

Spring Creek and the Chesapeake Bay

"We all live downstream" is a quip often used to encourage involvement in Chesapeake Bay cleanup efforts. But in its relationship to the Bay, Pennsylvania's Spring Creek is not downstream. In fact, its location (almost geographically in the center of Pennsylvania) is in the northwestern border of the Chesapeake Bay drainage basin. The connection of Spring Creek and the Chesapeake Bay may seem remote, but like a human body, the health of the Bay is dependent on what goes into it. This fact sheet explains how Spring Creek contributes to the Bay.

THE HISTORY

On July 20, 1769, the first European surveyors paddled up Bald Eagle Creek, and took a southern turn to paddle up the northward-flowing Spring Creek. Their journey brought them to a huge limestone spring, which they noted on their maps as "big spring," a name that continues to describe the underground water source that still discharges 11 million gallons per day.

With the discovery of abundant iron ore in the adjacent area, Spring Creek became an important water source for the industry as well as a limited narrow shipping lane for moving the resultant wrought iron. Although the lack of economic transportation led to the decline of iron-making as a Centre County industry by the late 1800s, the wealth and power that had come with it remained, attracting the Farmers High School, now known as the Pennsylvania State University. When the college opened its doors, it ushered in the region's new and lasting major industry - education.

THE NATURAL HISTORY

To follow the watery path of the first explorers of Spring Creek, paddle against the current of the Susquehanna River (portage around the dams) to its west branch north of Sunbury, Pennsylvania. Near Lock Haven, turn south on Bald Eagle Creek, pass the Foster Joseph Sayers Dam, to the mouth of Spring Creek.

The headwaters of Spring Creek are more than 22 miles away, where springs surface near the town of Boalsburg on the northwest slope of Tussey Mountain. Surrounding this fairly narrow limestone stream is a 144 square mile watershed that feeds the fertile ridge and valley region of Centre County, where dairy and crop farming remain important activities, taking up one-third of the watershed land.

Six tributaries--Cedar Run, Slab Cabin Run, Big Hollow, Thompson Run, Logan Branch, and Buffalo Run--supply Spring Creek as it literally flows from the mountain. Spring Creek starts at an elevation of 1,920 feet, but drops an average of 49 feet per mile as it flows through several small towns, three Pennsylvania Fish Commission fish hatcheries, the outskirts of State college, downtown Bellefonte, and disperses into Bald Eagle Creek. A total of 13 municipalities shape the watershed.

This corridor is the only place in Centre County to find purple clematis, a woody vine; it's the furthest north to find prickly ash, a nontropical member of the citrus family. Its limestone cliffs create rich streamside soil that feeds wild- flower patches, not necessarily unique, but unusual in their productivity. The creek has also been home to six threatened or endangered mammals, ten insects of special concern, and 41 rare, threatened or endangered plants. It's an unassuming vegetative and

geologic refuge.

But Spring Creek may be best known for its wild brown trout populations. According to Penn State studies, the 22 miles of the creek support an astounding 163 pounds of adult trout per acre, making it possibly the top trout stream in the state. The average angler who fishes Spring Creek travels 180 miles round trip, which contributes to making the net economic value of the stream and the fishery anywhere from \$46,000 to \$73,000 per mile per year.

Few East Coast fishermen haven't heard of Fisherman's Paradise, considered the elite of Pennsylvania's trout fisheries. Originally designed in the 1930s by the Pennsylvania Fish Commission as a demonstration project on Spring Creek, Fisherman's Paradise is now a no-harvest flyfishing area frequented by anglers from all over the United States.

THE PEOPLE AND THE POLLUTION

While most other Pennsylvania cities have grown around a river capable of meeting water needs, State College and its neighboring municipalities instead grew up surrounding a university. Spring Creek has borne the brunt of that decision for the last half of the 20th Century.

One of the first major documented pollution incidents was in 1956, when Penn State dumped 100 gallons of diluted sodium cyanide into the University's sewer system, eventually killing 200,000 trout downstream from the Thompson Run discharge.

The most famous poisons to enter Spring Creek are, in fact, still there. They are kepone, a carcinogenic insecticide used for control of fire ants (exported for use in foreign countries) and mirex, a carcinogen that doubled as a fire ant pesticide as well as a flame- and fire-retardant product for use in plastics. Both products were manufactured at the Ruetgers-Nease Chemical plant near Spring Creek.

Initial investigations in 1976 showed significant contamination of the underground water supply due to inadequate treatment practices. The pesticides moved through groundwater to Thorton Spring, and on to Spring Creek, and because the insecticides can still be found in fish flesh and sediment, bans on harvesting fish from Spring Creek continue to this day. The company now manufactures other chemical compounds at the plant that has been designated a Superfund site by the U.S. Environmental Protection Agency.

In the last 20 years, this urban watercourse also has had to distill the efforts of dumpings of lead, polychlorinated bipheynls (PCBs), heavy metals, gasoline, fuel oil, kerosene, sulfuric acid and zinc by local non-point and point sources. The first fishkill of the 1990s occurred in August during the draining of an over-chlorinated swimming pool directly into a Spring Creek tributary.

In addition to such individual pollution events, Spring Creek is also impacted by development right up to the stream edge. Almost one-third of the watershed is cropland, and 100 farms support animal operations. Many of these farmers do incorporate progressive soil management practices that keep the soil on the land and out of the stream. Since 1987, farmers within the Spring Creek watershed have participated in Pennsylvania's Chesapeake Bay Financial Assistance Funding

Program to address agricultural nonpoint pollution.

However, a small number of the streamside farmers do continue to allow their livestock unlimited access to the stream, resulting in contamination of the water from both soil erosion and fecal matter. In this watershed, washed-out stream banks is one of the biggest agricultural threats. As witnessed by adjustments to Penn State farming operations, impressive improvements can be made just by limiting livestock access and using plants and fencing to stabilize the banks.

In addition to animal contamination, the effects of humans continue to pound the stream. Raw sewage still finds its way into the creek, and stormwater pours off pavement and stream banks, carrying with it potentially damaging pollutants as well as sediment from nearby construction and streamside agricultural activities. It's possible that the pockets of reduced trout and insect populations and reproductive rates at certain locations can be traced to sediment pollution and stormwater runoff.

Spring Creek has often been used as a "dilution solution to pollution," a practice common at many urban streams. Currently, five major sewage treatment plants are located either on Spring Creek or one of its tributaries. By 1992, just one of the plants will expand by 58 percent, from less than a 4 million gallon- a-day discharge of treated water to a daily discharge of 6 million gallons, potentially the maximum that Spring Creek can handle.

Domestic waste water treatment is actually a source of heat. When the University Area Joint Authority's treated water is returned to the creek, it can be as much as 10 degrees warmer than upstream water levels. The thermal pollution can be detrimental to the stream's trout, which can't tolerate such high water temperatures during the low flows of summer.

Domestic waste water treatment is also a source of nutrient pollution. Phosphorus and nitrogen, two nutrients choking the Chesapeake Bay, are problems as far from the Bay as Spring Creek. Annually, 143,665 pounds of nitrogen and 14,612 pounds of phosphorus are discharged by five sewage treatment plants along the creek.

Not all of Spring Creek's problems focus on water quality. For those who may wish to enjoy this beautiful stream, access isn't always available. Only one-third of the stream corridor is public property, either held by municipalities, the Pennsylvania Fish Commission, or the State Correctional Institution at Rockview. The remaining 67 percent is owned privately, and in some stretches, is completely inaccessible because those landowners have posted their property against trespassing.

A LOOK AHEAD

The geologic foundation of Spring Creek watershed is extremely varied--14 different rock groups and formations shape the basin. Because of this unique geology, abundant sinkholes, caves and springs can be found here. Since sinkholes serve as drains for the land, surface waters and surface activities here are very directly connected to the watershed's underground water supply.

The local governments have already begun to protect wellhead areas, the surface area above underground water sources, and are starting to devise waterprotective waste programs that include stormwater management provisions, on-lot septic

system regulations, and alternatives to traditional sewage treatment.

Area planners recognize that water resources will shape the future of Centre County. Progressive thinkers have likened the Spring Creek watershed to a bank. Withdraw the watershed's groundwater as a supply of drinking water without allowing for recharge of those resources, and the account will dwindle. The projected 23 percent increased population (by the year 2010) in the watershed will enjoy their local stream and drinking water only if the supply continues to be refreshed.

Local residents can help the process by actively reducing any overuse of the local water supply. The less pulled from the underground sources, the less that has to be returned to Spring Creek as recycled water. Conserving water, preventing soil erosion, reducing pesticide use, and maintaining septic systems are all relatively easy steps that can help ensure a thirst-free future.

Citizen groups also serve Spring Creek by acting as watchdogs over impacts to the creek. Working with the Pennsylvania Fish Commission and the Centre County Conservation District, groups such as Trout Unlimited, Spring Creek Watershed Coalition, and Clearwater Conservancy have helped to motivate some of the streamside farmers to restrict animal access to the creek, reducing direct nutrient pollution. These groups are also working on maintaining and improving access for recreational activities along the privately owned stretches of the stream. A future goal is support for a parklike corridor that will enable the public to enjoy the stream or nearby trails.

State-designated protection of Spring Creek as one of the Commonwealth's "high quality" waters would also serve to limit activities that would degrade the creek. Not a "no-growth" policy, this type of state-issued designation merely provides standards for development in the immediate watershed.

Yes, Spring Creek has become an urbanized stream in a rural county. But when viewed as a reflection of the quality of life in Centre County, it's easy to see this fast-flowing stream as a resilient resource that has been able to rebound from incidents of reduced water quality. And with careful conservation, it should remain a top-notch cold-water stream for generations to come.