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Fences and Trees for Clean, Clear Rivers

By Robert Whitescarver, for the Bay Journal News Service

The Shenandoah Valley's Middle River, which begins its winding journey to the Chesapeake Bay in the farm country west of Staunton, Va., is one of the most polluted rivers in the state. That's the bad news. The good news: We have seen firsthand how the river, with a little help from farmers, can heal itself. By simply fencing cattle out of streams and planting trees along the banks, we have turned our farm into a bacteria filter, cutting *E. coli* bacteria levels by nearly a third as the river flows through our property.

The Middle River, which eventually flows into the South Fork Shenandoah River and then the Potomac, has been on Virginia's "dirty-waters list" for more than 20 years, because it exceeds the state standard for *E. coli*. It also violates the state's General Standard, meaning there is so much sediment in the water the river cannot support a healthy aquatic ecosystem. There is hope for turning that around.

When the river enters our farm, the average *E. coli* level is 2,471 colony-forming units (CFU) per 100 milliliters of water. That is more than 10 times Virginia's standard for *E. coli*, which is 235 CFU/100mL.

But a remarkable thing happens over the course of the farm's half-mile stretch of river. By the time the river leaves our property, the average *E. coli* level has been reduced 30.6 percent to 1,715 CFU/100mL.

While that's still pretty polluted, it is a huge improvement. What's

happening?

Here's the story.

While the river begins just six miles upstream from us, by the time it enters our farm it's 19 feet across, far too wide to jump across. When the weather is cold, the water is crystal clear. But when it's warm out, it looks like chocolate milk.

The cause of the pollution is obvious. Cattle cool off in waterways upstream, where they wallow, defecate, urinate and trample up and down stream banks.

The trampling dislodges soil from the riverbank and bottom, giving the water its chocolate color. This murky water, full of suspended soil particles, harms aquatic life by clogging the gills of fish, smothering eggs and blocking sunlight needed by underwater vegetation. And of course the manure deposited by livestock in and near the stream is the source of fecal coliform bacteria and nutrients. This devastating contamination fuels algae blooms, which further cloud the water and rob it of its life-giving oxygen. The bacteria can also cause illnesses, in livestock and humans alike.

Years ago the Virginia Department of Conservation and Recreation (DCR) met with the landowners in our community to inform us that the river was polluted. They told us that most of the pollution was caused by livestock having access to the river and its tributaries.

"It's not us," many farmers responded. "You'll have to prove it."

So the DCR set out to prove it. They worked with a private company and James Madison University to track down the source of the bacteria. They collected water samples from the river and feces from the land, grew cultures from each to see whose bacteria from the land matched up to the bacteria in the water.

They determined that 94 percent of the fecal matter in our river came from livestock. It was proven with empirical data — not a model.

On our farm, we fenced cattle out of the river in 2004 and planted native trees and shrubs along the banks. Many of those trees are now more than 15 feet tall. It's a joy to walk in the shade along the river and see beautiful native flowers such as jewelweed, goldenrod, and grand lobelia.

These trees and shrubs do so much for the river. They shade the water, stabilize the stream banks and provide food and habitat for wildlife.

The pollution reduction in our meager half-mile of the river boils down to two simple points. First, we don't have any cows in the river. Second, the trees and shrubs, known as riparian buffers, reduce erosion and help the aquatic ecosystem function.

There's no shortage of data showing that riparian buffers make for healthier streams and rivers. Scientists from Pennsylvania's Stroud Water Research Center, for example, determined that a stream flowing through forested buffers is two to eight times more capable of processing in-stream nitrogen pollution than a stream without trees and shrubs along its banks.

Not only do the trees and shrubs stabilize the soil and prevent erosion, the leaves of trees fall into the water and provide food for multitudes of critters that thrive in the water. These leaves are the corn silage of the aquatic ecosystem.

If we can get a 30 percent reduction in *E. coli* in half a mile, think what five miles or 100 miles could do. It doesn't matter if that pollution comes from a wastewater treatment plant, a malfunctioning septic field or the back end of a cow.

The bottom line is we can cut a lot of pollution in our rivers if we buffer them with trees and shrubs, and keep the cows out. Our little half-mile on the Middle River shows that it's just that simple.

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