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Brook Trout, Our Environmental Refugees

By Robert N. Whitescarver

Middle River flows through our land. Brook trout used to thrive in it —and most freshwater streams throughout the Chesapeake Bay watershed. They migrated or died long ago, environmental refugees from the sediment-laden waters. Middle River is slowly being restored and one day, we will reintroduce this native fish to the waters that flow through our farm.

Brook Trout are pollution sensitive — they must have cold, clear water to thrive and survive. I believe they vanished from the river when our ancestors harvested the trees along the river's banks in the early 1800s. The trees were harvested for many reasons, but mainly to clear land to grow crops. Without the shade from the trees, the water temperature rose higher than the trout's level of tolerance, and the aquatic ecosystem lost its main source of food: leaves from native trees.

But perhaps the biggest culprit in the demise of the fish was soil erosion from wheat fields before the Civil War. The Shenandoah Valley was known as the “bread basket” of the Confederacy and produced more wheat than anywhere else in the United States. Wheat production at that time involved much plowing and discing that made the land vulnerable to erosion.

Soil in streams is terribly damaging. It clogs the gills of aquatic insects and buries the rocks on the stream bottom. This sediment basically suffocates all the creatures that make up a healthy aquatic ecosystem. Brook trout and other pollution-sensitive fish migrate elsewhere to survive or die because there is nothing to eat, thus the term “environmental refugees.”

Today, the Shenandoah Valley remains Virginia's largest agricultural region, but not for wheat production. The valley produces more beef cattle than any region in Virginia and perhaps the entire Chesapeake Bay watershed. Cows eat grass and we can grow a lot of it. Unfortunately, most of the cattle in our watershed have direct access to streams.

Cattle in streams do bad things. They trample the banks and the stream bottoms, dislodging soil and destroying aquatic ecosystems. They defecate and urinate in the stream, polluting the water. Nutrients contained in manure are one of the main reasons for dead zones in the Chesapeake Bay. Manure also contains pathogens such as *E. coli* — a bacterium found in the intestines of mammals.

Middle River is on Virginia's “Dirty Waters List” because of sediment and high

concentrations of E. coli. The state conducted research to determine the source of the bacteria, and according to their findings, 94 percent of the E. coli in the river comes from livestock.

The state standard for E. coli in Virginia for freshwater streams is 235 colony-forming units per 100 ml (cfu/100ml) of water. Health officials warn that E. coli counts above this limit may cause human health problems and they don't recommend "direct contact" with water exceeding this limit.

When the river enters our land the E. coli counts are consistently more than 1,000 cfu/100 ml. That's right, 1,000! The river flows about a quarter of mile across our farm through riparian buffers we planted in 2004. When the river exits our farm, the E. coli count drops by 50 percent.

We fenced the cows out of our part of the river in 2004. Most of the denuded banks are now fully vegetated with native plants and trees. The leaves falling into the river replenish the aquatic ecosystem with the food it needs to restore itself. I call these leaves the "corn silage" of the aquatic ecosystem.

The E. coli count in the river is reduced by half on our farm because the aquatic ecosystems are processing the in-stream pollutants. Science tells us that a stream flowing through a forested buffer is two to eight times more capable of processing in-stream pollutants than a stream without trees along the banks.

"Restoring and sustaining naturally reproducing brook trout populations" is one of the goals in the 2014 Chesapeake Bay Watershed Agreement. Streamside fences to keep livestock out of the water and the planting of native trees along the banks of the stream are two very important practices to achieve this goal.

To find out how to help restore brook trout populations in your watershed, contact your local Soil and Water Conservation District or United States Department of Agriculture office.

Robert Whitescarver is a farmer, certified nutrient management planner in Virginia and a retired District conservationist for the USDA. He can be reached through his website at:

<http://www.gettingmoreontheground.com>