The Great Spring may be Home to a Prehistoric Fish

by Brian T. Lynch, MSW

The Black River as it exits the Hercules-Kenvil Property

The Great Spring in Kenvil is a relatively small wetlands area where cool spring water rises from an aquifer below to create the Black River in Roxbury Township, New Jersey. The spring is located at the southern tip of over 1,000 acres of industrial land once owned by the Hercules Powder Company. Explosives were manufactured on that land for more than 125 years. Throughout that time, the spring remained undeveloped.

Due to its location on private and restricted property, the existence of the Great Spring is not widely known, and, to my knowledge, the ecology of the spring has never been studied. This leads me to wonder: What surprises might be discovered in a wetlands area that has remained nearly undisturbed since the last ice age?

I've been a volunteer stream monitor for the Raritan Headwaters Association (RHA) since 2016. I initially thought the Black River began at Black River Pond, but I later discovered that it starts as a beautiful, fully formed stream flowing from a spring on the Hercules property. This spring contributes over two billion gallons of water to the Raritan River each year. The RHA soon established a new stream monitoring site 700 feet downstream from the spring, and I have been researching its history and geography ever since.

Over the years, I have seen several fish in the upper reaches of the Black River that I can't identify. I showed photographs to a fish biologist who couldn't identify them either, perhaps due to the quality of the pictures.

A family living near the stream recently noticed some eel-like creatures at the monitoring site. They took pictures and sent them to the RHA and me. What they saw were four adult

American Brook Lampreys. These freshwater lampreys are not the despised parasitic lampreys that live in oceans and swim up freshwater streams to attach themselves to game fish. Brook lampreys are smaller and live their entire lives in cool, unpolluted streams with sand or gravel streambeds.

American Brook Lamprey (with family's permission)

Lampreys are the most ancient group of vertebrates alive today, having existed for over 380 million years, long before the first dinosaurs. Scientists refer to them as living fossils because they have remained unchanged since their earliest appearance in the fossil record. Lampreys lack jaws and possess seven-gill holes behind their eyes, in contrast to the familiar gill slits of modern fish. They are considered an endangered species in some states. In 2016, the New Jersey Endangered and Nongame Advisory Committee recommended a Special Concern status for this species, but no formal rule proposal has been filed to date. I spoke with a representative at DEP who indicated that the Brook Lamprey may be classified as a species of special concern in the future, but due to insufficient data regarding their prevalence, they won't be listed as endangered. The federal EPA, however, lists the American Brook Lamprey as a bio-indicator fish for high quality water sources.

Lampreys are increasingly studied by scientists around the world. There is a growing imperative to investigate them. I came across a zoological research article in the NIH's National Library of Medicine that highlights the potential importance of these ancient fish:

"The rapid development of cell biology and biochemistry technology, especially genomics and proteomics, has propelled lamprey research to new heights. Lampreys possess a powerful and unique immune system and many valuable genes. Based on lamprey genome research, crucial human disease-related genes may be discovered. Furthermore, the pathogenesis of human diseases can be illuminated by establishing lamprey genetic models, which could provide a theoretical basis for in-depth studies of disease pathogenesis and treatment, as well as the development of new drugs. In recent years, lamprey populations have drastically dwindled, making lamprey research vital."

What else might we uncover in this nearly forgotten wetland? The Great Spring has been in private corporate hands for generations. Yet, it remains a prolific public water source and an essential ecological area. It is time we designate this land as a protected public resource.