

ENVIRONMENT

Title: Best Management Practices Research in a Watershed with Swine Production Facilities - **NPB #02-042**

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Abstract: The South Fork of the Iowa River drains a 215,000-acre watershed in north-central Iowa dominated by agricultural land uses. There are a number of swine-producing facilities in the area, plus several farm operations that include cattle grazing. In order to understand the water quality dynamics of a large watershed that contains a range of livestock operations, the National Soil Tilth Lab (USDA-ARS), with support from the National Pork Board, has been monitoring water quality and conducting watershed assessments in the South Fork since 2000. This project supported several activities to assess best management practices in the watershed, and monitor water quality. These activities have provided maps of conservation plantings and permanent vegetation in the watershed, identified a possible new site for demonstration and research on a new constructed wetland site, documented water quality across the watershed during 2002, and assessed a range of soil properties near the beginning of a long-term manure management research project.

Results show that about 10% of the watershed is planted in permanent vegetation, with most of these areas located in the lower riparian valleys of the watershed. Conservation Reserve Program plantings are also mapped, with many being riparian buffers for streams in the upper parts of the watershed. About 2000 water samples were collected and analyzed for nutrient concentrations. Some differences between years and between sub-basins were found, based on grab samples collected from 13 locations. These differences are probably due to varying amounts of seasonal rainfall and runoff. In-stream monitors were used to continuously measure temperature and dissolved oxygen near the outlet of Tipton Creek during summer 2002, and results showed the water to be of suitable quality for a range of game fish. A process-level study of manure management effects on soil properties was initiated at a long-term experimental site, which will allow interacting effects of manure application, rotation, and slope position to be identified in several years time. The initial results showed some interesting variations in the amount and quality of organic matter depending on slope position, with resulting improvement in soil structure (aggregate stability) at the lower slope position. This range of research activities provides important progress towards the long term goal of assessing best management practices and water quality in the South Fork watershed, which is becoming an important location for research activities on agricultural practices and environmental quality that are of interest to swine producers.

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