fish and Wildlife Propagation (FWP) beneficial use because of unknown toxicity and pesticide impairment.

Project Highlights

An educational effort on reducing fertilizer and chemical usage targeted landowners and highlighted the benefits of potential cost savings. One-on-one meetings and public sessions were held to teach peanut and alfalfa grow-

ers integrated pest management techniques including proper weed and insect scouting, determining pest thresholds, interpreting soil test reports and proper fungicide use. Demonstration BMPs illustrated techniques to manage vegetation; exclude cattle from riparian zones; and reduce nutrient, pesticide, and sediment loading. BMPs implemented from 1995 to 2002 included reduced tillage planting in peanut fields, riparian fencing, alternative livestock water source construction, grade stabilization structures, diversion terraces, deferred grazing, rotational grazing, and revegetation in riparian zones.

Results

More than 200 people attended the various educational presentations. More than 400 acres of pasture were converted to deferred or rotational grazing. Grade stabilization and diversion terrace structures were constructed. Approximately 20,000 feet of stream exclusion fencing was erected, and vegetation was planted in critical riparian areas. As a result of these practices and the accompanying educational program for proper pesticide and fungicide use, the fish community improved significantly.

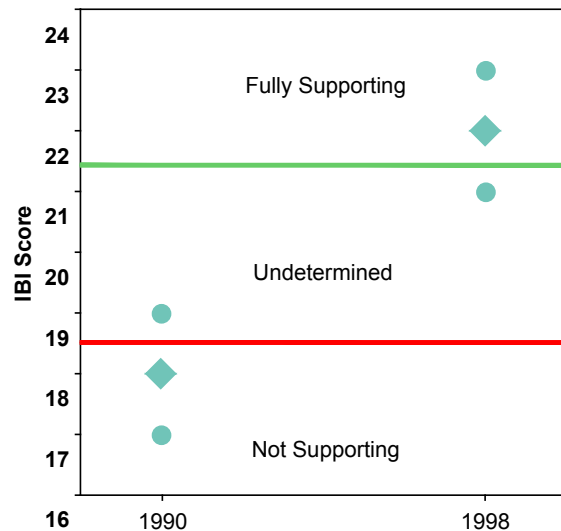
The median number of species caught in 1998 was 13.5, compared to 6 in 1990, and the

median number of fish caught in 1998 was 637, compared to 299 in 1990. The increase in these parameters improved the IBI scores for Lake Creek to the degree necessary to fulfill the state biological criteria in support of the FWP beneficial use. Additionally, samples of Lake Creek water and sediment failed to exhibit any toxicity using the same tests that had demonstrated toxicity in 1990. Because of these results, Oklahoma removed Lake Creek from the 303(d) list for unknown toxicity and pesticides in 2002.

Partners and Funding

Many groups contributed to the success of this project. Crucial educational efforts were led by the Oklahoma Cooperative Extension Service and the Oklahoma Department of Agriculture (now Oklahoma Department of Agriculture, Food and Forestry) with the participation of the other agencies. EPA section 319 funds provided \$280,441, while the State of Oklahoma supplied \$186,961 toward the Lake Creek project.

Lake Creek Fish Bioassessment



Fish bioassessment results from 1990 and 1998. Circles represent the IBI scores of fish collections at two sites in Lake Creek; diamonds indicate the average IBI score of the two sites. The improvement in these parameters resulted in an average IBI score that justified delisting (Oklahoma biocriteria allows pooling of data from multiple sites when they lie within the same reach).



U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-07-001E
April 2007

For additional information, contact:

Dan Butler
Oklahoma Conservation Commission
405-522-4500
dan.butler@conservation.ok.gov