



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Texas

Improved Herbicide Management Restores Safety of Drinking Water Source

Waterbody Improved

Aquilla Reservoir is an important source of drinking water and recreation but was found to have excessive levels of the herbicide atrazine beginning in 1997. Project partners initiated efforts to reduce agricultural atrazine sources—and to a lesser extent, urban sources—in the watershed. As a result of technical assistance to corn and sorghum producers, using agricultural best management practices (BMPs), and educating urban residents, atrazine concentrations in Aquilla Reservoir declined by 60 percent. The waterbody now meets atrazine concentration standards, and in 2004 the Texas Commission on Environmental Quality (TCEQ) recommended that Aquilla Reservoir be removed from the state's 303(d) list of impaired waters for 2004.

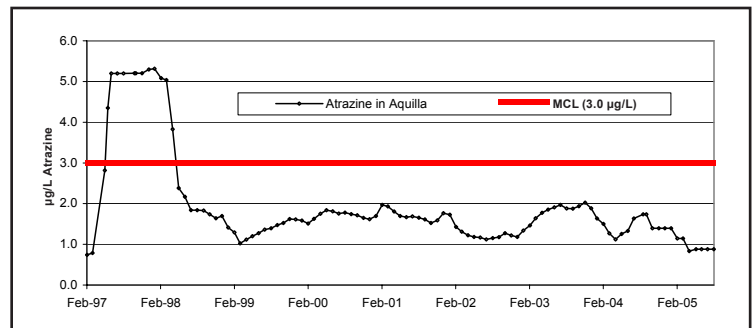
Problem

Aquilla Reservoir was built in 1983 for water supply, flood control, and recreation purposes. Approximately 10 miles southwest of the city of Hillsboro in east-central Texas, it controls drainage from a 255-square mile watershed. Corn and sorghum production comprise 40 percent of land use in the watershed. The reservoir is the sole source of water for the Aquilla Water Supply District's treatment plant.

Atrazine is an herbicide used by many corn and sorghum producers. It is also an ingredient in many residential lawn products. During the late 1990s, monitoring of finished drinking water showed that atrazine concentrations consistently exceeded state and federal drinking water standards mandating a maximum contaminant level (MCL) of 3 micrograms per liter ($3\mu\text{g/L}$). Three consecutive MCL violations led the state to place the reservoir on its 303(d) list of impaired waters in 1998.

The Aquilla Water Supply District took immediate steps to ensure public safety by reducing atrazine in drinking water through its treatment process. Meanwhile, TCEQ began an examination of atrazine loading to the reservoir.

The study found that all loading originated from nonpoint sources. This led TCEQ and the Texas State Soil and Water Conservation Board (TSSWCB) to establish a total maximum daily load (TMDL) for atrazine. EPA approved



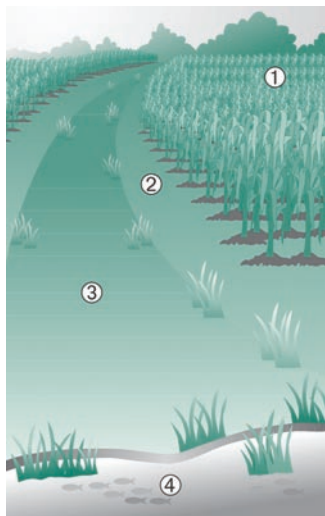
Atrazine concentrations in Aquilla Reservoir. Data represent running annual averages. Concentrations have steadily remained below the maximum contaminant level (MCL) since 1998. With the reservoir meeting the MCL requirement for more than 2 consecutive years, Texas has recommended that it be removed from the state's 303(d) list.

the TMDL in 2002. It required the reservoir to maintain a running annual average atrazine concentration not to exceed the $3\mu\text{g/L}$ MCL for 2 consecutive years. This would amount to a 25 percent atrazine load reduction.

Project Highlights

The atrazine threat to drinking water triggered several coordinated projects to address urban and agricultural atrazine sources and restore water quality in Aquilla Reservoir. State, federal, regional, and local agencies collaborated to formulate and implement plans designed to reduce reservoir pollution, protect against new pollution sources, and monitor progress through water quality testing.

Agricultural producers, affected water supply companies, government agencies, and other stakeholders formed the Texas



Sample best management practices used to reduce atrazine loads. A field of corn (1) is cultivated. Atrazine is tilled into the soil, rather than simply applied on top of the ground. Farmers may install filter strips (2) between the field and an adjacent creek (4). A grassed waterway (3) may also be used to direct runoff to the creek while filtering out pollutants at the same time.

Watershed Protection Committee, which identified BMPs for use in the watershed and documented BMP adoption. Recommended BMPs included incorporating atrazine into the soil, filter strips, grade stabilization, grassed waterways, terraces, integrated pest management (e.g., targeted herbicide application), and education. The committee also worked to increase pesticide dealers' awareness of the problem and gain their assistance and support in solving it. Finally, corn and sorghum producers received technical and financial assistance to implement the BMPs.

Project leaders also targeted urban areas for atrazine reductions. They prepared fact sheets about atrazine and alternative lawn management. Through the Texas Master Gardener program, they delivered

television public service announcements about proper application and storage of herbicides and pesticides. Finally, they distributed fact sheets and general articles to local newspapers, to feature columnists, and at local meetings.

To measure the effectiveness of reduction efforts, TCEQ conducted monthly water quality monitoring. In addition, a private corporation that markets atrazine continued its voluntary pesticide monitoring program with the area's public water suppliers.

Results

These efforts led to a 60 percent atrazine load reduction, far exceeding the TMDL. As presented in the graph on the previous page, over 2 consecutive years of monthly reservoir sampling showed atrazine concentrations well below the $3\mu\text{g}/\text{L}$ requirement. The waterbody now meets atrazine concentration standards, and TCEQ has recommended that it be removed from the state 303(d) list.

TCEQ will continue collecting quarterly samples to monitor reservoir water quality. In addition, finished drinking water will continue to be monitored for compliance with the Safe Drinking Water Act.

Partners and Funding

TCEQ and TSSWCB led the atrazine reduction project and developed the TMDL. Various Texas Watershed Protection Committee activities were also vital to the effort. Led by the Texas Department of Agriculture, the committee consists of representatives from TCEQ, TSSWCB, Texas Agricultural Experiment Station-Blacklands Research Center, Texas Cooperative Extension, USDA-Natural Resources Conservation Service, Brazos River Authority, and Texas Farm Bureau.

Other partners included the Aquilla Water Supply District, Woodrow-Osceola Water Supply Corporation, Hill County Appraisal District, Hill County Blackland Soil and Water Conservation District, Sabine River Authority, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, and Syngenta (formerly Novartis).

Since 1999, approximately \$2.8 million in EPA section 319 and nonfederal matching funds have helped to support this restoration effort. In addition, the USDA-Natural Resources Conservation Service provided more than \$1.9 million in cost-share funds between 1998 and 2003 to assist producers implementing BMPs in the watershed.

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Washington, DC

EPA 841-F-06-003F
June 2006