

Brook Trout Water Temperature Study 2011

Project Summary

In 2009, the Rappahannock Friends and Lovers of Our Watersheds (Rapp FLOW), Trout Unlimited (TU), Piedmont Environmental Council (PEC) and with support and contributions from the Rappahannock League for Environmental Protection (RLEP) started on a project to better understand brook trout in Rappahannock County, VA. A report produced by TU for the Eastern Brook Trout Joint Venture, *Eastern Brook Trout: Status and Threats* gave an assessment of brook trout habitat for each state in the eastern U.S. For Virginia, the greatest threat to brook trout habitat was high water temperatures, followed by poor land management, lack of riparian habitat, grazing, and stream fragmentation (ex: roads). Their assessment shows that brook trout habitat has been greatly reduced in Virginia, but for the sub-watersheds on the eastern portion of Shenandoah National Park (SNP) the assessment rated the habitat as being "Intact." Most of the habitat in Rappahannock County for brook trout is contained in Shenandoah National Park in the head waters of the Rush, Thornton, Hughes, Jordan and Hazel Rivers due to more ideal water temperatures due to the intact forested riparian buffers. Eastern brook trout prefer water temperatures below 68°F, and cannot survive temperatures above 77°F.



To better understand water temperatures in streams in Rappahannock County, last year from May to October of 2010 RappFLOW collected continuous water temperature readings on the North Fork and South Fork of the Thornton River and the Rush River (8 sites total) using HOBO Water Temp Pro V2 temperature loggers. All of the loggers recorded temperatures that were over the preferable range for brook trout habitat (< 68° F) starting June and ending in the middle of September 2010, with some of the loggers lower in the watersheds exceeding the >77° F for multiple days in June, July, August. The biggest factor from last year study was the extremely low stream flow

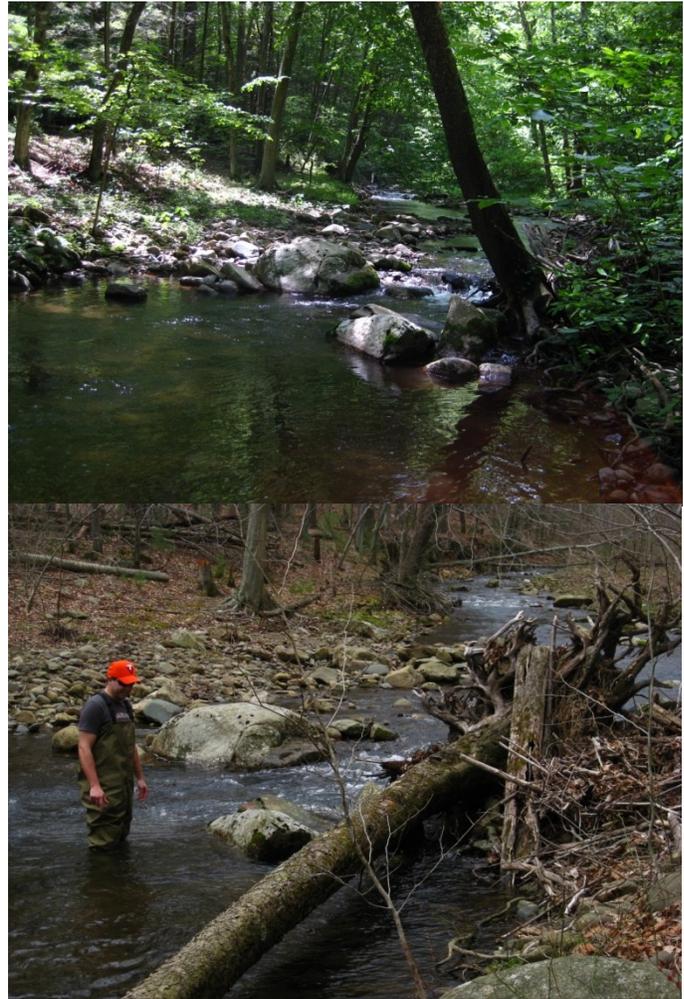
during the summer, which caused some stream segments that had temperature loggers in riffle sections to go dry.

2011 Water Temperature Study

For the 2011 Water Temperature study we changed a few of the parameters in the study in order to collect a better temperature data set. We added sites to the Hazel and Jordan Rivers and kept two sites each on the North and South Forks of the Thornton River and on the Rush River. To prevent issues during low flow events and to better monitor the habitat where brook trout would be found during the summer months, all of the temperature loggers were placed in pool sections instead of riffles. Also temperature loggers were placed in streams earlier (April) and removed in the late fall (November) in order to evaluate water temperatures before and after the hotter summer months.



Only 7 temperature loggers out of the 9 sites were recovered when RappFLOW volunteers collected them in November. Loggers at the Upper North Fork of the Thornton River, Upper South Fork of the Thornton River could not be found, and were most likely washed downstream during heavy flooding during the spring. Also a logger recovered at the lower South Fork of the Thornton River was crushed due to a large volume of rocks that had been deposited on top of it during the study period and no data could be recovered. The data collected showed very similar results to last year's temperature study, with all sites going over the preferred temperature range of 68° F during a portion of the summer months. As to be expected the upper watershed sites had the lowest temperatures during the study period, with the exception of extremely high temperature readings (90°-101.4° F) from the Upper Jordan River that occurred at the same time of day for a ten day period during August, most likely caused by exposure from sunlight for 30 minutes each day. The lower temperature logger sites did not have issues with low flows this year, but still showed signs that brook trout would have difficulty living in the pools being monitored due to high temperatures over a few weeks during the summer months, but temperatures in the lower watershed during the spring and fall do show promise for brook trout.



Water temperature monitoring location on the Upper North Fork of the Thornton River. The top image was taken at the start of the 2010 temperature study, and the bottom image was taken at the start of the 2011 study.

Water temperature is only one piece of the puzzle in determining the quality of brook trout habitat in a stream. Water quality properties (i.e. dissolved oxygen, pH), stream morphology (gravel stream bottoms, adequate pools and riffles) and a healthy aquatic ecosystem (plants, macroinvertebrates, and fish species) all need to be evaluated in order to improve brook trout populations and habitat. By planting more riparian buffer segments on sections of streams that do not vegetative cover, stream temperatures and along with the aquatic habitat could be improved below the SNP boundary. Rapp FLOW and TU will continue to monitor water temperature for the coming years and add other streams in Rappahannock County that contain brook trout higher in their watersheds.

Related Links:

Piedmont Environmental Council: <http://www.pecva.org/>

Rapidan Chapter of Trout Unlimited: www.rapidantu.org/

Rapp FLOW: <http://www.rappflow.org/>

Trout Unlimited: <http://www.tu.org/>