

Site Suitability Modeling for Water Quality Riparian Buffers

Joe Herring, Thomas Isenhardt, and Richard Schultz
Department of Natural Resources, Ecology, and Management
Iowa State University
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Purpose of study. To develop rapid and repeatable GIS methods of ranking site suitability for the installation of future riparian buffers in agricultural watersheds.

Methods. Potential restoration sites within 180-feet (55 m) of perennial stream channels were segmented by landowner tract boundaries, since this is the typical scale at which new conservation practices are installed. 180-feet represents the maximum width to which a new Riparian Forest Buffer practice may be funded by the USDA Conservation Reserve Program (CRP) in most states.

Sites were ranked in three ways:

1. **Erosion risk near the stream as an indicator of site sensitivity.** Risk was based on the mean L, S, and K factors of the RUSLE in the riparian zone.
2. **Potential runoff interception as an indicator of a site's ability to slow down incoming surface runoff and trap & filter NPS pollutants.** Site potential was based on the size of the immediate upslope drainage area and the local topography in the riparian zone.
3. **Erosion risk in the upslope source area (catchment).** Risk was based on the mean L, S, and K factors of the RUSLE in the immediate upslope source area delivering flow to the riparian zone.

Results. Results are published to an interactive mapping website for each watershed. Each website provides a color scheme to identify "high priority" sites, and users may click on any site to learn details about that site's size, amount of cropland, management concerns, and potential government programs & practices that may be available for conservation. See attached page for more information.

Strengths.

- The methods are applicable to any watershed in the United States and much of the world due to easily obtainable, free data that are required as inputs (soils, streams, tract boundaries, and a digital elevation model)
- The methods are quick and reliable, yet sophisticated in their ability to model surface hydrological flows
- The results are easily interpreted and are readily applicable to 'real world' situations for watershed managers

Limitations.

- Groundwater flow and artificial drainage, which riparian buffers cannot treat, are not accounted for
- Land management variables are also not accounted for, including crop rotation, tillage system, livestock presence, fertilizer rates, other conservation practices, etc.
- Data quality impedes accuracy of results (Modeling is currently limited to a 30-m grid resolution)

To contact the authors. Joe Herring (jherring@iastate.edu) is a M.S. student, Thomas Isenhardt (isenhardt@iastate.edu) is an associate professor, and Richard Schultz (rschultz@iastate.edu) is a professor in the Department of Natural Resources Ecology and Management (NREM) in 339 Science II at Iowa State University, Ames, IA 50010.