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Targeting Watershed Nitrogen Export at the Local Level: The Role of Landscape Sinks

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Abstract:

One of the major advances in watershed science over the last 25 years has been the realization that certain areas of the landscape have a capacity to function as removal sites (i.e., sinks) for water-borne nitrogen (N). We present a geospatial tool for local watershed managers to prioritize restoration and abatement practices based on the extent and location of N sinks within specific stream reach ecosystems. Our approach uses readily available county scale geospatial data (e.g., SSURGO soils, USGS digital terrain data, Anderson Land Use classifications) to track the pathway and fate of N from source areas through critical hydrologic and geomorphic attributes of stream reach ecosystem N sinks in lower order watersheds. Areas of high N sink capacity can be within or along stream reach ecosystems and include certain types of wetland riparian zones, reservoirs, and particular features within streams, such as pools or organic debris dams. The risks of watershed N export can be diminished in watersheds where sinks intercept and transform N moving from upland sources. In contrast, where landscape sinks are absent or are bypassed by land management practices (e.g., tile drainage or storm water conveyance systems), activities generating N losses pose a greater risk of watershed N export. We will illustrate the tool through case studies from southern New England.

Impact Statement:

We are working with the NEMO national network and with NRCS personnel to introduce this tool to local decision makers and land managers in coastal areas. This tool will permit decision makers and landowners to target best management practices (BMPs; e.g., intensive source controls or stream reach ecosystem restoration) in subwatersheds that lack N sinks. In subwatersheds with important N sinks, the tool will provide guidance to protect critical areas.

Category: Watershed Assessment and Restoration

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