

Using GIS to Predict Pollution in Pennsylvania

The Challenge

Control of soil erosion and associated stream sedimentation is identified as a critical need within the Kiski-Conemaugh (KC) watershed in southwestern Pennsylvania. Increased erosion contributes to flooding, reduces the storage capacity of reservoirs, and transports contaminants downstream. Although some of the erosion occurs naturally because of the steep topography, other activities or disturbances within the watershed that contribute to the overall problem include these:

- Acid mine drainage, which remains the number one problem in the basin.
- Nonpoint source pollution, which includes agricultural and urban runoff, nitrogen, and other contaminants.
- Dirt and gravel roads.

The Solution

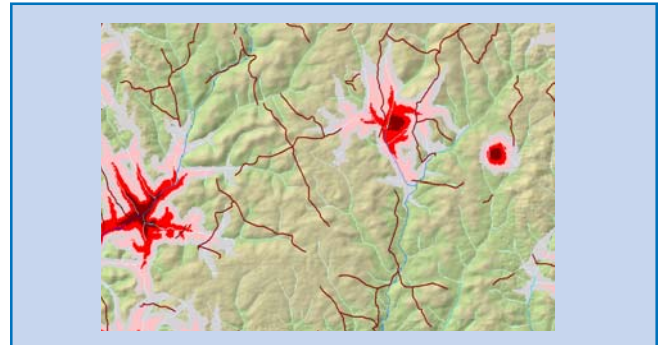
The nonprofit Conemaugh Valley Conservancy (CVC) District developed a watershed Geographic Information System (GIS) model to assist in remediation planning for acid mine drainage sites. This led to a modeling system, which was developed to evaluate, identify, and recommend treatments or best management practices (BMPs) in watersheds that are affected by both point and nonpoint source pollution.

With a \$58,000 grant from the Northeastern Area, the CVC was able to expand this model allowing them to predict inputs from some of the leading causes of pollution in the KC Watershed. The ability to predict the effects of clear-cuts, strip mines, dirt and gravel roads, or agriculture on stream water quality was examined.

The GIS model performs scenarios such as these:

- What if land cover changes from forestland to agriculture?

An interactive GIS model allows users to predict the effects that land-based activities will have on water quality.



The gravel roads, shown as brown lines, need maintenance in order to prevent erosion.

- What would happen to total suspended solids if a new dirt and gravel road were constructed in a particular location in a watershed?
- How would a vegetated buffer improve water quality in a watershed?

Resulting Benefits

- An interactive GIS model, which allows users to perform “what if” scenarios on the landscape within the KC watershed.
- Solution-oriented information for environmental managers to use in making strategic decisions regarding water quality issues in the KC watershed.
- Identification of the sub-watersheds or tributaries that contribute the most contamination to the river.

Sharing Success

- The GIS model will be a universal tool for public use. The model will be available in CD format to anyone who wants to use it as an analytical tool. This tool has been designed to be easier and faster to use than standard GIS applications.
- The Dirt and Gravel Road Task Force and the Pennsylvania Conservation Commission have completed baseline GIS mapping of all dirt and gravel roads in the State. CVC will make the results of the gravel road scenario available to the Task Force. The Task Force will then decide which roads need repairs in order to prevent further sedimentation from reaching the stream.



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