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Predicting thermal regimes of stream networks across the Chesapeake Bay Watershed: Natural and anthropogenic influences.

Thermal regimes are a critical factor in models predicting joint effects of watershed management activities and climate change on fish habitat suitability. We have compiled a database of lotic temperature time series across the Chesapeake Bay Watershed (725 station-year combinations) from both state and federal data sources with the goal of creating spatial network statistical models for stream temperature regime metrics, using an approach developed by the U.S. Forest Service. We are extrapolating methods currently being utilized to predict New England stream temperatures to the Chesapeake Bay Watershed in order to develop models to predict median monthly stream temperature as well as daily stream temperature range, maximum temperature and other possible thermal metrics during the growing season. We will be using air temperature metrics along with components of watershed physiography and land use to determine possible thermal regime predictors. Best models will be based on Akaike Information Criteria values and may include spatial covariance terms using both proximity along the stream network (upstream and/or downstream) and, in some cases, Euclidean distance.

Keywords: stream network, temperature, spatial statistical model, Chesapeake Bay Watershed