DETERMINING OPTIMAL STREAM TEMPERATURE HABITAT BASED ON REMOTE SENSING DATA IN VERMONT STREAMS

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Knowing the average summer temperature regime in a stream can help determine if it is optimal habitat for cold water fish. An important fish species is the brook trout (Salvelinus fontinalis), which are a native game fish in Vermont. In theory, one could find optimal habitat by looking at the temperature regime of a stream in the state. One way to determine the average temperature is to place temperature loggers in a stream reach, but this may not be practical to determine the average temperature of streams throughout the state. Using historic state temperature logger data, remote sensing and GIS data layers were used to create a multivariate equation of geologic and land use data todetermine the temperature of a specific reach. Variables included geologic material, hydraulic conductivity of soils, sediment size, groundwater inputs, sinuosity, aspect, gradient, channel width, and percent of land use such as urban, agricultural, and forested. This was calculated only using streams that were second, third, and fourth order. Temperature loggers were also placed out in the field and various streams in order to compare actual temperature data to predicted data for a scale of accuracy. If the predictions using the equation are accurate enough, one could use the equation for restoration purposes to change the variables and see how the proposed activities would influence the temperature in a way that would provide better habitat for cold water fish, especially brook trout.