

# Response of benthic algal and invertebrate communities to nutrient enrichment in agricultural streams: Implications for establishing nutrient criteria.

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## **Biographical sketches of authors**

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## **Abstract**

As part of the USGS National Water Quality Assessment Programs Nutrient Effects study, benthic algae and invertebrate communities were used to examine nutrient enrichment in the Central Columbia Plateau-Yakima River (Washington) and Central Nebraska (Nebraska) study regions. In each region, 28-29 independent sites were selected to represent a gradient of nutrient conditions. The study was carried out at low-flow conditions in 2003. Data collected included nutrients, benthic and seston chlorophyll-*a*, benthic algal and invertebrate communities, stream and riparian habitat, and basin-scale land use. Based on multivariate ordination methods, algal and invertebrate communities were significantly different between regions. These differences were due to different combinations of explanatory variables including nutrients for each study region. Explanatory variables identified during the ordination analysis were incorporated into significant predictive models using nonparametric multiplicative regression. The most significant models used nutrient data in combination with other explanatory variables to predict algae metric scores. Those models predicting benthic and seston chlorophyll-*a* concentrations were statistically less significant. The results of this study suggest that algal and invertebrate communities from different agricultural settings respond to different combinations of nutrients and other explanatory variables. These findings suggest that predictive tools used to help establish nutrient criteria may need to be done on a regional scale. The study also suggests that more ecologically realistic statistical modeling tools can be used to relate biological response variables to predictor variables including nutrients. The presented modeling approach could be used to help establish regional nutrient criteria.