

## ENVIRONMENT

**Title:** Optimizing the Placement of Practices that Improve Water Quality Within a Watershed – **NPB# 01-024**

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### Abstract

There is an increasing need to design and implement best management practices (BMPs) that will effectively protect water resources. While BMPs can be put into practice in agricultural fields to minimize erosion and reduce nutrient losses, complementary practices located within riparian ecosystems are also being advocated and supported using public subsidies. Riparian buffers and constructed wetlands are the dominant examples of these practices; riparian buffers can intercept surface water runoff, but constructed wetlands are needed to intercept and treat tile drainage. Can the placement of these practices be optimized within a given watershed? The Tipton Creek watershed, a 50,000-acre catchment in north-central Iowa, was used as a case study. Hydrologic modeling of digital elevation data helped to identify where the best opportunities to intercept surface runoff waters exist along the stream network. Buffer placement was prioritized for streamside zones where overland flow should occur as distributed (sheet or rill) flows. Also, we identified those sites that qualify as possible CREP (Conservation Reserve Enhancement Program) wetlands in Iowa, which are aimed to treat tile-drainage waters.

Results of the analyses were produced as a series of maps, and a field review was carried out, assisted by locally stationed agency personnel, to evaluate the accuracy of the maps and their utility for planning purposes. The feedback from this review was positive. The maps were carefully compared to existing land use along the watershed's riparian corridor, and 12 specific sites were selected for review. While several of these sites had BMPs installed recently, several others were identified as priority sites for establishment of new riparian BMPs. Agency personnel are initiating landowner contacts to encourage voluntarily participation in USDA conservation programs for these sites. One conclusion from this study, supported by statistical analysis of terrain data, is that sensitive areas best suited for riparian BMPs tend to be relatively small in size (<1000 ft of length along the stream), and well distributed throughout the watershed. This may alleviate landowner concerns that watershed assessment technologies may target a small group of individuals to bear a disproportionate share of conservation investments. The analyses conducted only required existing data that is publicly available. Therefore similar analyses can be readily and inexpensively applied to other watersheds, and allow producers to identify locations where riparian buffers should effectively intercept nutrients, and those sites that should meet criteria for installation of CREP wetlands.

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