Reducing Nutrients in Agricultural Runoff - The Godfrey Creek Project in Gallatin County

The Godfrey Creek project, initiated in 1989 by the Gallatin County Conservation District and other key agencies, has two primary objectives: to demonstrate agricultural best management practices that will reduce suspended solids, fecal coliform, and nitrates in runoff from dairy operations, grazing, and farming practices; and to develop an education program for producers in the watershed.

Several animal confinement operations (dairies, swine, and beef operations) are located immediately adjacent to Godfrey Creek and are the major sources of impairment. But grazing management, riparian area degradation, and crop farming also add to the problem.

The education program can help the agricultural community in general understand how its actions impact water quality, the environmental and financial consequences of the impact, and the benefits of improvement.

Farmers turn out

All landowners became actively involved in project implementation at least to the extent of making management changes in their operations. Over 80 percent participated in major efforts such as fencing riparian areas, adopting improved grazing systems, removing livestock from riparian areas, establishing buffer zones, improving manure- handling systems, and improving irrigation water management. In addition, nearly all landowners participated in informational tours and meetings.

Reductions in nutrients

Baseline data on various water quality parameters was collected, including total suspended solids, nitrate + nitrite, total phosphorus, fecal coliform, and macroinvertebrate samples. To monitor the effectiveness of the project, data collected prior to 1994 were considered preproject; data collected since 1994 were considered post-project.

Samples of these parameters were taken 11 to 19 times a year at each of three sites. Annual means were computed from monthly averages of the raw data to eliminate potential effects of seasonal bias that might occur from an increase in sampling frequency part way through the project.

Postproject data are sufficient to prove that water in Godfrey Creek watershed did improve as a result of project activity. Estimated reductions in mean annual concentrations are:

- 58 percent for total phosphorus;
- 64 percent for total dissolved solids over preproject conditions

Fecal coliform data also indicate a dramatic 82 percent decline in bacterial contamination. These improvements were not, however, matched by reductions in nitrate plus nitrite. Instead, the data show an (estimated) average increase of nitrate plus nitrite of 24 percent.

Though it has not yet reached its goal of 80 percent reductions in these key indicators (except for fecal coliform), the project is successfully helping landowners gain control of the factors that influence surface and bank erosion and nutrient runoff. Agricultural practices that can be managed to help control nitrate include a combination of irrigation and manure disposal methods.