Nonpoint Source Nitrogen and Phosphorus Loads at Implementation Scale

Issue: The Iowa Nutrient Reduction Strategy estimated potential reductions in nitrogen and phosphorous loads that could be achieved by a wide range of in-field and edge-of-field practices. The estimates were based on a review of published research on the effectiveness of various practices and potential applicability. However, most of the studies were conducted at plot scale. The report highlighted the need for studies that scale up to the area of practice implementation to better assess water quality impacts across landscapes and with multiple practices.

Objective: For most of the cultivated cropland in Iowa, the most appropriate scale for assessing agricultural nonpoint source loads to surface water would be from a few hundred to a few thousand acres. This project focuses on measuring N and P loads at this scale, and in relation to land use and management. In addition to better characterizing loads at implementation scale, this research will improve the predictability of practice performance and the understanding of practice uncertainty.

Approach: Several dozen potential monitoring sites have been identified in the upper Des Moines River, Iowa River, Raccoon River, Skunk River and Beaver Creek watersheds. Instruments will be installed at a selected set of sites for close interval, automated sampling and flow measurement. Land management and watershed conditions will be characterized by working with cooperating landowners/farmers to collect information on nutrient management practices, crop yield and soil test phosphorus. Nutrient concentrations and flow data will be used to calculate mass nutrient load from the contributing watersheds for evaluation against the land use and management information and GIS-based load estimates.

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