

Aquatic Macroinvertebrates

Park Analysis of sensitive stream species



What and why

Small watersheds of the Upper Delaware, like anywhere else, are influenced by land cover and land use change, including residential development. Urban development increases impervious cover, such as pavement and rooftops, preventing water from soaking into the ground. This can reduce water quality by increasing sediment and pollutant loads, as well as reducing subsurface flow. Each of these changes negatively impacts living organisms in the river and stream ecosystems. Stream biota, particularly sensitive species, provide good indicators of water quality and aquatic life, crucial for maintaining a healthy ecosystem within the park.

How it works

We characterized the health of watersheds based on predictions of stream biota using models that include land cover information, derived from satellites, and stream data collected in the mid-Atlantic region by the Maryland Biological Stream Survey. We then predicted the diversity

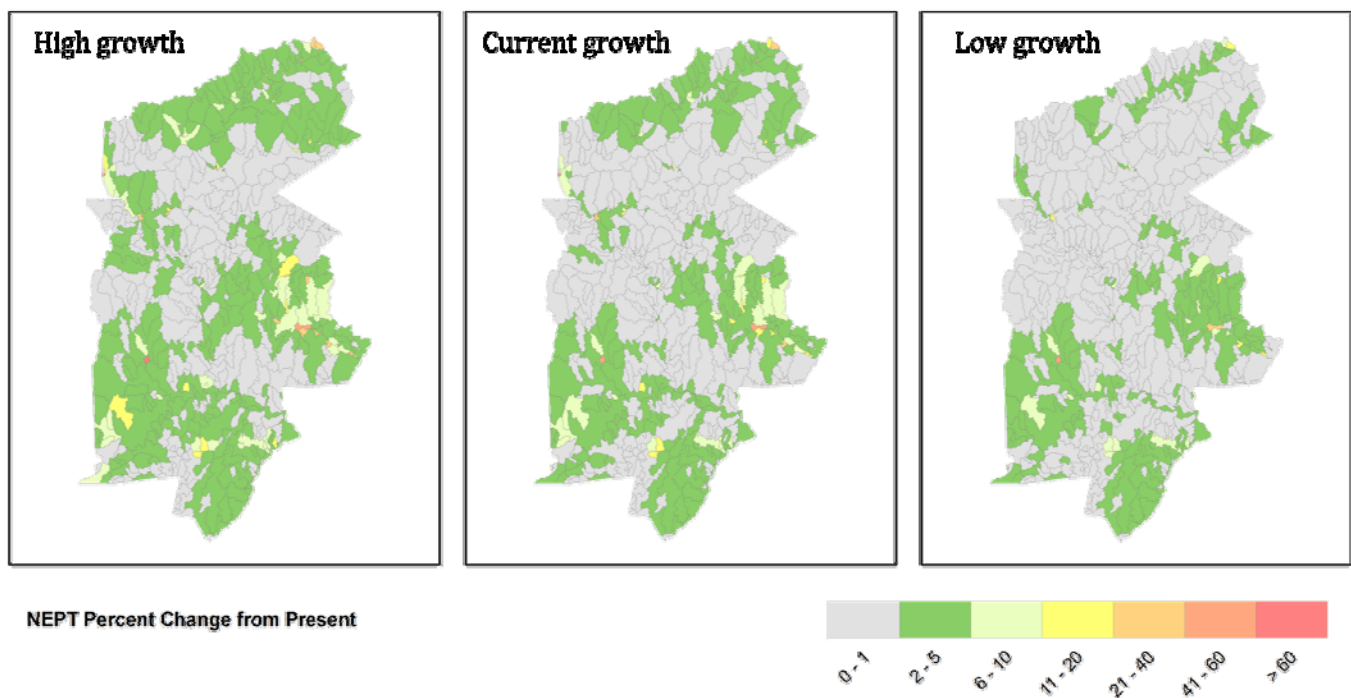
and the abundance of sensitive species (stoneflies, caddisflies and mayflies) into the future (to 2030) under different urban growth scenarios. Predictions for the Upper Delaware watershed streams show how much these species decline as urbanization increases at current rates.

Results

Species that are adapted to healthy streams and provide food for fish populations, particularly trout, show substantial declines with increasing urbanization. Most small watersheds in the Upper Delaware are impacted, and some could experience loss of more than half of these sensitive species. Even sparse residential development increases the amount of impervious cover by changing water flow and introducing pollutants. These findings are now being assessed using local stream measurements being collected by Park Service and other scientists.

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<http://science.nature.nps.gov/im/monitor/lulc/palms/index.cfm>



Predicted declines (%) in the abundance of sensitive stream species under three scenarios of urbanization: high growth, current trend of growth, and conservation oriented growth. Each scenario decreases stream biotic integrity, but the impacts vary by watershed.

