SPARROW MODELS OF FISH COMMUNITY METRICS

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Abstract: SPARROW (Spatially Referenced Regression On Watershed attributes) models mathematically relate measurements of water quality made at a network of sampling stations to spatially referenced characteristics of the watersheds draining the stations (see Smith and others, 1997). To date, the methodology has been used to describe the transport of waterborne contaminants in stream and river networks, and the underlying form of the model has been a mass-balance relation. In this study, SPARROW models were used in an attempt to predict fish community metrics as functions of a variety of basin characteristics. The metrics examined included measures of species richness and the presence or absence of selected key species at a given stream location. Because the dependent variables examined here, like many ecologically important variables, are not biomass measures, the models are not mass-balance in form. The explanatory powers of many natural and human-related basin characteristics were tested in this study. Relaxation of the usual mass-balance constraint allowed for greater flexibility in formulating the models, but made physical interpretation of predictor variables and their associated coefficients more difficult. Spatial referencing of all variables in the models increased the physical interpretability of model components.

REFERENCE

Smith, R.A., Schwarz, G.E., and Alexander, R.B. (1997). Regional interpretation of water-quality monitoring data, *Water Resources Research*, 33(12), pp 2781-2798.