Joint Aquatic Sciences Meeting*, May 18-23,Portland, OR*

Detenbeck, Naomi E., Alisa Morrison, Ralph Abele, Darin Kopp, and Jessica Morgan. 2014.

Predicting thermal regimes of stream networks across New England: Natural and anthropogenic influences.

Thermal regime is a critical factor in models predicting joint effects of watershed management activities and climate change on habitat suitability for fish. We used a database of lotic temperature time series across New England (> 7000 station-year combinations) from state and Federal data sources to create spatial network statistical models for stream temperature regime metrics, using an approach developed by the U.S. Forest Service. Median July and August stream temperatures are best predicted by a combination of median monthly air temperatures, main channel slope, solar radiation (corrected for topographic and riparian shading), coarse surficial deposits, and watershed storage (August only). Predictors for daily July or August stream temperature range and growing season maximum temperature also include corresponding air metrics, watershed percent imperviousness and mean discharge (daily ranges only). With one exception, only maximum daily rate of change (ROC) in air temperature was retained in predictive models for stream temperature ROC. Best models based on Akaike Information Criteria values included 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, New England