Drinking water for 600,000 Delawareans falls to the ground in the Christina Basin Watershed, a 563-square-mile area that slices through the northern part of the state from The Wedge to the Delaware River.

That rain is funneled southeast before finishing its journey in the Christina River Basin. Of the 334 square miles from which the Brandywine collects rain, 87 percent are in Pennsylvania, including its headwaters, and they are also the source of drinking water for the cities of Coatesville, Downingtown and West Chester. Delaware is home to the remaining 15 percent of the land that feeds the Brandywine.

More than any other natural feature of the landscape, Brandywine Creek and its confluence with the Christina River was the reason for the settling and growth of Wilmington. Descending from 650 feet above sea level in Chadds Ford to sea level at the Christina, the Brandywine provided drinking water, allowed for navigation and powered mills. With these industries comes a legacy of contamination.

Forty years ago, Wilmington residents would watch colorful ink run down the Brandywine, says Gerald J. Kauffman, director of the Water Resources Center at the University of Delaware. Since then, the stream has seen impressive improvement, including a 50 percent reduction from 1980 levels of phosphorus, a nutrient found in fertilizers. Nutrient contamination can lead to algal buildup that is killed by dissolved oxygen, which can kill fish. The reduction in nutrient pollution has helped raise levels of dissolved oxygen and boost fish populations.

Overall, Kauffman gives the Brandywine a B- for environmental health. It is improving, but major problems remain.

Threats: Upstream contamination, especially nitrogen runoff from fertilizer and sediment erosion

Levels of nitrogen, though reduced, remain high along much of its course at least some of the time. A hard rain can wash soil from farms fields, which is not stabilized by the roots of year-round vegetation, into the river, increasing E. coli bacteria to dangerous levels and, perhaps a dozen times a year, forcing Wilmington to tap its reservoir for drinking water. Many of the Brandywine's problems are seen in each of the other three rivers in the watershed.

Solution: Upstream watershed protection

Because cities are equipped to make investments within their boundaries, they have historically favored creek drainages as sources. Some would prefer to look upstream for water improvements, to where pollutants enter the water supply, but their authority to do so is limited.

Kelly Williams, Wilmington’s commissioner of public works, says the city has been waiting to make these upstream investments, calling it “where we’ll have to go in the future.” But without a specific analysis laying out how spending will result in cost savings, the city’s overriding concern is for its most vulnerable rate-payers, she says.

Sen. Bryan Townsend of Newark wrote a bill that would authorize cities and water companies to use money from water bills on watershed protection. “The framework is clear, the merits of it are clear,” he says. He describes the idea as “spending less money to stop a problem from happening.”

Some of his colleagues opposed the bill because it involved Delawareans’ money to clean water in Pennsylvania. But because we live downstream from Chester County, PA, water users are forced to play the hand they’re dealt.

“If you live in the tailpipe in terms of air or downstream in terms of water, you have got to find ways to innovate,” Townsend says.

Southern Delaware taps a different drinking water source. Instead of snaking into streams, rainfall there settles into the sandy soil, creating vast underground water stores. But pollutants have settled in, too, at times entering the topmost aquifer, the Columbia, the one chiefly relied upon by farmers and rural wells because it is easiest to reach.

Everywhere in Delaware, water quality has improved. Landmark environmental legislation from the 1970s has led to tremendous reductions in water contamination from major industrial sources. The tidal portions of the Christina and Brandywine, for example, long among the state’s dirtiest waters, have seen their concentrations of the industrial chemical PCB halved in the past eight years.

Despite improvement in the quality of our drinking water supply, its sources are still polluted to varying degrees. Here are the sources, the threats and a few ways to keep water safe and plentiful.

The remaining half is comprised of forests, where the trees filter water before it hits the creeks and tree roots anchor soil along stream banks.

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Do not hallucinate.
Another Solution: The Water Fund and Pay-for-Success

One promising new approach to improving water quality in Delaware is the creation of a “water fund”—a public-private partnership that invests in watershed restoration. The Nature Conservancy pioneered the water fund model in Latin America and recently expanded into the United States. At a basic level, a water fund pools resources from downstream water users—such as Penn Foundation SEUs and SUEZ—and directs them in cost-effective upstream conservation measures that improve water quality and/or reduce quantity.

Over the past four years, with grants from the William Penn Foundation in Philadelphia, TNC Delaware and the University of Delaware Water Resource Center have developed the Brandywine-Christina Healthy Water Fund. The fund is designed to create a revolving funding mechanism by which upstream pollution-reduction activities—mainly changed practices on agricultural lands—are quantified in marketable units called environmental impact units, or EIUs. EIUs can be purchased by municipalities and drinking water producers to help meet regulatory obligations or reduce operating costs. The Brandywine-Christina Healthy Water Fund with marketable EIUs can be generated in our neighborhoods and cities by generating more pollution reductions, which in turn shades out bay grasses and decreases biodiversity. Agriculture is not the only source of nitrates—others include land application of wastewater and failing septic systems—but it is the largest cause in rural areas.

Solution: Regulation and cleanup

Bacon says pollution at a chicken processing plant near Milford is an example of regulatory failure. The facility had been serving water with nitrates since at least 1974, in unhealthy levels at nine sites. Last year, Newark’s council created a $20,000 fund for source water protection. Raising money from local rate-payers to clean upstream waters on a large scale, however, remains difficult, Hubbard says. “Right now, not state that we’re aware of has a mechanism to let a utility get money from its rates to invest upstream,” he says. “But there’s no one that’s said, ‘Yeah, it’s there’s no mechanism carved out.’”

Threat: Complacency from consumers who believe water is plentiful and safe

The Northeast’s abundant freshwater and progress in removing the most visible of industrial pollution has made us complacent. “Honestly, I think we’re spoiled here,” says Williams. From that perspective, recent disasters in Flint, Michigan, and Saxen, Sussex County, have a silver lining. “They are getting people to not take water for granted.”

In addition to their work in the field, nonenvironmental organizations, such as the Delaware Nature Society are trying to educate the public, get them outdoors to increase their appreciation. People are unlikely to protect a water source unless they feel a personal connection with it. As the Appalachian Piedmont gives way to the Atlantic Coastal Plain, sandy soils start to dominate. The topmost layer of sand was laid down over the past million years with the advance and retreat of glaciers and the ocean. It is called the Columbia Aquifer. “It’s a county that is often assumed to resemble an underground river or lake, it is more like water coursing among soil and gravel. Unlike clay, which consists of plate-like particles, sand and gravel barriers, is ideal for creating aquifers because there is plenty of space for water to flow between the grains. Because it is the aquifer closest to the surface, the Columbia is the one most tapped for wells. This convenience can be dangerous for communities that draw water from it. When there is little to stop rainfall from carrying pollutants into the water, “We live in a special place because our governments have not made us complacent to contamination,” says Chris Bason, executive director of the Delaware Center for the Inland Basens. “That’s one of the reasons why, in Sussex County, we have pervasive contamination of drinking water with nitrates.”

Solution: Education

Brenna Goggin, director of advocacy at the Delaware Nature Society, says the best way to change minds is to educate people about the consequences of their actions. For example, grasses absorb fertilizer better in the fall, so spring applica- tion discourages it. “If enough people learn about their water, many will take action,” she says. “We would like for people to think about their impact. You don’t need to have lives—grass or” or make radical changes.