# The Economy of Trees

When Henry Hudson sailed into Delaware Bay in 1609, he found all around him an unbroken band of old-growth trees. As he sailed up the river toward what is now Wilmington and Philadelphia, he saw waters teeming with fish, woods filled with wildlife, and native peoples drinking water straight from the streams. So thick were the forests that a squirrel could have traveled from Dover to Wilmington without setting its feet on the ground. The European settlers who came soon after Hudson, however, saw the trees as both an impediment to progress and a resource to exploit. Within 200 years Pennsylvania – "Penn's Woods" – had become one of the great misnomers in history, as the settlers cleared millions of acres for farmland, timber and fuel. That progress had a price, and we are still paying it.

For scientific studies now confirm that those trees were the foundation of the exceptional quality of the water in the region's streams and rivers and the enormous fertility of the Delaware estuary. Here's why. Almost every drop of rain that fell penetrated into the soil, which was soft and rich in organic matter because over a ton of leaves fell annually on each acre of ground. The water worked its way slowly downhill, irrigating the forest and eventually adding itself to the stream.

At the stream's banks, the forest slowed the entry of nutrients into the water and protected the floodplain from erosion. Its soils were so absorbent that even in periods of flooding most streams ran clear. The trees also provided the shade necessary to support cold-water plants and the fish, primarily trout, that feed on them. Scientists have known for a long time about the value of riparian forests as buffers that keep pollutants out of a stream. We have more recently discovered that trees do much more than that. By supplying the leaves, fruits and seeds that feed the great diversity of aquatic life, they actually enable streams to clean their own waters. A healthy stream ecosystem can provide critical services – from filtering the water to mitigating flooding – for which humans now depend on water-filtration systems, sewage-treatment plants and massive dams. We now pay billions of dollars for those services. A healthy stream can provide them free of charge.

We will never again have in this region the unbroken expanse of forest that greeted Henry Hudson 400 years ago. And we will probably never again be able to drink water directly from our streams. But there is no reason that our streams and rivers can't once more teem with life, be safe places for recreation, and provide a source of drinking water that does not require elaborate and expensive treatment. During the past decade, my colleagues and I at the Stroud Water Research Center have studied hundreds of streams from Quebec to Florida, and we have found that the single most important factor in determining the quality of a stream's water is the amount of forested land in its watershed. The best streams usually have a high percentage of forest; the poorest typically do not. Simply put, replanting trees along a treeless stream, on the hills of a treeless watershed, or in the backyard of a treeless home improves the quality of the water.

And doing so is not expensive. In fact, there are a number of programs to help farmers and other landowners plant trees on their properties that are convenient and easy to access – the Natural Resource Conservation Service, State Farm Bureau, County Conservation District and local watershed associations are all places where people know about funding opportunities.

Clearly, though, it isn't just money that keeps landowners from planting trees. We have a long history to overcome – from our reliance on massive engineering projects to solve water issues to decades of marketing campaigns that extol the beauty of weedless lawns and treeless landscapes. If we are to make streamside forests truly best practices in the region, we must recognize the limits of engineering solutions and include in our economic calculations the value of the services nature can provide. It is hard to imagine that the landscape Henry Hudson discovered was less beautiful than today's. It was certainly healthier and its water far cleaner. Trees were the reason for that, scientists now know, and they can be again. In fact, the simple act of planting a single tree can be the first step in the restoration of both our land and our water.

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