

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Integration of water quality, habitat, and benthic macroinvertebrate data to assess ecological integrity of streams in Yellowstone National Park

Discipline: Natural

Type of Project: Technical Assistance

Funding Agency: National Park Service

Other Partners/Cooperators: Colorado State University

Effective Dates: 9/1/2007 - 4/30/2009

Funding Amount: \$21,362

Investigators and Agency Representative:

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Project Abstract: Colorado State University and the Greater Yellowstone I&M Network will work together to: 1) identify macroinvertebrate metrics for assessing biological integrity of the unique aquatic ecosystems in Yellowstone National Park; 2) assess natural spatial and temporal variation of these metrics; 3) quantify the relative influence of habitat and water quality (e.g., watershed area, stream order, elevation, physicochemical characteristics) on macroinvertebrate metrics; 4) estimate expected values for metrics based on their statistical distribution at reference sites; and 5) develop and validate a multimetric index of biological integrity that is specific to the unique environmental conditions in streams at Yellowstone National Park.

Water quality, habitat, and macroinvertebrate data collected from 45 locations in Yellowstone National Park from 2002-2006 will be used to develop and validate a multimetric index of biological integrity for stream ecosystems. We will combine stepwise multiple regression and multivariate statistical procedures to select individual metrics that are sensitive to natural and potential anthropogenic stressors in Yellowstone National Park. An initial list of benthic macroinvertebrate metrics based on abundance, richness, dominance, diversity, and pollution tolerance will be considered

Outcomes with Completion Dates:

1. Master list of benthic metrics determined to be appropriate for use in Yellowstone National Park (December 10, 2007)
2. Multimetric index developed for aquatic ecosystems specific to Yellowstone National Park (April 30, 2008)
3. Reference streams and the environmental variables responsible for separating reference from those impacted by natural or anthropogenic disturbances (July 30, 2008)
4. Final Report, suitable for a peer-reviewed publication, describing the development and application of the multimetric index at Yellowstone National Park (December 1, 2008)

Keywords: multimetric index, water quality, benthic invertebrates, Greater Yellowstone inventory and monitoring network, Yellowstone NP, Colorado State University

For Administrative Use Only:

Date Annual Report Received:

Date Final Report Received:

Publications, etc. on file: