

Ecosystem services derived from headwater catchments

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We used data from the US Environmental Protection Agency's wadeable streams assessment (WSA), US Forest Service's forest inventory and analysis (FIA), and select USFS experimental forests (EF) to investigate potential ecosystems services derived from headwater catchments. C, N, and P inputs to these catchments were estimated from site measurements and atmospheric deposition models. C, N, and P sequestration in vegetation and soils were estimated from the proportion of the catchment in forests and vegetation and soils data from the forest inventory databases. C, N, and P export from catchments was estimated based on measured stream chemistry and flow, microbial respiration and denitrification, and extrapolating these from instantaneous to annual estimates. Water quality benefits were estimated by mass balance. N removal by headwater streams was modeled using ambient nitrate concentrations and stream depth. Water yields were calculated from site measurements and national-scale hydrographic models. These catchment-scale ecosystem services were correlated with atmospheric deposition and C, N, and P stoichiometry of stream chemistry. Valuations of these ecosystem services, based on market or substitution pricing, suggests the relative importance of headwater catchments.

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