THE ENVIRONMENTAL LEGACY OF LAMPREY RIVER HISTORY

A QUICK TOUR THROUGH TIME

LAMPREY RIVER
ADVISORY COMMITTEE
Wild & Scenic
www.lampreyriver.org

The Good Old Days

In the beginning of our story, rivers ran free through forests that dominated the landscape. Native people made use of the abundant natural resources and left few lasting impacts. Archaeologists have confirmed Native people were present in New Hampshire as far back as 12,700 years ago. One of the oldest Native camp sites in New Hampshire was found on the Lamprey River in Lee and dates back 8000 years. The Native population of New Hampshire from 1500 to 1609 A.D. was 12,000 people.

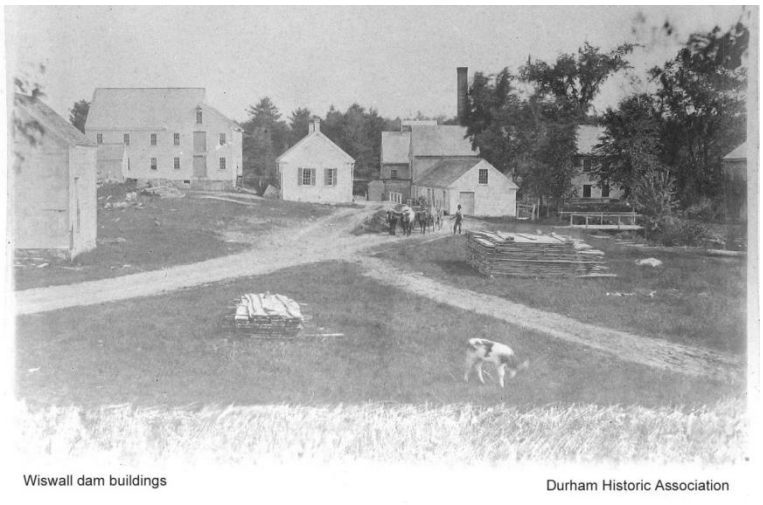
The River in Simpler Times

As settlers from Europe moved in, they began cutting trees for lumber and clearing land for agriculture. They built simple wood and earthen dams to capture the power of water to perform mechanical work at mills, such as sawing wood or grinding grain. Almost anywhere river water dropped even slightly in elevation, a dam and mill were built.

The map below shows that there were once over 100 mills along the Lamprey River and its tributaries.

The early mills in the 1600s were modest, family-owned businesses. Wadley Village in Lee began with a sawmill in 1665 and expanded to include a grist mill, tannery, wooden pail factory, leather board manufacturing, and herbal medicine.

In Epping, the Folsom family damned the river on or before 1732 and operated a sawmill and grist mill. Other products manufactured at the site later included boxes, musket boxes, shoes, and woolen goods including socks.

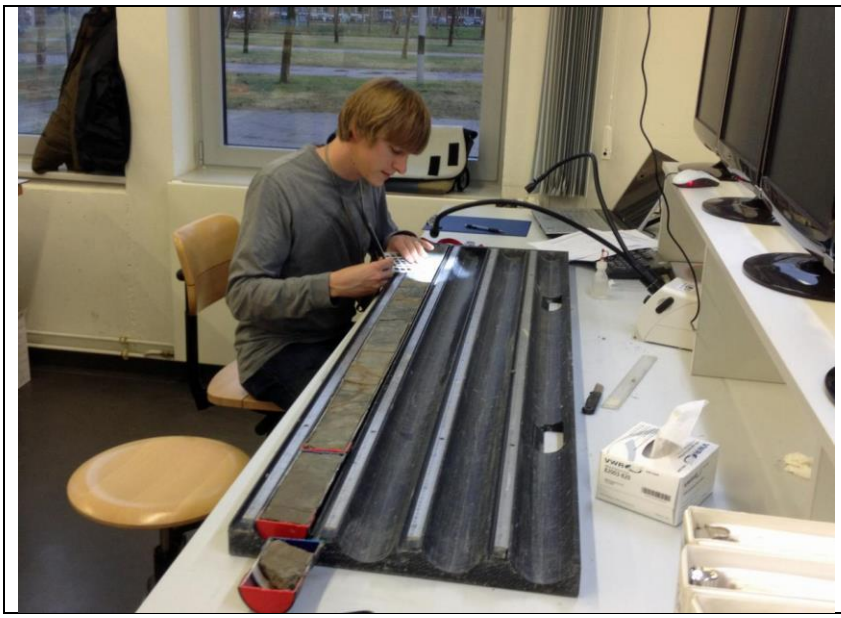


Wiswall dam buildings

Durham Historic Association

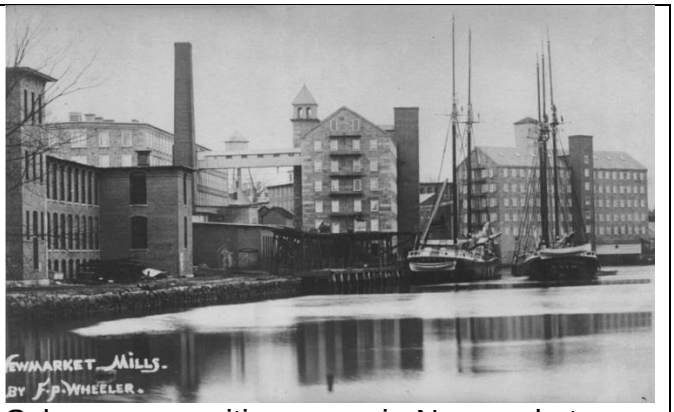
The industrial complex at Wiswall Falls in Durham started as a sawmill in 1831 and expanded to include a grist mill and then factories for gingham cloth, nuts and bolts, and sleighs. By the mid 1800s, simple water wheels were replaced by turbines that more efficiently captured water power. The original wooden dam was wiped out by a flood in 1868 and replaced with a new wooden dam.

The site's output greatly expanded in the 1860s when a 3-story factory was moved from Newmarket to begin manufacturing wall paper. By 1870, the paper mill was producing a ton per day. All the waste from these activities was dumped into the river, where it was carried "away." For those unfamiliar with the sights, smells, and sounds of paper mills, Wiswall Falls would not have been a place to fish or picnic.



Sediment cores taken from Great Bay show a black layer of excess organic matter that indicates tons of sawdust and other organic waste entered the bay from local rivers.

Early nut and bolt factory, Newmarket.



Schooners awaiting cargo in Newmarket.

Newmarket's early mills focused on ship building. In the early 1820s, the Newmarket Manufacturing Company began making textiles on a grand scale. The company built large dams in Northwood and at Mendum's Pond to secure dependable water power. A bigger, stronger dam was built at the Route 108 falls in 1887. The mill complex dominated downtown Newmarket and employed thousands of workers. At one point, the mill had the biggest weaving room in the world. Dyes and other wastes were dumped into the river, resulting in river water that changed color on a daily basis.

In 1899, the sawmill at Wiswall Falls was replaced with a hydroelectric facility. In 1900, electricity was delivered to nearby houses for the first time. In 1912, the wooden dam was removed and replaced by a concrete dam. The small hydroelectric plant operated until 1930.

A River of Troubled Waters

Like many waterways across the US, the Lamprey River had problems: steep dams that caused the loss of anadromous fish that need both fresh water and salt water to live and unregulated discharges from industries and municipal sewage treatment plants that resulted in fouled water. The Wild and Scenic Rivers Act of 1968 sought to protect certain rivers and river sections with "outstandingly remarkable values" in a free-flowing state "to protect the water quality of such rivers and to fulfill vital national conservation purposes." The Clean Water Act of 1972 addressed pollution from pipes and required that all US waters be "fishable and swimmable."

In the 1980s, as energy policy in the United States shifted to favoring alternatives to fossil fuel, the development of hydroelectric power became a major political and economic force. Significant funding and incentives were available to entities looking to expand this source of power. Hydroelectric power already existed at the Macallen Dam in Newmarket and a new proposal to establish a hydroelectric facility at Wiswall Dam in Durham was submitted to the Federal Energy Regulatory Commission (FERC) in 1982. After some local objections were aired but rejected, FERC issued a license in June of 1989 to the applicant for developing the site.

As local residents and municipalities raced to learn more about hydroelectric power and wrestled with the idea of a hydroelectric facility controlling water normally available for recreation and public water supply, objections to the project grew. Residents recognized, correctly, that FERC was an entity not easily stopped or dissuaded. American Rivers offered critical legal advice and a long-shot suggestion: convince local citizens, municipal officials, and federal representatives to support a federal Wild and Scenic study for the Lamprey River. In September 1989, selectmen in the towns of Lee and Durham passed resolutions in support of a Wild and Scenic study for the Lamprey River.

More legal appeals against the hydroelectric license were submitted in 1990 and again FERC's position prevailed. In February of 1991, New Hampshire's freshman Congressman Bill Zeliff and senators Judd Gregg and Warren Rudman introduced bills in the US House of Representatives and the US Senate for a Wild and Scenic Study of the Lamprey River. In December, the bill was signed into law. In February of 1992, FERC ordered a stay of license for construction of the Wiswall hydroelectric facility pending the outcome of the Wild and Scenic River Study.

A River Protected

Protection from the State of New Hampshire came first in 1990 when a segment of the the main stem Lamprey River in Durham and Lee was designated under the NH Rivers Management and Protection Program, one of the original rivers in the state program. The Lamprey River Advisory Committee was formed following this state designation. Following submission of a comprehensive resource assessment and a river management plan by the committee, 11.5 miles in Lee, Durham, and Newmarket were designated by the U.S. Congress as a National Wild and Scenic River in November of 1996. An additional 12 miles in Epping were added in May of 2000 for a total of 23.5 miles.

In 2011, the entire 49 miles of the main stem Lamprey River and five tributaries (Little, North, North Branch, Pawtuckaway, and Piscassic rivers) were designated under the New Hampshire program, becoming the first watershed to be protected.

The New Hampshire designation does not come with any funding, but it does offer the members of the Lamprey River Advisory Committee the opportunity to review and comment on proposed development of the river corridors. The advisory committee cannot issue or deny permits, but this important local input must be considered by the New Hampshire Department of Environmental Services when it reviews applications such as wetlands permits, shoreland permits, and large-scale alteration of terrain permits.

The Wild and Scenic designation is an exceptional badge of honor in that the Lamprey River is among an elite group; fewer than 0.25% of all rivers in the US and its territories are so designated. No future alterations in the free-flow condition of the river will ever be allowed, so no new or bigger dams. This designation also comes with technical and financial support from the National Park Service to help to protect the outstanding resource values and implement the river management plan.

Neither river protection program allows the advisory committee to own land, force people from their land, or enact regulations to limit people's use of their property.

A River Still at Risk

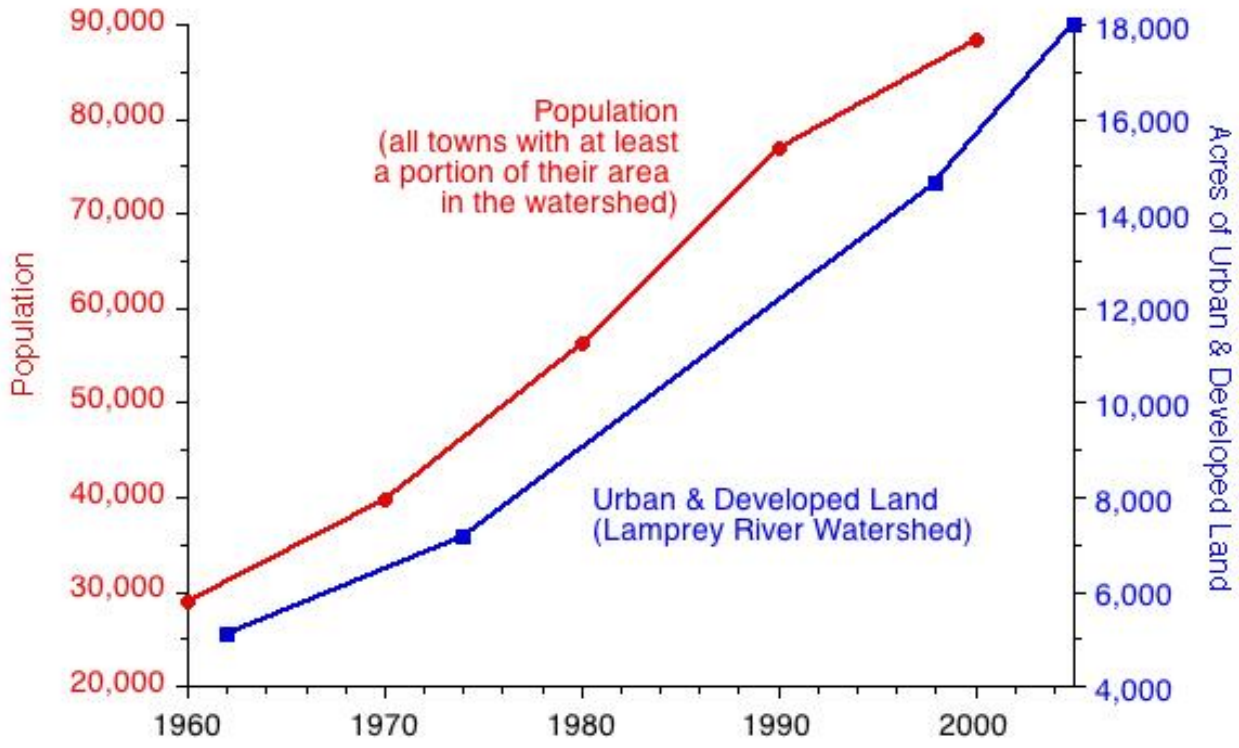
Despite its National Wild and Scenic River status, the Lamprey River has three significant dams: Macallen Dam in Newmarket, Wiswall Dam in Durham, and Wadleigh Falls Dam in Lee. There are no plans to remove any of the dams in the foreseeable future. The Wadleigh Falls Dam is breached. Macallen and Wiswall dams both have Denil fish ladders that are managed by the New Hampshire Fish and Game Department. These ladders function like handicap access ramps and support the spring migration of river herring (a generic term for two species: alewife and blueback herring) as they swim upstream back to their spawning grounds. These ladders play a key role in the continued presence of alewife in the Lamprey River, but many fish, often blueback herring, that arrive at the base of the dam do not use the ladder. According to NH Fish and Game, the average annual successful passage at Macallen Dam is only about 42% of all fish that arrive at the base of the dam. These fish ladders also require significant time and attention from the biologists from Fish and Game who often must manually move fish from the upper chamber of the fish ladder to the open river.

alewife

When the Wiswall fish ladder was installed in 2012, it was hoped that river herring could finally access all the spawning areas upstream. That hope quickly faded as biologists discovered that the fish that made it to Wadleigh Falls could not get past the natural falls of the breached area in the dam. Negotiations with the owner of the dam, a private citizen, fell flat. State law in the case was interpreted to affirm that the dam owner also owns the bottom of the river at the base of the dam. Even though no major work was proposed, the owner refused to allow even minor modifications that would result in a slightly shallower slope for the fish. At Wadleigh Falls, the river herring migration ends.

The Clean Water Act of 1972 addressed “source pollution”, or pollution that comes out of a pipe; however, not all pollution comes from a clearly identifiable source. “Non-point source pollution” comes from all over. It comes from the wastes created by burning fossil fuels that fall from the sky. It comes from agricultural and residential fertilizers, pesticides, and animal waste. It comes from bare or un-vegetated soil that erodes and enters waterways with stormwater. It comes from oils, salt, and other substances that fall onto roadways. It comes from septic systems that remove solids but not nutrients from household and commercial wastewater. It comes from undersized culverts that cause soil erosion and prevent wildlife from getting upstream. It comes from people.

The people of the New Hampshire Seacoast and watershed have brought great change over the last 400 years. From low numbers and low impacts, a rapidly growing population is causing significant impacts to the environment.



Courtesy of Cameron Wake, www.100yearfloods.org

(Watershed towns include Barrington, Brentwood, Candia, Deerfield, Durham, Epping, Exeter, Fremont, Lee, Newfields, Newmarket, Norhtwood, Nottingham, and Raymond.)

The graph above shows population growth and land development in the Lamprey River watershed towns over the last 50 years. Between 1960 and 2010, the population in tripled. During that same time period, the amount of land that has been developed has more than tripled. Developed land means losses to wildlife and habitat, but it also directly impacts the human space. Impervious surfaces such as pavement and rooftops lead to dirtier water going into the rivers, since less storm water is being filtered as it goes through the soil. It also results in an increased risk of flooding, again because water is not filtering through natural soil.

The Lamprey River is the predominant source of freshwater to the Great Bay estuary. The estuary's health is, therefore, connected to the health of the river. Great Bay is under threat of serious decline, largely due to too many nutrients. One of the impairments related to excessive nutrients that is occurring in Great Bay is low dissolved oxygen; the mouth of the Lamprey River is the site of the worst and longest infractions, due to a combination of ambient water conditions as well as geologic/physical conditions that tend to create water density layers that do not mix (PREP, State of Our Estuaries 2018). Low dissolved oxygen can result in water that is incompatible to fish and shellfish that must get oxygen from the water. Roughly one third of Great Bay's nutrients come from air-borne pollution from the burning of fossil fuels in the Mid-west. Another third comes from several local wastewater treatment facilities. The municipalities that operate these facilities have been required to undertake significant upgrades at significant expense to capture more nutrients before discharging to the rivers or estuary itself. The final third comes from non-point sources in the surrounding towns, and population and development around Great Bay are increasing every year. More people and more development result in more stress on the ecosystem.

Not to exclude the climate change crisis, a more developed landscape is less able to weather the storm, literally. Over the past few decades, the worst storms in the region have become more intense, dropping significantly greater amounts of precipitation per storm and these storms are becoming more frequent (Cameron Wake, www.100yearfloods.org). When massive amounts of rain suddenly wash into the river, flooding can and does occur, as well as the attendant erosion of unprotected soils and spikes in nutrient concentrations (W. MacDowell, NH Water Quality Analysis Laboratory). Some of these negative impacts can be lessened by ensuring that stormwater can soak into the ground. Land conservation that limits development, local stormwater and zoning regulations that incorporate green infrastructure for new development and redevelopment, and retrofit activities and programs to improve opportunities for water to soak into the ground are tools that can help accomplish this goal.

A River of Community

The people who live and work along the Lamprey River will determine the next chapter. Everyone can easily take small steps that collectively can slow the decline and make a positive difference.

Doing one of these will help; doing more than one will help even more:

- Protect soils and water with natural, native vegetation, especially within 150 feet of a stream. Plant trees and shrubs.
- Reduce water use. Don't waste water.
- Keep septic systems in good repair. Inspect and pump every 2-3 years. Put only human bodily waste and toilet paper down the drain. Dispose of grease and food waste in the garbage. Dispose of medications at the pharmacy or local police. Avoid the use of strong chemicals such as bleach. Ensure that the leach field has short or medium height vegetation (no trees or shrubs) and do not allow vehicles onto the leach field.
- Save your money and just say no to lawn fertilizers and yard pesticides, especially within 150 feet of a stream or storm drain that empties into a stream. When establishing a new lawn, seek professional guidance from the UNH Cooperative Extension. Limit lawn to areas far from surface water, as lawn does not count as natural vegetation and cannot withstand the erosive effects of harsh rain.
- Encourage water to soak into the soil rather than run off untreated. Collect rain water in rain barrels. Direct surface flow of water to rain gardens or naturally vegetated areas.
- Keep river banks and river corridors as natural and vegetated as possible to protect water quality and critical wildlife habitat.
- Balance sustainable growth with conservation. Support local land trusts and town conservation commissions. Encourage municipal leaders to require ecologically sound municipal planning and regulations.
- Enjoy rivers gently. Use designated canoe launches to reduce erosion of river banks. Walk on established paths and avoid walking in wet areas. Bag dog waste and dispose of it properly in a trash can. Let wildlife stay wild: do not harass or collect wild animals, learn to identify rare, threatened, and endangered species and report all sightings to the Nongame and Endangered Wildlife Program at the NH Fish and Game Department.
- Prevent problems rather than try to fix them. Keeping nature natural is easier and more effective than trying to engineer a solution. It's also a lot less costly.