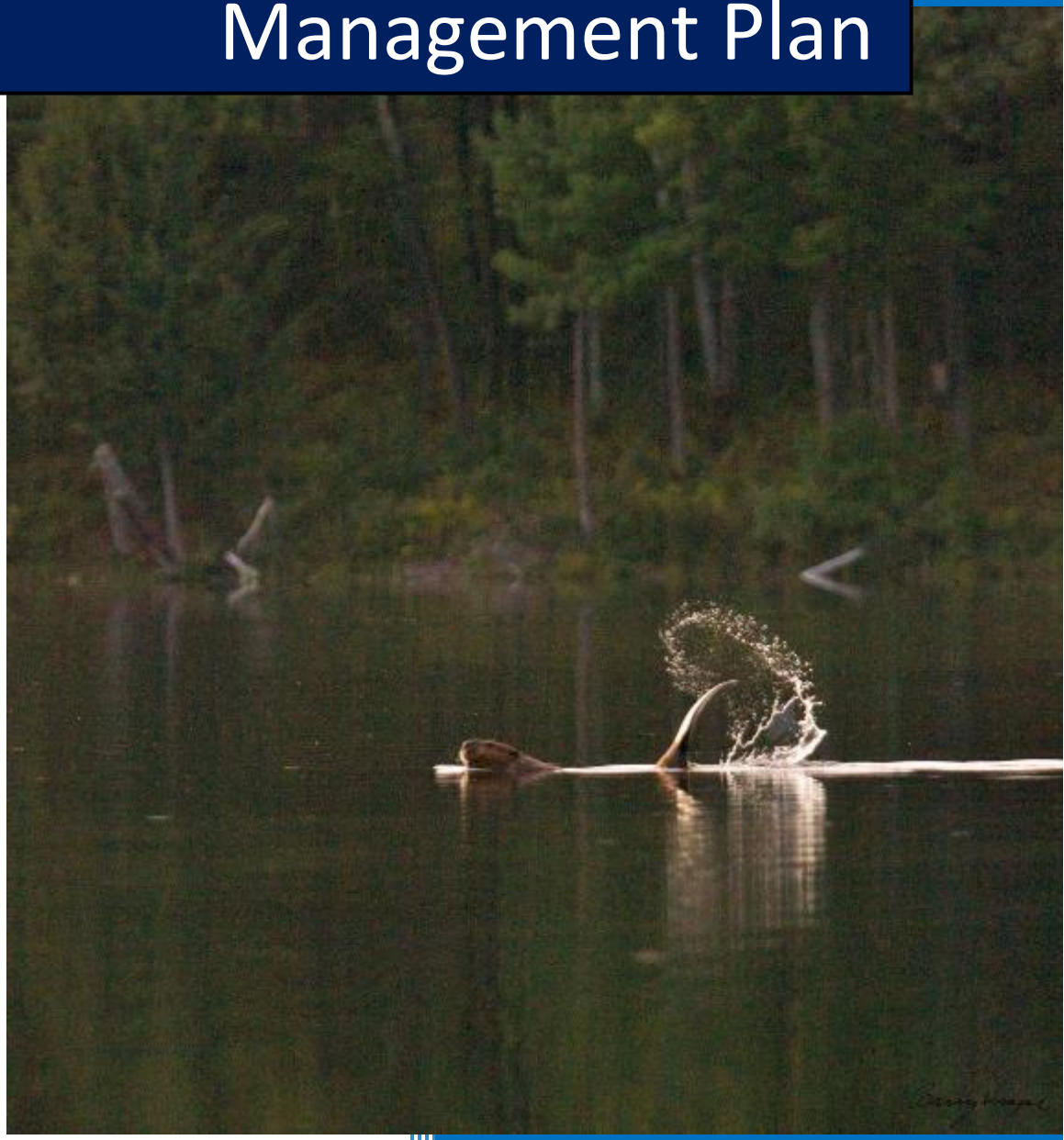
2024

Pemigewasset River Corridor Management Plan



Pemigewasset River Local Advisory Committee (PRLAC)

1/2/2024

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Developed by the Pemigewasset River Local Advisory Committee

with assistance from the Lakes Region Planning Commission.

Funding and guidance provided by the New Hampshire Department of Environmental Services.

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Cover photo credit: B. Draper

Pemigewasset River
Corridor Management Plan Update
2024

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1. Executive Summary

This Plan is the second update to the Pemigewasset River Management Plan prepared by the Pemigewasset River Local Advisory Committee (PRLAC). The original management plan was published in 2001, it was then updated in 2013. The entire river was designated for protection in 1991 under the New Hampshire Rivers Management and Protection Program (RMPP), with the exception of the section through Lincoln and Woodstock. The RMPP covers the municipalities of Franconia, Thornton, Campton, Plymouth, Holderness, Ashland, Bridgewater, New Hampton, Bristol, Hill, Sanbornton, and Franklin. The stretch from Hill to Franklin, while designated under RMPP, is managed by the U.S. Army Corps of Engineers as part of the Franklin Falls Dam flood control system. RMPP designation requires that a citizens committee made up of local representatives nominated by the Selectmen or City Council, appointed by the Rivers Management Advisory Committee, and representing diverse interests draft a plan that protects the river characteristics most valued by corridor communities and periodically update that plan.

In 2022 funding was made available to assist PRLAC representatives in updating the 2013 Pemi River Corridor Management Plan. While some things have not changed much, other things have changed in the intervening decade.

Over the last decade PRLAC members like other LACs have responded to changes at the state level impacting river corridors. A few local protections have been strengthened. PRLAC representation has expanded.

Water quality, water withdrawals, and stormwater management continue to be the issues of greatest concern to PRLAC communities.

Water quality in the Pemi generally meets Class B Standards. Class B waters are considered acceptable for fishing, swimming, and other recreational purposes, and for use as water supplies after adequate treatment has been applied. As with all surface water in the state, it does not meet the standard for mercury. Several sections of the Pemi are listed as impaired either for high acidity or for low dissolved oxygen.

Under state law (RSA 483:8-a III.), the purpose of the LAC is to advise the communities within the watershed and NHDES on matters pertaining to management of the river, comment on governmental plans within the corridor, develop a corridor management plan which communities may adopt as an adjunct to their master plan, and report to NHDES and communities on the status of compliance to laws and regulations.

Many of the key concerns of PRLAC representatives have not changed much since the last plan (stormwater, erosion, water quality, habitat impairment), but some have more of an emphasis now than in the past.

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We appreciate the ongoing support of the Pemi River communities and the efforts of the local PRLAC representatives:

Ashland- Kathleen DeWolfe
At Large- Tyson Morrill
Bridgewater- Judith Faran
Bristol- Richard LaFlamme, Max Stamp
Campton- Sherrill Howard (Chair), Janet Lucas,
Holderness- Carl Lehner
Lincoln- Tamra Ham, OJ Robinson, John Daly
New Hampton- Russ Brummer, Barry Draper, Lewis Mundy-Shaw
Plymouth- Lisa Doner, Neil McIver, William (Bill) Bolton
Thornton- Myrtle Lewis (Vice-Chair)
Woodstock- James Chesebrough

2. Introduction

a. The Plan

This plan is composed of nine sections, generally following the format of the recently released A Guide to River Corridor Management Plans (NHDES). While retaining some elements from prior versions of the Pemigewasset River Corridor Management Plan, Section 3 addresses the current state of the land and water resources within the corridor, including some of the changes that have occurred during the past decade. Also addressed in this section are a few of the programs that impact the river corridor. Section 4 specifically addresses protections at various levels intended to benefit the river corridor, this includes an updated matrix of local regulations in the riparian communities. Section 5 outlines the major threats of the corridor. The final sections of the plan set out the goals, objectives and the action steps proposed to meet those goals.

The plan update process highlighted the need for balance in this plan. There was an effort to be thorough, meet the requirements of the Legislature for plan development (RSA 483:10), as well as be practical resource to the Pemigewasset River Local Advisory Committee (PRLAC) and its communities. Much information is included in this document, but this is just a sampling of the information now available about the river and associated land so there is frequent use of hyperlinks (in the blue underlined font) guiding the reader to explore these resources in their area of interest. Also, throughout this process both PRLAC representatives as well as members of the public noted the need to make the list of recommended actions relatively short, specific, and limited to things that PRLAC has the capacity to implement.

PRLAC's task in updating this plan was to document the current state of the river corridor, develop actions for stewardship over the next decade, while also acknowledging the fact that the river and its corridor are ever-changing.

While this plan is the result of many hours of research, study, and discussion, we recognize that no plan is perfect or unchanging. The committee also recognizes the need to make the unique value of this regional resource more apparent to the corridor community. Planning for river protection is a dynamic process, much like the preparation of a town master plan, and we therefore anticipate periodic updating to address changes along the river and in public attitudes toward this resource.

b. Description of River

The Pemigewasset watershed drains approximately 1,000 square miles as the river flows through three counties: Grafton, Belknap, and Merrimack. The Pemi River's headwaters are in Profile Lake in Franconia Notch State Park, and the East Branch originates in the Pemi Wilderness area. Leaving the Notch, the river widens as it moves south along its approximately 70-mile route to its confluence in Franklin with the Winnipesaukee River, thereby forming the Merrimack River. Major tributaries to the Pemi include the East Branch of the Pemi, the Mad, Beebe, Newfound, Smith, Squam, and Baker Rivers, plus several

brooks. A description of several additional tributaries is included in the Appendix at the end of this document.

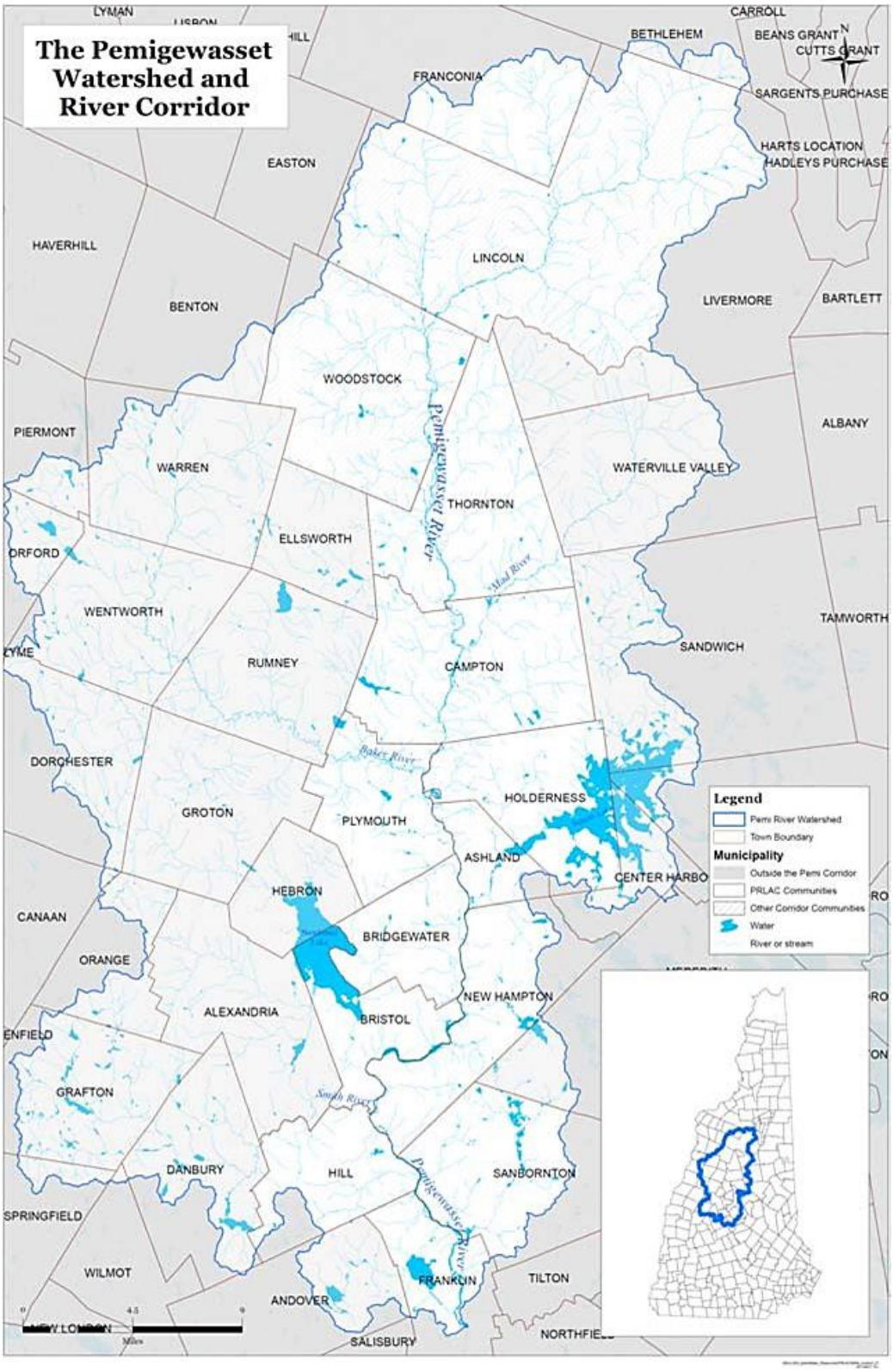

Figure 1. The Pemigewasset River flows from Franconia to Franklin and the watershed drains many more communities.

The Pemigewasset (Pemi) River and the land surrounding comprise the river corridor. The width of the corridor is defined as 1,320 feet from the normal high-water mark of the river, or to the landward extent of the 100-year floodplain, whichever distance is larger (RSA 483:4). The entire river except a ten-mile segment through Lincoln and Woodstock is protected under the New Hampshire Rivers Management and Protection Program (RMPP) as of June 1991 (RSA 483:15). When the term 'corridor' is used in this document, it refers to this definition.

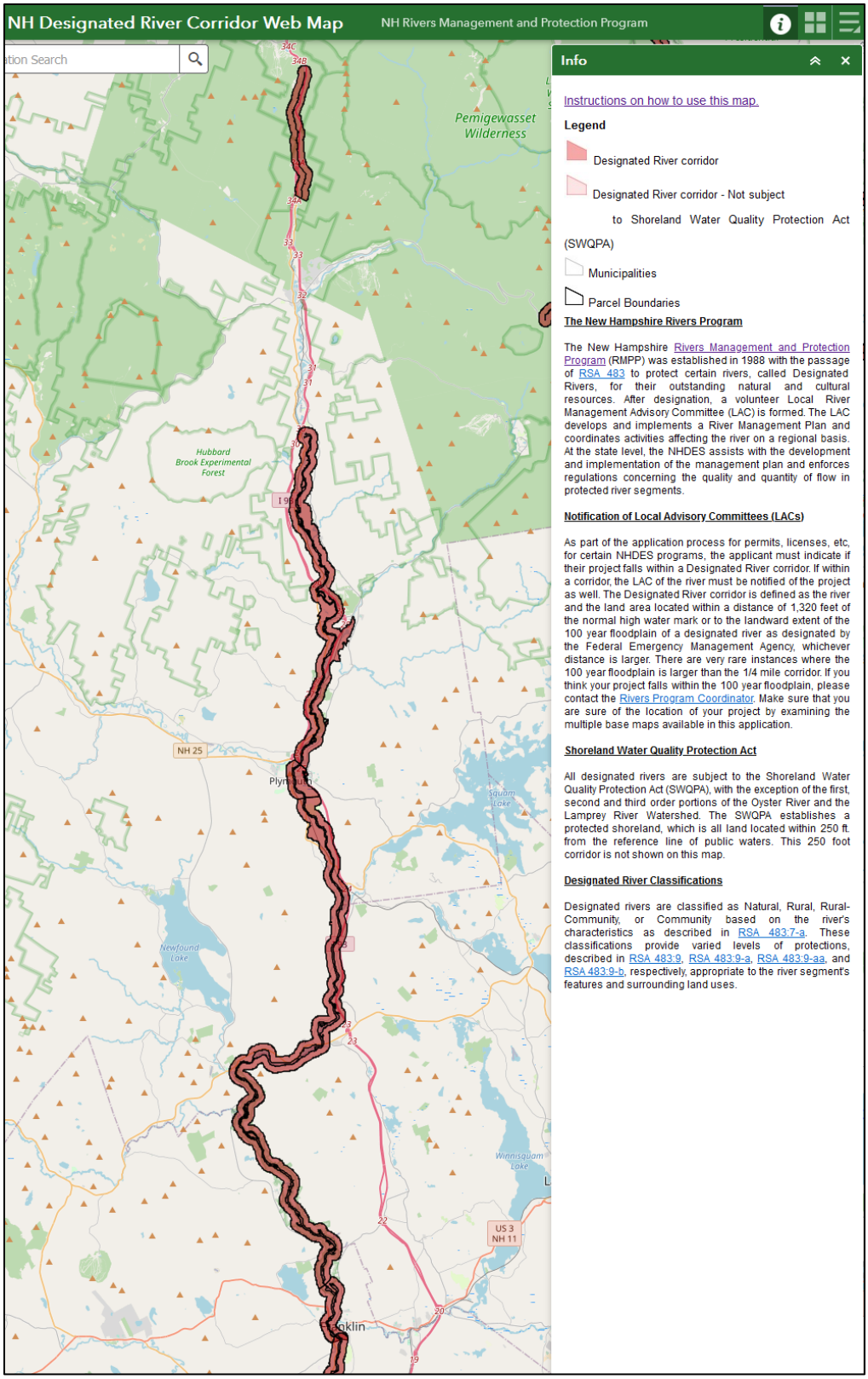

Figure 2. The Pemigewasset River and its Designated Corridor. [NH Designated River Corridor Mapper.]

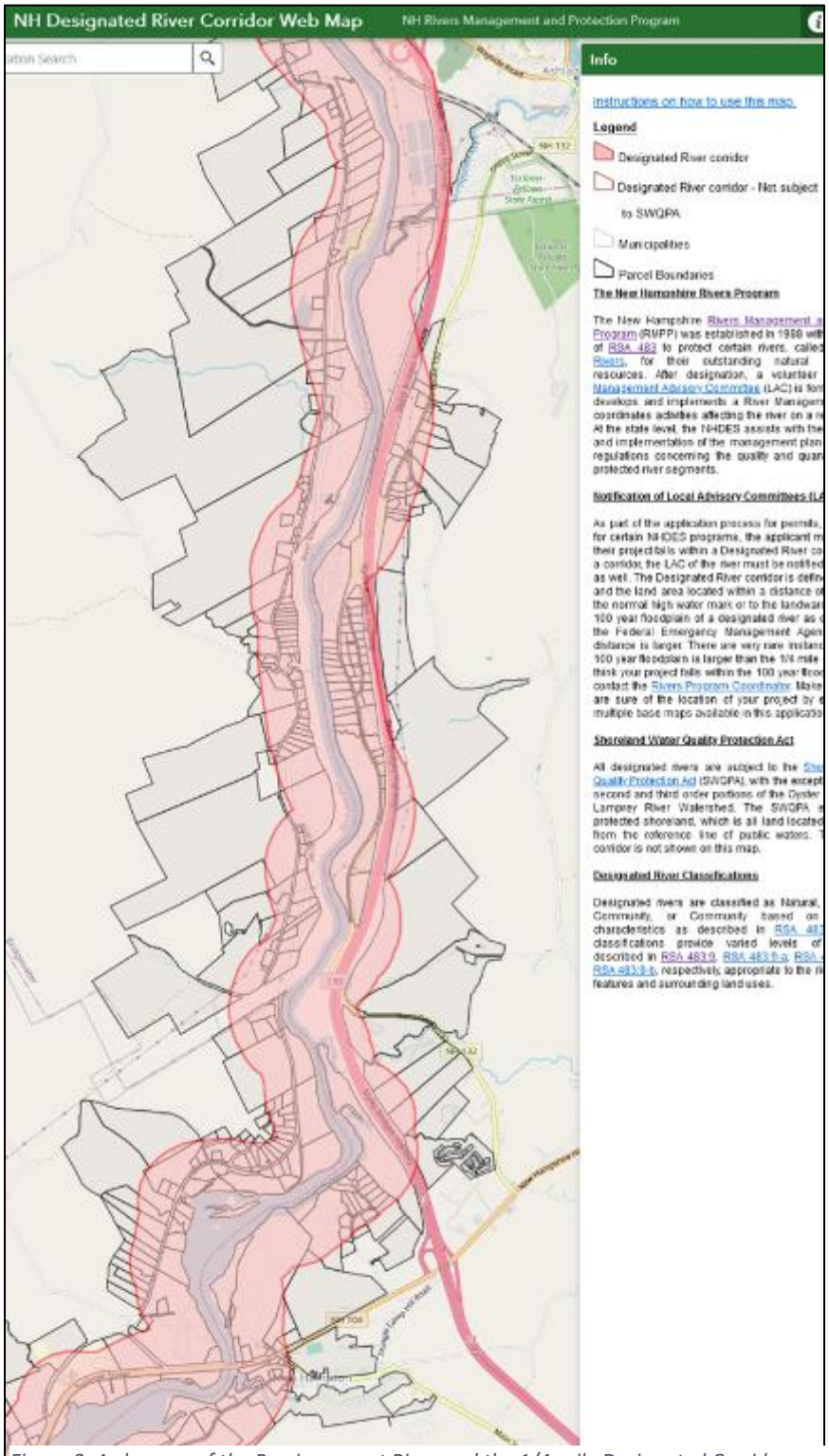

Figure 3. A close-up of the Pemigewasset River and the 1/4-mile Designated Corridor overlay with intersecting parcels. Area shown includes Ashland, Bridgewater, Bristol, and New Hampton. NH Designated River Corridor Mapper.

c. Pemigewasset River Local Advisory Committee (PRLAC)

The Pemigewasset River Local Advisory Committee (PRLAC) was established under the New Hampshire Rivers Management and Protection Program (RMPP) in 1992; this program was enacted in 1988 by the New Hampshire Legislature under RSA 483. The Act is designed to help communities accommodate a wide range of uses for the river without adversely affecting the very qualities that make rivers such rich resources. The Act divides responsibility into two jurisdictions: 1) the state protects instream resources, 2) community representatives develop river corridor management plans to further protect shorelines and adjacent lands.

PRLAC is made up of volunteers representing diverse interests from the communities within the designated section of the river. These are the communities of Franconia, Thornton, Campton, Holderness, Plymouth, Bridgewater, Ashland, New Hampton, Bristol, Hill, Sanbornton, and Franklin. Each member of the committee is nominated by his or her municipal officials and is appointed to a three-year term by the state rivers advisory committee (RSA 483:8-a).

Like most volunteer organizations, PRLAC's representation has ebbed and flowed, it has generally grown over the past decade. This has also included interest and involvement from the towns of Lincoln and Woodstock. PRLAC meets about nine times a year on the last Tuesday evening of the month. The agenda and minutes for each meeting are posted at the PRLAC webpage. PRLAC reviews and comments on Wetlands, Shoreland, and Alteration of Terrain permit applications within the designated river corridor. Several members of the group also sample water quality at various sites along the river.

PRLAC's objective is to balance sensible environmental and economic goals while respecting the rights and desires of riparian property owners of the region. This plan provides municipal officials with a common resource that they can use in preparing their master plans or can adopt as an adjunct to their master plan per RSA 483:8a.

3. Resource Assessment

a. Land Use & Development

i. Development Patterns

1. Demographics & Housing

Throughout the 1980s and 1990s, New Hampshire had the fastest rate of population growth in New England.

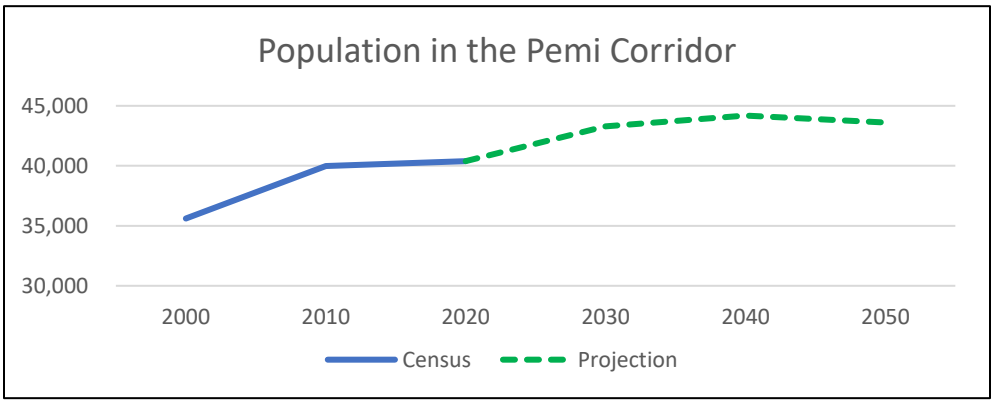

Figure 4. Sources: US Census and State, County, and Municipal Population Projection:2020-2050, NH Office of Planning and Development (2022)

There was a great deal of population growth along the Pemi corridor from 2000 – 2010, especially in the northern communities. That growth slowed quite a bit during this past decade. From 2010 to 2020 most

Table 1. Population and Population Change 2000-2020. Source: US Census Bureau, 2020

Municipality	2000-Total	2010-Total	2020-Total	% Change '00-'10	% Change '10-'20
Franconia	924	1,104	1,083	19%	-2%
Lincoln	1,271	1,662	1,631	31%	-2%
Woodstock	1,139	1,374	1,434	21%	4%
Thornton	1,843	2,490	2,708	35%	9%
Campton	2,719	3,333	3,343	23%	0%
Plymouth	5,892	6,990	6,682	19%	-4%
Holderness	1,930	2,108	2,004	9%	-5%
Ashland	1,955	2,076	1,938	6%	-7%
Bridgewater	974	1,083	1,160	11%	7%
Bristol	3,033	3,054	3,244	1%	6%
New Hampton	1,950	2,165	2,377	11%	10%
Sanbornton	2,581	2,966	3,026	15%	2%
Hill	992	1,089	1,017	10%	-7%
Franklin	8,405	8,477	8,741	1%	3%
Pemi Corridor	**35,608**	**39,971**	**40,388**	**12%**	**1%**

communities saw a decline in the population growth rate, some even saw a decrease in population. While more growth is forecast for the current decade, communities can expect growth beyond 2030 to taper off.

The number of housing units in PRLAC communities rose slightly in the 1990s and at a much higher rate between the 2000 and 2010 Census. In the 1990s this rate of growth in housing units was below the rate of population growth.

According to the US Census, from 2010 to 2020 the total number of housing units in the Pemi Corridor communities remained nearly constant. There was growth in the number of occupied housing units and a corresponding drop in the number of vacant (mainly seasonal) units. This is likely an indicator of 'seasonal conversions', seasonal properties being converted to year-round and a pattern that has being observed by many in the wake of the COVID-19 pandemic (2020-2023).

Table 2. Housing Units 2010 – 2020. Source: US Census Bureau, (2020)

	2010			2020		
MUNICIPALITY	**TOTAL**	**OCCUPIED**	**VACANT**	**TOTAL**	**OCCUPIED**	**VACANT**
Franconia	859	484	375	838	473	365
Lincoln	2,988	794	2,194	2,824	809	2,015
Woodstock	1,421	624	797	1,375	669	706
Thornton	1,862	1,070	792	1,874	1,169	705
Campton	2,208	1,407	801	2,167	1,451	716
Plymouth	2,231	1,953	278	2,310	1,987	323
Holderness	1,510	860	650	1,428	845	583
Ashland	1,355	980	375	1,352	938	414
Bridgewater	995	471	524	948	526	422
Bristol	2,488	1,283	1,205	2,495	1,452	1,043
New Hampton	1,083	848	235	1,175	948	227
Sanbornton	1,612	1,166	446	1,695	1,224	471
Hill	512	413	99	499	433	66
Franklin	3,938	3,407	531	4,046	3,611	435
Pemi Corridor	**25,062**	**15,760**	**9,302**	**25,026**	**16,535**	**8,491**

The volume of traffic along the roads in the corridor is another measure of the pressure placed on the land in the corridor by residents and visitors alike. Interstate 93 is a major artery bringing people into the area and crosses the Pemi at several locations. NH DOT historic data show increases over the past decade in the Average Annual Daily Traffic (AADT) volumes:

- about 27,000 vehicles per day in the Franklin-Tilton-Sanbornton area, up about 10% from a decade ago,
- 18,500 around Campton (9% increase),
- about 9,800 (more than 20% increase) in the Lincoln area.

2. Land Use

Although much of the land in the Pemigewasset River corridor remains undeveloped, the developed land supports a variety of uses. In addition to several highways and a seasonal railroad line along parts of the river corridor, there are agricultural, recreational, and industrial uses. The flood storage area behind the Franklin Falls Dam historically was used for agriculture, even after construction of the dam, but now supports mainly recreational use.

The level of development and distribution of land uses along the rivers directly affects all aspects of the rivers' resources. Impervious surface area associated with development affects the land's ability to absorb and filter stormwater. The closer development is to the river's edge or to a tributary, the greater the impact on water quality unless buffers or some other technique to enhance infiltration are installed. Developed areas can put pressure on or eliminate habitat for plants and animals and can disrupt wildlife from their natural life cycles, impeding movement. Land uses involving hazardous materials or extensive excavation pose a threat to water quality as well, unless Best Management Practices (BMPs) are followed.

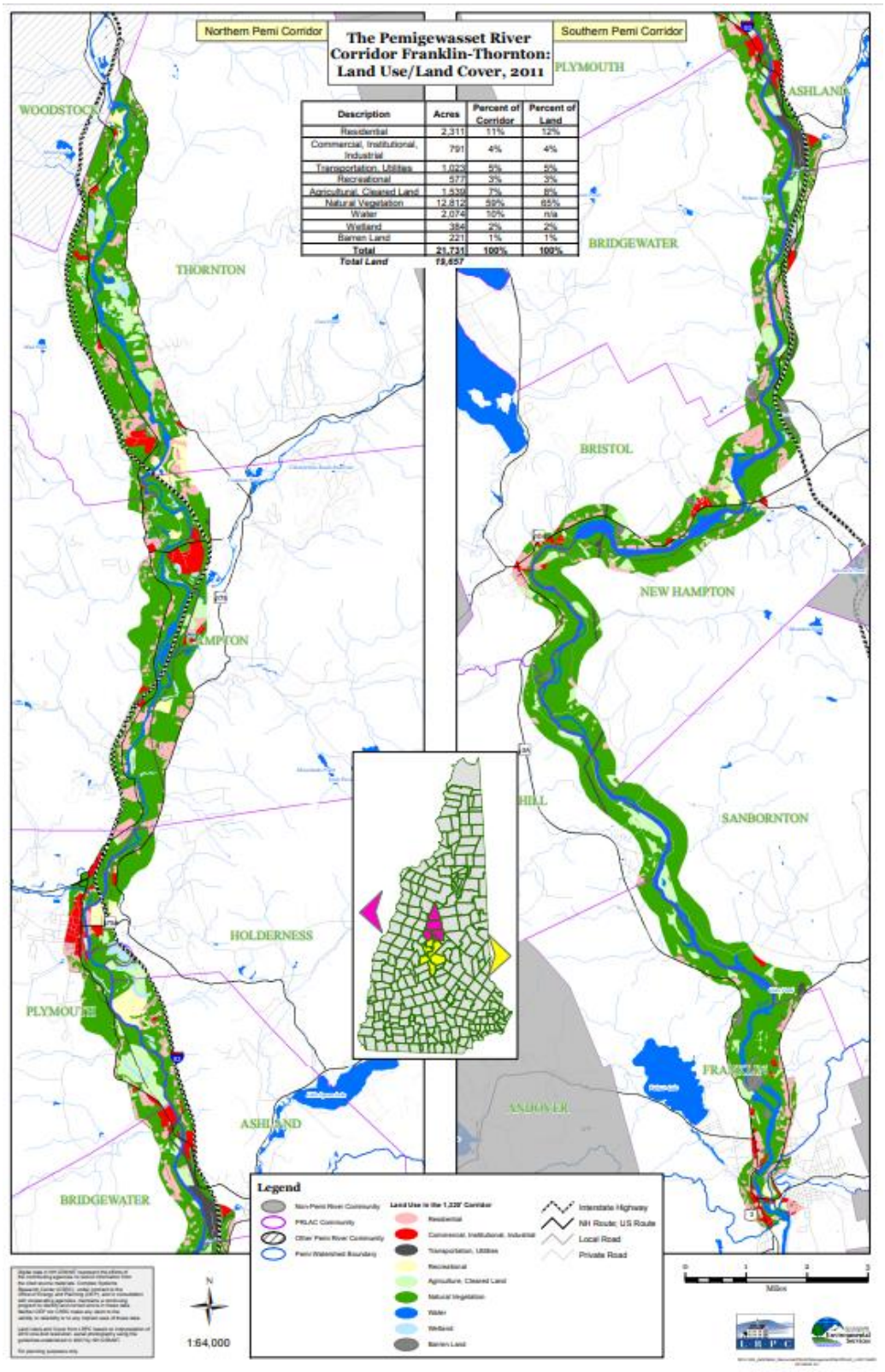

Figure 5. Land Use/Land Cover within the Pemi River Corridor (2011)

3. Permitted non-recreational uses & activities

All communities permit residential uses within the corridor (except that the Franconia section is within Franconia State Park). Commercial activities are permitted in the corridor by most communities and industrial uses are permitted in several. Those with Pemi Overlay zones or Aquifer Protection Overlays do limit certain activities that are most likely to impact the river or groundwater.

4. Pemi Overlay districts (refer to Local Regulations matrix)

Ten of the fourteen communities along the Pemi have some form of a Shoreland Overlay District which protects the land abutting the river with greater restrictions than the state restrictions. These districts are locally defined areas which enhance the regulations of the underlying local zoning districts based on environmental characteristics. Thornton, Franconia, Sanbornton, Hill and Franklin do not have an overlay district. While Franconia and Sanbornton do not have this overlay, they do have an aquifer overlay district and much of the riverfront land in Hill and Franklin is under federal control through the US Army Corps of Engineers.

In Campton, Plymouth, Holderness, Ashland, New Hampton, and Bristol the protections extend at least 500' out from the river's edge, sometimes further based on local features. In Woodstock and Bridgewater, the overlay extends 250' from the river's edge. Common uses prohibited in these districts are automobile repair shops or junkyards; underground petroleum tanks; excavation of sand, gravel or other earth materials; the use of common fertilizers on lawns; landfills and other solid and hazardous waste facilities; and various industrial uses. In a couple of communities, their local ordinances mirror earlier versions of the state's Shoreland Protection Act. Even where local standards are stricter, PRLAC representatives noted that enforcement or lack thereof plays a critical role in the effectiveness of the regulations.

5. Prohibited Uses

The Shoreland Water Quality Protection Act (SWQPA) was created by state law RSA 483-B in 1990, amended in 2011 and establishes a buffer or "protected shoreland" along public waters. Within this protected shoreland certain activities are regulated by SWQPA such as subdivision of lots, development of land, and vegetation management (Protected Shoreland FAQ). There are differing limits based on distance from the river.

Some permitted uses vary depending upon the type of river segment designation (RSA 483:15.VI.a-d.). These classifications are based primarily on the land uses through which it flows and some of the instream structures. The Pemi includes all four protection types: natural, rural, rural-community, and community along its length. The protection type impacts various river uses including dams, recreational use, and waste disposal.

ii. Dredging, Filling, Mining, and Earth-moving

The Alteration of Terrain (AoT) permitting program helps regulate stormwater control and treatment on larger sites. It applies to earth moving operations, such as industrial, commercial, and residential developments as well as sand pits, gravel pits, and rock quarries. Permits are issued by NHDES after a technical review of the application, which includes the project plans and supporting documents.

An AoT permit is required whenever a project proposes to disturb more than 100,000 square feet (sf) of contiguous terrain (50,000 sf, if any portion of the project is within the protected shoreland) or disturbs an area of 2,500 sf having a grade of 25 percent or greater. In addition to these larger disturbances, the AoT Permit by Rule applies to smaller sites.

A copy of each application is sent to PRLAC for review and comment by PRLAC representatives to NHDES.

iii. State-owned Lands

There are nearly 60 state-owned properties that are either partially or completely within the Pemi River corridor, ranging in size from less than half an acre to 141 acres. The total area within the corridor is 579 acres, these parcels are directly connected to an additional 441 acres extending beyond the 1/4 -mile designated corridor boundary.

During the past decade the land at Livermore Falls in Holderness was converted into a public park with seasonal staffing. This public-private project was just beginning when the 2013 Pemigewasset River Corridor Management Plan was being finalized. PRLAC did maintain representation in the planning process, as recommended in the Plan.

State/Federal Parks and Trails on the Pemi River Corridor

Profile Falls Park, Army Corps of Engineers (federal)	Slim Baker Lodge (state)	Wells Field (state)	New Hampton Scenic Easement, New Hampton (state)
Keniston Woods (state)	Scribner-Fellows State Forest (state)	Church Hill Wildlife Management Area (state)	Livermore Falls State Forest (state)
Blair State Forest and Cemetery (state)	Fox Pond Park (state)	Panther Park (state)	Lumen Nature Retreat (state)
White Mountain National Forest (federal)	Flume Gorge Visitors Center, National Forest (federal)	Branch Brook Campground (state)	Cloudland Falls, National Forest (federal)

New Hampshire Fish and Game owns 124 Wildlife Management Areas (WMA) throughout the state. Many of these properties have been purchased through the Sport Fish and Wildlife Restoration Funds from US Fish and Wildlife Service or Land Conservation Investment Program Funding. The purpose of these lands is to protect and improve wildlife habitat areas. Recreational activities like hunting, fishing, trapping, and wildlife viewing are permitted on WMAs in New Hampshire.

There are several WMAs within Pemi Corridor communities and two with shoreland along the river.

The Pemigewasset River WMA in Campton includes over two miles of frontage on the Pemigewasset River. It includes a one-acre island in the middle of the river and approximately 33 acres of floodplain forest with a few old fields dominated by grasses and forbs. Common wildlife: white-tail deer, eastern turkey, rough grouse, American woodcock, songbirds, waterfowl, trout fishery and Atlantic Salmon breeding habitat.

The Thornton Wildlife Management Area fronts over 3,000 feet of the Pemigewasset River and includes the island created by the Pemi carving a new, straight path, at the beginning of the oxbow in the river. The upland portion is primarily old field habitat growing up with field pine. Common wildlife: deer, moose, bear, coyote, grouse, Otter, mink, beaver, waterfowl, Coldwater fishery.

iv. Wetlands

Wetlands serve important roles in the watershed ecosystem – geographically, hydrologically, and biologically. Many wetlands serve as connectors between various waterbodies throughout a stream and watershed network. In doing so, they also slow the movement of water, enabling the landscape to absorb water and reducing the likelihood of erosion. Finally, wetlands serve as nurseries and often home for many fish, amphibians, and reptiles. Wetland areas within the Pemigewasset Corridor may be found by utilizing the Wetlands Permit Planning Tool. The image below shows a section of the Pemi River Corridor in Thornton showing several floodplain wetlands using that mapping tool.

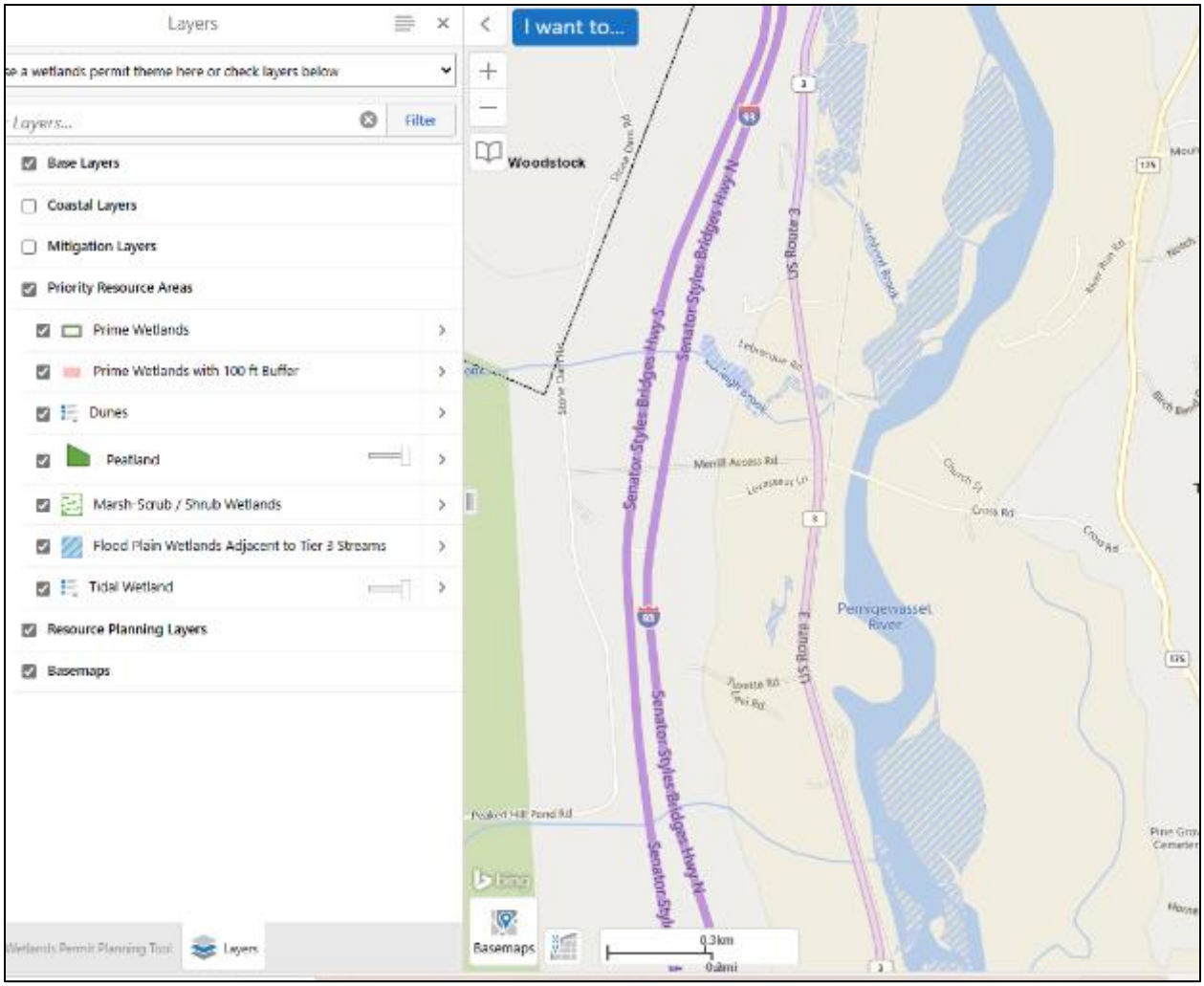

Figure 6. A section of the Pemi River Corridor in Thornton showing several floodplain wetlands using the Wetlands Permit Planning Tool.

v. Open Space

Within the Pemigewasset River Corridor, there are many areas of open space. While concepts of what comprises open space will vary, it is generally considered to be undeveloped land. The river corridor has the following types with natural cover on undeveloped land: forests, wetlands, grasslands, forested floodplains, and shrubland. All these public and private areas can provide habitat for wildlife, and most contribute to local economies and support the health of the river ecosystem in a variety of ways.

vi. Geology

The bedrock geology history of the Pemigewasset River Valley is long and complex. This area of northeastern North America was joined and separated from the early European continental masses several times as the Atlantic Ocean opened, closed, and reopened.

Mountain building periods (orogenies) occurred when the continents were thrust together, and sediments were deposited as the mountains eroded away when the continents drifted apart. These sediments were later metamorphosed through the heat and pressure of deep burial and subsequent orogenies into the metamorphic rocks such as schist and gneiss common in the area. In addition, volcanic activity occurred at times to create the granitic and volcanic rocks found in the White Mountains.

An unusual feature of the area is a unique metamorphosed section of rock through Livermore Falls which was first discovered in 1879. This rock, Camptonite, named after the town of Campton in which it was found, is a dark intrusive rock with unusual chemical composition. Geologists have discovered this rock type in other regions, and it is known as Camptonite throughout the world.

Once mountain building ceased, millions of years of subsequent erosion shaped the mountains and valleys that we see today. Periods of glaciation over the last two million years made the final geological modifications to the area by eroding the bedrock, moving some sediments and depositing others. The ice sheets eroded the bedrock, smoothing its surface and creating the gouges and scrapes often seen. Much of the soil and loose rock here before the ice ages was scraped off by the ice sheets and deposited in southern New England. Some of the deposits created a dam that formed Glacial Lake Merrimack as the ice sheets melted.

vii. Setbacks & Other Location Requirements

Establishment of setbacks for structures or location requirements for activities in riparian areas are tools that communities may utilize to control the way land is used and to protect some of the functions and values of the land.

In addition to state requirements, these requirements are usually established by the local planning board through the zoning ordinance or subdivision and site plan review regulations. The required dimensions may vary by municipality. Section 4. c includes a matrix that lists dimensional requirements for each riparian community. Applications are reviewed and approved through the planning board and enforced by the selectboard, sometimes through a code inspector.

viii. Protection of floodplains, wetlands, habitats, & open space

1. Conservation Lands

While some land is conserved as public land, other parcels are conserved by private entities. The owner of any parcel of land makes decisions regarding how the land is used. Some decide that the best use of the land is to put it in some form of conservation. This might be done as an individual or through a land stewardship program such as The Society for the Protection of NH Forests (SPNHF) or Lakes Region Conservation Trust (LRCT).

Often a land management plan is developed to protect specific functions and values of the land. Certain activities such as trail access or timber harvesting may be permitted on the land as part of the management plan.

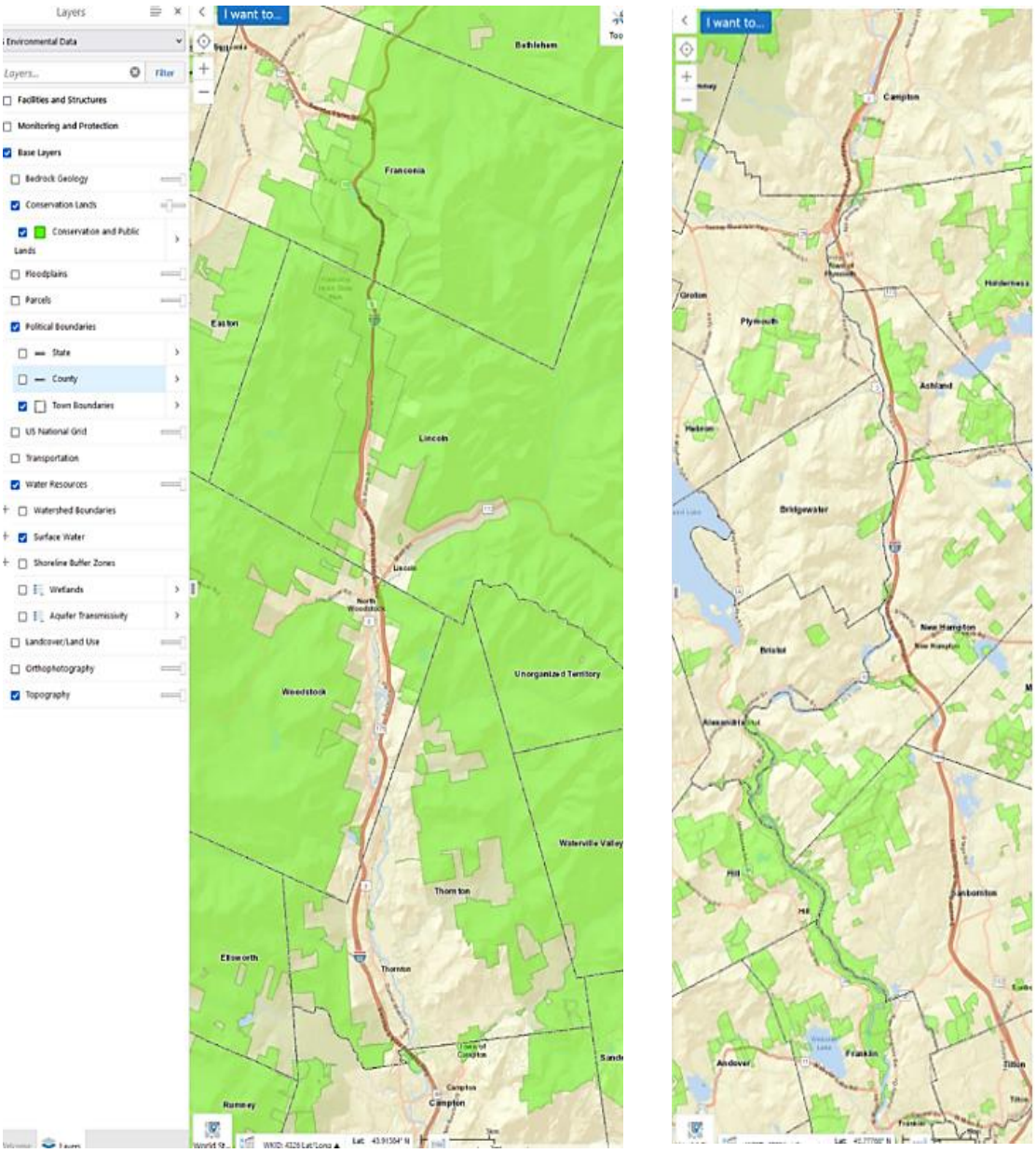

Figure 7. Conservation Lands near the Pemigewasset River (northern & southern halves of the corridor). Source: NHDES OneStop Mapper

A report from the US Department of Agriculture and US Forest Service, *Private Forests, Public Benefits* identified the Merrimack River watershed (of which the Pemi watershed is the headwaters) had the largest amount of private forest projected to experience increased housing density. Encouraging conservation of parcels is an important strategy. In 2008 LRPC worked with PRLAC to develop a

resources co-occurrence model to help prioritize land for protection/conservation based on certain characteristics. In addition to a report, maps and tables were produced.

Conservation Lands

Table 3. Conservation Lands in the Pemi Corridor

NAME	TYPE
Blair Woods Natural Area	Municipal (Campton)
City of Franklin Land	Municipal or County
Drew	Municipal or County
Egan Property	Municipal or County
Franklin Wellfield	Municipal or County
Merrill	Municipal or County
Morrell	Municipal or County
Pattee Conservation Park	Municipal (Campton)
Pemi Valley View Open Space	Municipal or County
River Street River Frontage	Municipal or County
Sahegenet Falls Rec. Area	Municipal or County
Swain	Municipal or County
West Branch Brook Forest	Municipal (Campton)
Franklin Falls Reservoir	Federal
White Mountain National Forest	Federal
Ballou	State
Blair State Forest	State
Livermore Falls State Forest	State
New Hampton - Bridgewater Scenic Easement	State
New Hampton Fish Hatchery	State
New Hampton Scenic Easement	State
Pemigewasset Wildlife Management Area	State
Plymouth State University - Langdon Park	State
Scribner-Fellows State Forest	State
Sugar Hill State Forest	State
William H Thomas State Forest	State
Conkling	Private
Martin Easement	Private

2. Floodplain Regulations

Communities may choose to adopt Floodplain Regulations as part of their Zoning Ordinance, all PRLAC communities have a Floodplain Ordinance. Adopting and maintaining such regulations enables all property owners in the town to purchase flood insurance through the FEMA Flood Insurance program. The NH Office of Planning and Development provides guidance and training regarding floodplain regulations.

FEMA has the responsibility of creating and updating floodplain maps. New floodplain maps for the Pemi were recently developed for Merrimack and Grafton counties. Digital versions of the maps for Belknap County are not yet available.

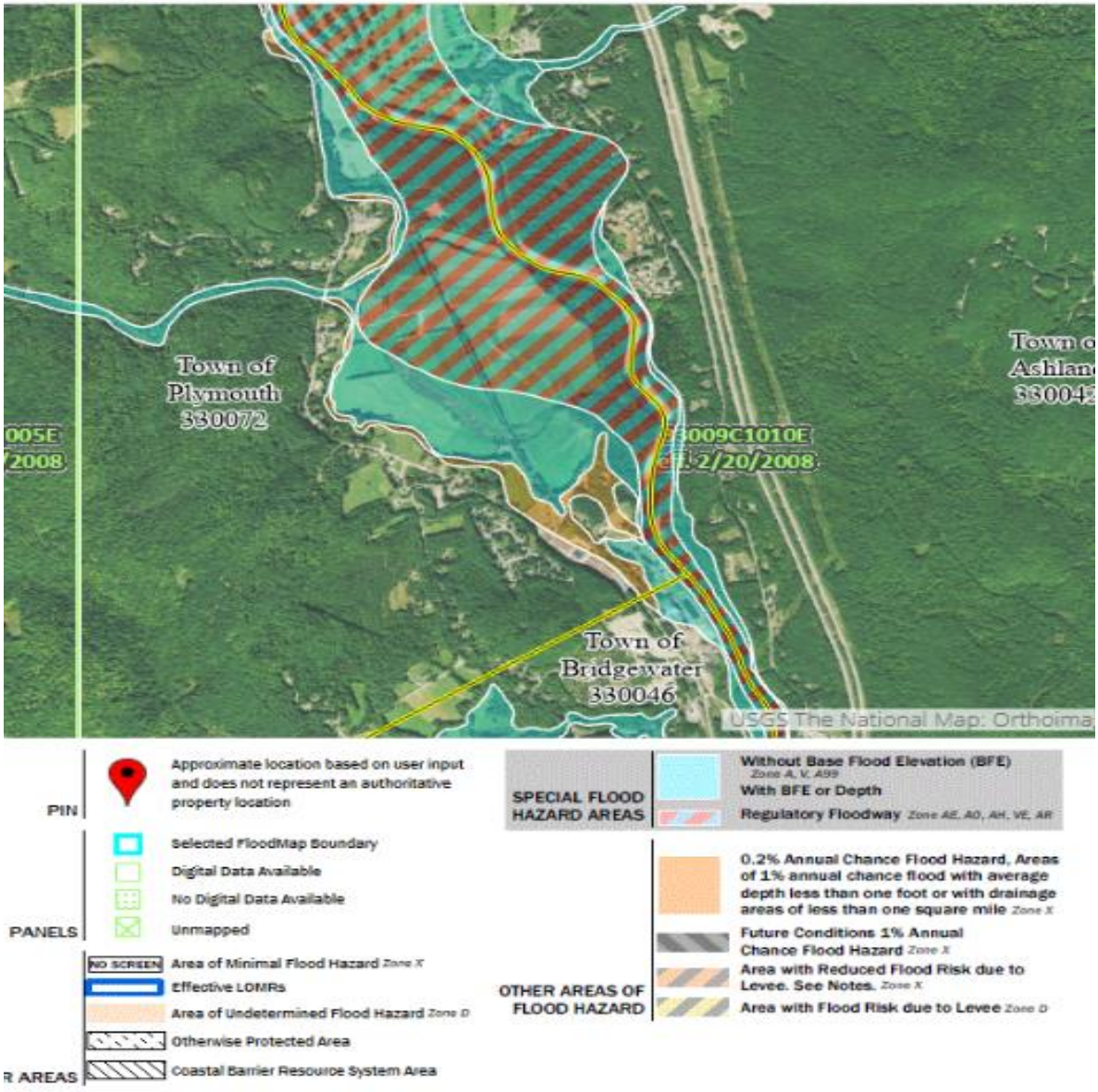

Figure 8. Digital floodplain map of the Plymouth, Ashland, Bridgewater area. Source: FEMA Flood Map Service Center.

3. Prime Wetlands

Individual communities in New Hampshire may decide to designate certain high-quality wetlands as "prime wetlands". Favorable characteristics may include large size and the ability to sustain threatened or rare species. This adds an additional layer of protection to the wetland. Holderness and Sanbornton are the two PRLAC communities that have chosen to designate prime wetlands.

4. Current Use

Current Use is a tax incentive (RSA 79-A) available to qualifying landowners who maintain their land as undeveloped forest, farm, or open space. This encourages land preservation. According to NH Fish & Game, more than 50% of the land in the state is in some form of Current Use protection.

b. Water Quality & Quantity

i. Designated Uses

Water quality "standards" are goals and criteria for measuring the health of the state's surface waters. Standards consist of three parts:

- designated uses,
- numerical or narrative criteria to protect the designated uses,
- an anti-degradation policy which aims to maintain existing high-quality water.

There are six designated uses for freshwaters:

- aquatic life,
- fish consumption,
- drinking water supply after adequate treatment,
- swimming,
- boating,
- wildlife.

The entire length of the Pemigewasset River covered in this plan is classified as Class B water quality by the NHDES. Class B waters have high aesthetic value and are acceptable for swimming and other recreational activities, fish habitat, and for use as a water supply after treatment.

ii. Flow Characteristics

The section of the Pemigewasset River covered by this plan is free flowing until it reaches the impoundment area behind the Ayers Island Dam. The natural flow of the river from the Ayers Island impound area to its confluence with the Winnipesaukee River is greatly affected by the operation of the dams. As part of its Federal Energy Regulatory Commission (FERC) license agreement, the Ayers Island Dam is required to maintain minimum flows to accommodate the needs of salmon migration and the requirements for whitewater boating. The short section between the Franklin Falls Dam and the Eastman Falls Dam is an impoundment area. The last section of the river, downstream from the Eastman Falls Dam, is dam-controlled quickwater down to where the Pemi joins the Winnipesaukee River, becoming the Merrimack River.

There are numerous tributaries which contribute to the Pemigewasset and impact its flow characteristics including the Mad, East Branch of the Pemi, Baker, Beebe, Squam, Newfound, and Smith Rivers.

Flow volume or "discharge" is measured by the U.S Geological Survey (USGS) at Plymouth and by the U.S. Army Corps of Engineers (USACE) at Franklin Falls Dam. Data from Plymouth's gauge is particularly useful, as continuous records exist from October 1903 to the present. Typically, the lowest monthly flows occur in August and the highest discharges in April. The charts below show water flow data at the Plymouth gauge for 2013 (during the last corridor management update), 2018 (in the middle of the ten-year span), 2022 (current discharge info). The final chart shows the entire time span of water data from

2013 to 2022. During that span not only were there low flows of less than 200 cubic feet per second (ft3/s), but there were more than ten minor flood stage events (13 ft or nearly 30,000 ft3/s) and one moderate flood stage (18 ft or 40,000 ft3/s).

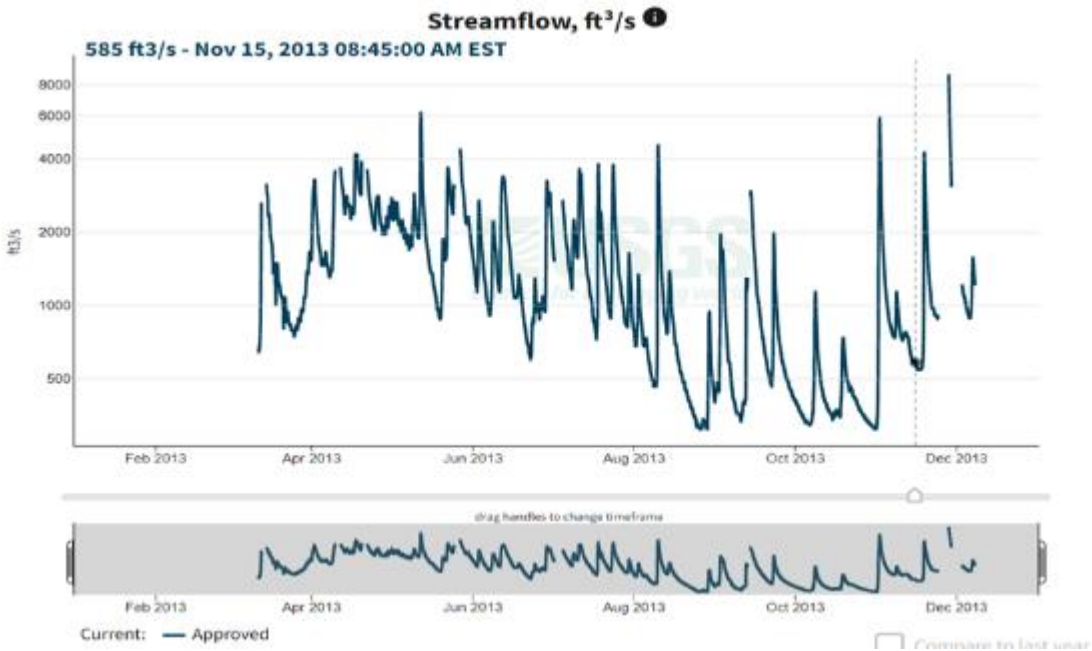

Figure 9. Flow (Cubic ft/sec) in 2013 at Plymouth, Highest flow recorded was 8,900 ft3/sec Source: USGS

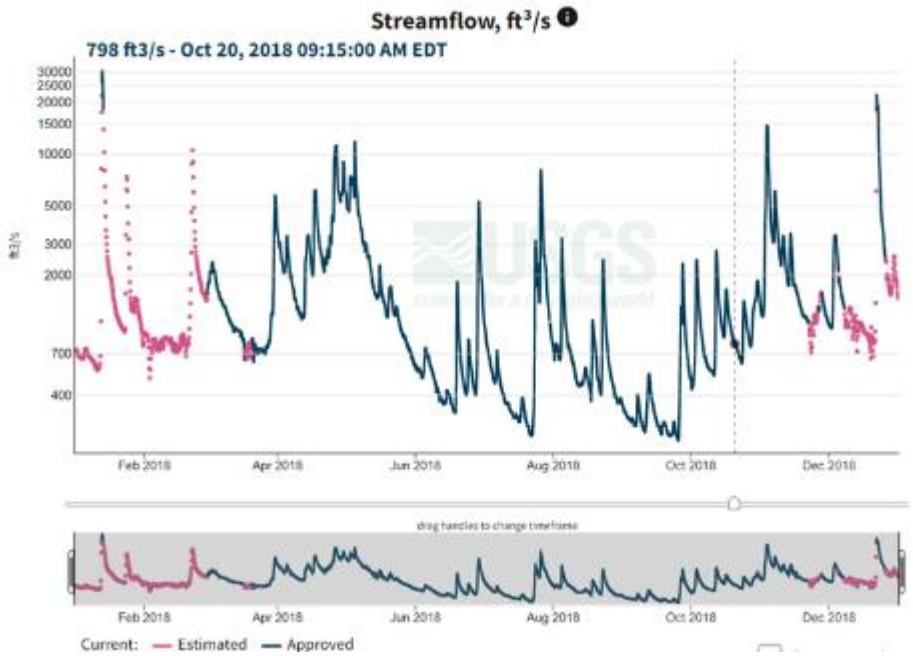

Figure 10. Flow (cubic ft/sec) at Plymouth for year 2018, highest flow rate was 30,200 ft3/sec. Source: USGS

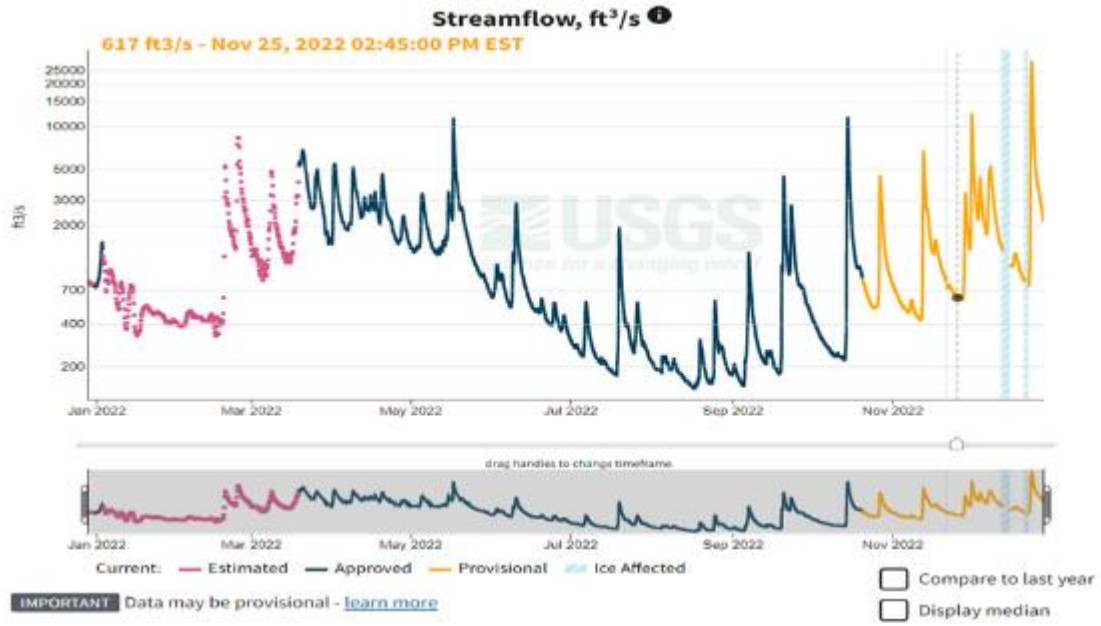

Figure 11. Flow (cubic Ft/sec) at Plymouth water gauge for 2022, highest flow was 20,700 ft3/sec Source: USGS

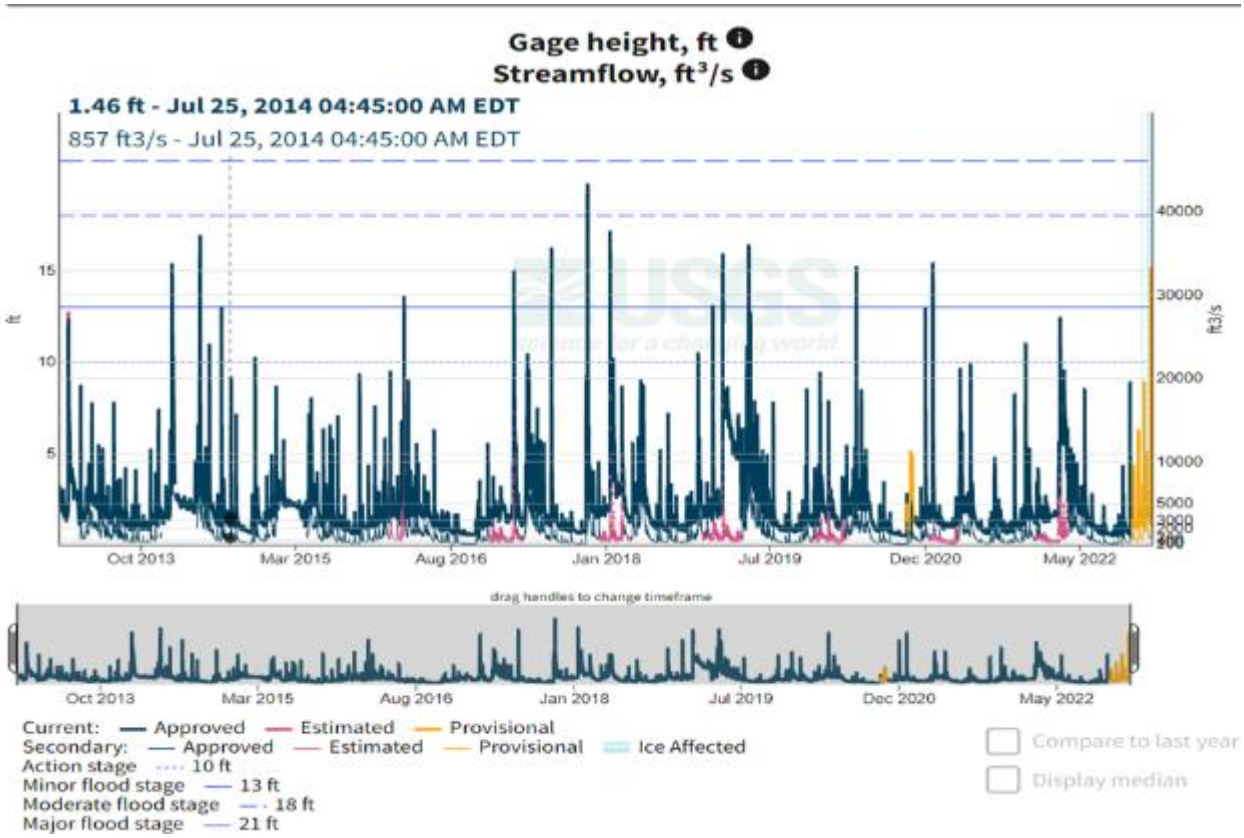

Figure 12. Guage height 2013 – 2022 (Plymouth, NH. Source: USGS

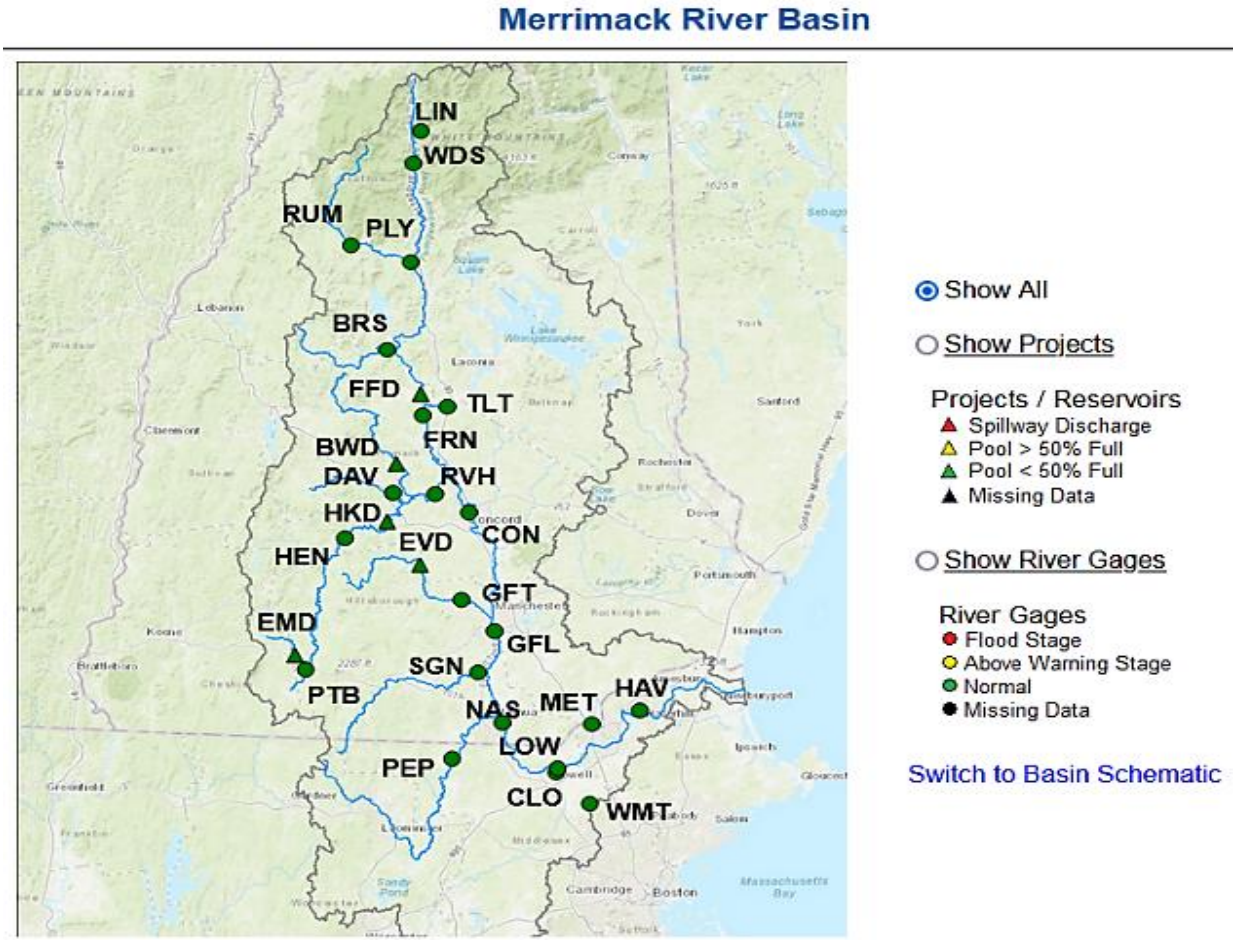

Figure 13. Monitoring sites in the Merrimack River Basin. Source: US Army Corps of Engineers

The United States Geological Survey (USGS) monitors stream flow at stream gauge locations along the Pemi in Woodstock and Plymouth. There are also gauges on the East Branch of the Pemi (Lincoln), Baker (Rumney), and Smith (Bristol) Rivers. Another site for accessing current flow data is at the US Army Corps of Engineers NAE Reservoir Regulation website.

The Federal Emergency Management Agency (FEMA) describes the Pemigewasset River Corridor as "one of the most flood prone areas in the state." Flooding events have been associated not only with spring runoff and ice jams but have also occurred at other times. Flooding is a serious problem, causing erosion and damage to bridges, culverts, dikes and railroad beds, as well as to structures located in the floodplain. The September 2011 floods associated with Tropical Storm Irene resulted in substantial erosion and damage to property along the river.

Floodplains provide a storage area for water when it exceeds the river's banks, allowing the river to gradually return to its normal levels. All eleven PRLAC communities have adopted floodplain ordinances that meet Federal Emergency Management Association (FEMA) guidelines. Having a floodplain ordinance in force provides the opportunity for property owners throughout the community to purchase flood insurance. Local ordinances can place even more stringent requirements on development to protect property owners, residents, emergency personnel, taxpayers, and the floodplain.

Figure 14. NH Route 175 in Holderness, September 2011
Photo Credit: B. Ayotte

iii. Impairments

NHDES reports to the US Environmental Protection Agency (EPA) every two years on impairments to water quality for the state's surface waters as part of the requirements of the Clean Water Act; data collected during PRLAC's water monitoring activity is used in this assessment. 2020/2022 watershed report cards for the Pemi mainstem and intersecting streams can be viewed utilizing the NHDES Surface Water Quality Assessment Viewer.

This report, known as the 303(d) list, identifies impairments based on a variety of parameters relating to pollutants, nutrients, oxygen content, and other factors. The draft 2020/2022 303(d) list identifies sections of the Pemigewasset River as being impaired for dissolved oxygen (DO), pH, and aluminum. Additionally, fish consumption in New Hampshire's surface waters is discouraged because of high mercury content. Using this and other data, NHDES has developed a "Watershed Report Card" for each HUC12 watershed (approximately 34 square miles). There are 17 of these small watersheds that intersect the Pemigewasset River corridor.

Water quality can be adversely affected by

- stormwater runoff,
- siltation resulting from flood events,
- scouring of the banks due to water level fluctuations resulting in slumping and siltation.

Other factors that can influence water quality include pollutant loading (point source and non-point source), the presence or absence of naturally vegetated riparian buffers, water quantity, invasive plant and animal species, and litter.

There are some sections of the Pemi that do not meet Class B standards because of low pH and low dissolved oxygen. Low pH readings are found throughout much of New Hampshire and are generally linked to acidic precipitation. Low DO values tend to be found in slower moving water where less aeration occurs. Regular collection of water quality data allows for early detection of water quality changes, allowing NHDES to trace potential problems to their source. The most likely source of mercury is emissions from coal-fired power plants.

Taken as a whole, the water quality of the Pemigewasset River has remained good throughout the past decade. PRLAC's Volunteer River Assessment Program (VRAP) monitoring efforts demonstrate that, despite these impairments, the river generally meets its required water quality standards under the RMPP. Continued monitoring, maintenance of facilities, and landowner education are critical to maintaining and enhancing quality.

iv. TMDLs

Every two years NHDES issues a report on the quality of the surface waters in the state. This includes analyses that guide balanced stewardship. Some waters are categorized as impaired, and some of those require the determination of a TMDL (Total Maximum Daily Load) to control the amount of pollutants while maintaining water quality.

In the 2020/2022 303(d) list, ten segments of the Pemi are listed due mainly to pH (acidity) levels, common in many of New Hampshire's surface waters.

Assessment Unit Name	Town[s] Primary Town is Listed First	Water Size	Size Unit	Designated Use	Parameter Name	Parameter Level - NHDES Category	TMDL Priority	Last Sample	Last Exceedance
PEMIGEWASSET RIVER - AYERS ISLAND DAM POND	NEW HAMPTON, BRISTOL	580.000	ACRES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET LAKE	MEREDITH, NEW HAMPTON	248.360	ACRES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET RIVER	WOODSTOCK	6.431	MILES	Aquatic Life Integrity	Aluminum	5-M	LOW	2019	2019
PEMIGEWASSET RIVER	WOODSTOCK	6.431	MILES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET RIVER - HUBBARD BROOK	THORNTON, WOODSTOCK	6.682	MILES	Aquatic Life Integrity	pH	5-P	LOW	2019	2019
PEMIGEWASSET RIVER	CAMPTON, HOLDERNESS, PLYMOUTH	5.115	MILES	Aquatic Life Integrity	pH	5-P	LOW	2019	2019
PEMIGEWASSET RIVER - SPRING BROOK	ASHLAND, HOLDERNESS, PLYMOUTH	4.457	MILES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET RIVER	NEW HAMPTON, BRIDGEWATER, BRISTOL	4.230	MILES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET RIVER	NEW HAMPTON, BRISTOL	1.140	MILES	Aquatic Life Integrity	pH	5-M	LOW	2019	2019
PEMIGEWASSET RIVER	NEW HAMPTON, BRISTOL, FRANKLIN, HILL, SANDBORNTON	9.836	MILES	Aquatic Life Integrity	pH	5-M	LOW	2007	2007

Figure 15. 2020/2022 303(d) segments. Source: NHDES TMDL

v. Other contaminants including PFAS

Non-point source pollution can have a variety of causes, including septic systems, road salt and sand application, agriculture, and timber harvesting. While best management practices (BMPs) are either recommended or required by the state or municipality when new projects are undertaken, existing sites may not be following such BMPs, and inspections may be sporadic.

The Groundwater Protection Act (RSA-485-C) identifies nearly twenty different potential contamination sources, including transportation corridors, salt storage areas, septic systems, stormwater, vehicle repair shops, and cleaning services. There are many small businesses and private companies along the Pemi

corridor that could be potential contamination sources for the river. These businesses primarily consist of gravel/construction companies, junk/salvage yards, electronic/chemical manufacturing companies, salons, and laundromats. Additionally, there are some unique characteristics as well including: a municipal salt storage area (Lincoln), a car dealership (Thornton), a concrete/asphalt company (Ashland), a pesticide storage area (country club in Ashland), an animal hospital (Plymouth), a machine shop in Bristol, and a dry cleaner in Franklin.

PFAS (Per- and polyfluoroalkyl substances) are a family of contaminants that are very stable and therefore can move through the environment quite easily. PFAS chemicals pose several health risks to humans, including high cholesterol, thyroid disorders, and some types of cancer. Testing for PFAS occurs at numerous locations in Pemi corridor communities, notably from Public Water Supplies and Groundwater samples. Out of 53 PFAS sampling sites along the corridor, seven sites have been found to have PFAS contaminants present. Currently, there are no regulatory enforcement levels.

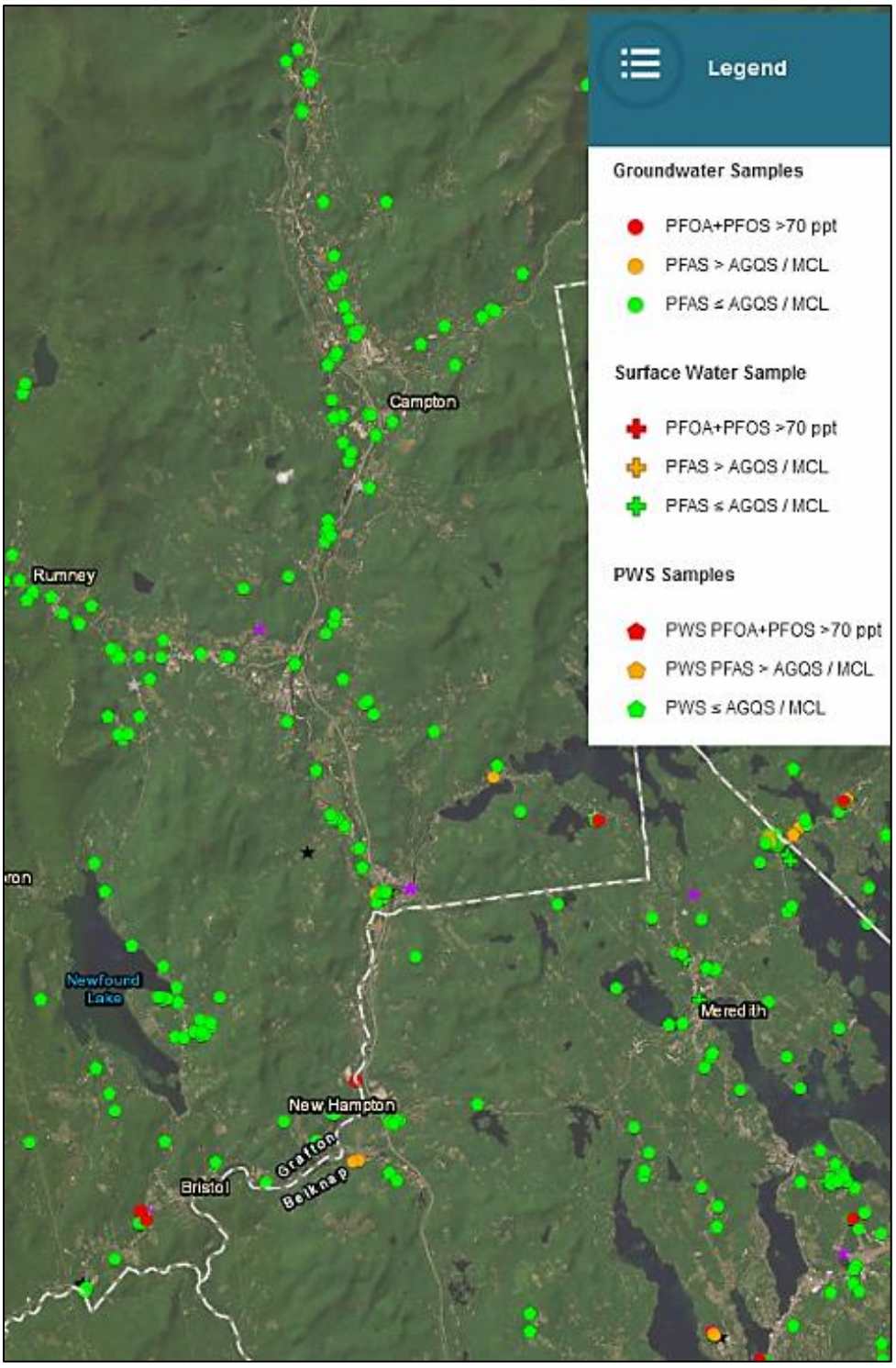

Figure 16. PFAS Sampling Sites in Pemi Corridor Communities. Source [NHDES PFAS Sampling Map]

vi. Monitoring

The entire length of the Pemigewasset River covered in this plan is classified as Class B water quality by the NHDES. Class B waters have high aesthetic value and are acceptable for swimming and other recreational activities, fish habitat, and for use as a water supply after treatment. The NHDES is charged with developing and enforcing water quality standards and monitoring New Hampshire rivers for compliance with the Clean Water Act. For the past two decades, NHDES has provided support for the Volunteer River Assessment Program (VRAP), which provides education, equipment loans, and technical assistance for hundreds of volunteers that supplement the state ambient sampling program.

Testing was identified as a high priority objective in the 2001 Pemi River Corridor Management Plan. At that time, river water quality testing by the state was sporadic. PRLAC started its water testing program on the Pemi in the summer of 2002 with loaned equipment from NHDES. PRLAC acquired its own test equipment through grants from local banks in 2004. The twenty years of accumulated Pemi water quality data provides a baseline to detect whether key elements of our water quality are showing signs of deterioration.

PRLAC volunteers begin testing in late spring and continue a biweekly schedule through early fall. Tests are conducted at nine sites – six in the Pemi and three tributaries.

There currently are nine test sites, ranging from Thornton to Hill:

- Pemi River: Memorial Bridge Thornton (21-PMI)
- Mad River: Route 49 Bridge Thornton (03G-MAD)
- Pemi River: Blair Bridge Campton (18-PMI)
- Pemi River: Holderness Road Bridge Plymouth (15-PMI)
- Pemi River: Sahegenet Falls Bridgewater (11A-PMI)
- Newfound River: Pleasant Street Bridge Bristol (01-NFD)
- Pemi River: Mooney-Clark Landing Bristol (09A-PMI)
- Pemi River: Central Street Bridge Bristol (07-PMI)
- Smith River: Profile Falls Bristol (00M-SMT)

Additional sampling sites are being considered in consultation with NHDES staff.

Figure 17. Gov. Maggie Hasson assisting PRLAC Chair Max Stamp with water sampling in Plymouth, NH (2015). Photo credit, NHDES.

The PRLAC VRAP monitors test for the following elements that are considered key indicators of river health:

A. Dissolved Oxygen (mg/L) - Dissolved oxygen (DO) is vital to bottom dwelling organisms, fish, and amphibians.

B. Specific Conductance (µS/cm) - High specific conductance indicates pollution from road salt, septic systems, wastewater treatment plants, and urban or agricultural runoff.

C. Turbidity (NTU) - High turbidity increases water temperature because suspended particles absorb more heat.

D. pH is a measure of acidity, which affects chemical/biological processes in water important to survival and reproduction of fish and other aquatic life.

E. Temperature (°C) - Increased temperature reduces DO and determines which fish and macro-invertebrate species can survive in a given river or stream.

Tests for E. coli and Phosphorus are conducted at three separate sites three times per season.

F. E. coli (Cts/1,000 mL) – This bacterium is an indicator of fecal pollution and other pathogens.

G. Total Phosphorous (mg/L) - This nutrient is an indicator of pollution; it causes algae blooms, which consume oxygen, reducing DO.

Annual reports of the water monitoring program can be found at the NHDES Publications page.

vii. Quantity - Instream Flow

"The purpose of the Instream Flow Program is to ensure that rivers continue to flow in spite of the uses and stresses that people put on them. Under natural conditions, rivers flow freely with source waters coming from precipitation via lakes, ponds, wetlands, small streams and groundwater. River levels vary greatly through the seasons, and native plants and animals have adapted to low summer flows, as well as to the typical spring floods. But the rivers remain hydrologically connected to water storage areas, such as wetlands, so that some flow is maintained even during the hot summer months.

> Under human influences, however, river dynamics can change drastically. People frequently withdraw large amounts of water for drinking and irrigation directly from rivers, as well as from the sources that supply the rivers, particularly lakes and groundwater. Many rivers have dams that restrict the amount and timing of water flowing downstream. In addition, the loss of wetlands to land development reduces the amount of water that would normally augment rivers during dry periods."
> Source: Chapter Env-Wq 1900 Rules for Protection of Instream Flow on designated rivers.

The Pemi has been designated for protection under the Rivers Management and Protection Act RSA 483 since 1991. As such, flow "shall be established and enforced to maintain water for instream public uses and to protect the resources for which the river is designated" (RSA 483:9-c). The Department of Environmental Services was assigned responsibility for developing standards, criteria, and procedures to protect flows necessary to maintain the river's designated uses. Elements of current instream flow protection on the Pemi:

- RSA 483 applies to any person/entity.
- A person/entity must register if the cumulative incoming/outgoing water exceeds an average of 20,000 GPD in any 7-day period or exceeds total volume of 600,000 gallons in any 30-day period.
- Reports of water use activity must be recorded monthly and submitted quarterly.
- Water withdrawal/return location is within 500' of a river or stream or its drainage area.
- DES shall track the estimated average monthly aggregate water use and average monthly stream flow.
- A designated river shall not be in compliance with the general standard if it does not meet average flows equivalent to lowest average flow rate for a period of seven consecutive days on an annual basis – determined at a fixed location on the river/stream expressed in terms of volume per time period. Such conditions can trigger aggregate use restrictions.

There are three broad areas of flow dependent instream use:

- human use,
- fish and aquatic life,
- riparian wildlife and vegetation.

These are used to set recommended protected flows. The three broad flow dependent uses include these specific uses:

- (human uses) hydropower, pollution abatement/ wastewater dilution, recreation such as boating, fishing, swimming,
- (fish and aquatic life) the maintenance and enhancement of aquatic fish and life, fish and wildlife habitat, rare threatened and endangered fish, and
- (riparian wildlife and vegetation) wildlife, vegetation, and natural/ ecological communities.

There are many variables to be considered when establishing protected instream flow. The rules must recognize the natural variability shown in the stream's hydrograph. These natural changes are then

expressed in terms of frequency, duration, timing, rate-of-change, and magnitude. Timing, for example, would be biologically significant periods for fish spawning and their critical need to reach spawning areas. Duration and magnitude could come into play when dealing with wastewater dilution during low flow periods.

In 2002 legislation was enacted by the New Hampshire Legislature calling for an Instream Flow Protection Pilot Program. The goal of the program is to:

- compile a comprehensive list of instream public uses, for example, navigation, recreation, fishing, conservation, aquatic habitat, water quality,
- propose methods to assess their flow dependence,
- develop a water management plan to implement the protected instream flow.

Two designated rivers, the Lamprey and Souhegan Rivers are now part of the program with three other rivers are part-way through the process. The years this has taken speaks to the effort required to accommodate all special interests related to river flows.

In 2022 PRLAC applied to become included in the NHDES Instream Flow Program. Baseline sampling began along the Pemi in 2023 with an initial report slated for 2026.

c. Water Resources Management

i. Water Withdrawals

Withdrawals - The water user registration and reporting program authorized by RSA 482:3 went into effect in 1987. The information collected under this program is a fundamental element in the overall assessment of water availability. Potential future problems relating to well interference, declining water tables, and/or diminished stream flows can be identified at an early stage and corrective action taken. Currently there are 130 Registered Water Users in the Pemigewasset River watershed ranging from municipal water suppliers and industries to golf courses and ski areas. (NHDES Onestop Data Mapper) The 2013 version of this plan reported 43 Registered Water Users in the PRLAC Corridor, indicating a three-fold increase in the number of withdrawals. It should be noted that these water users include the hydroelectric dams where water travels through the dam and is then released below.

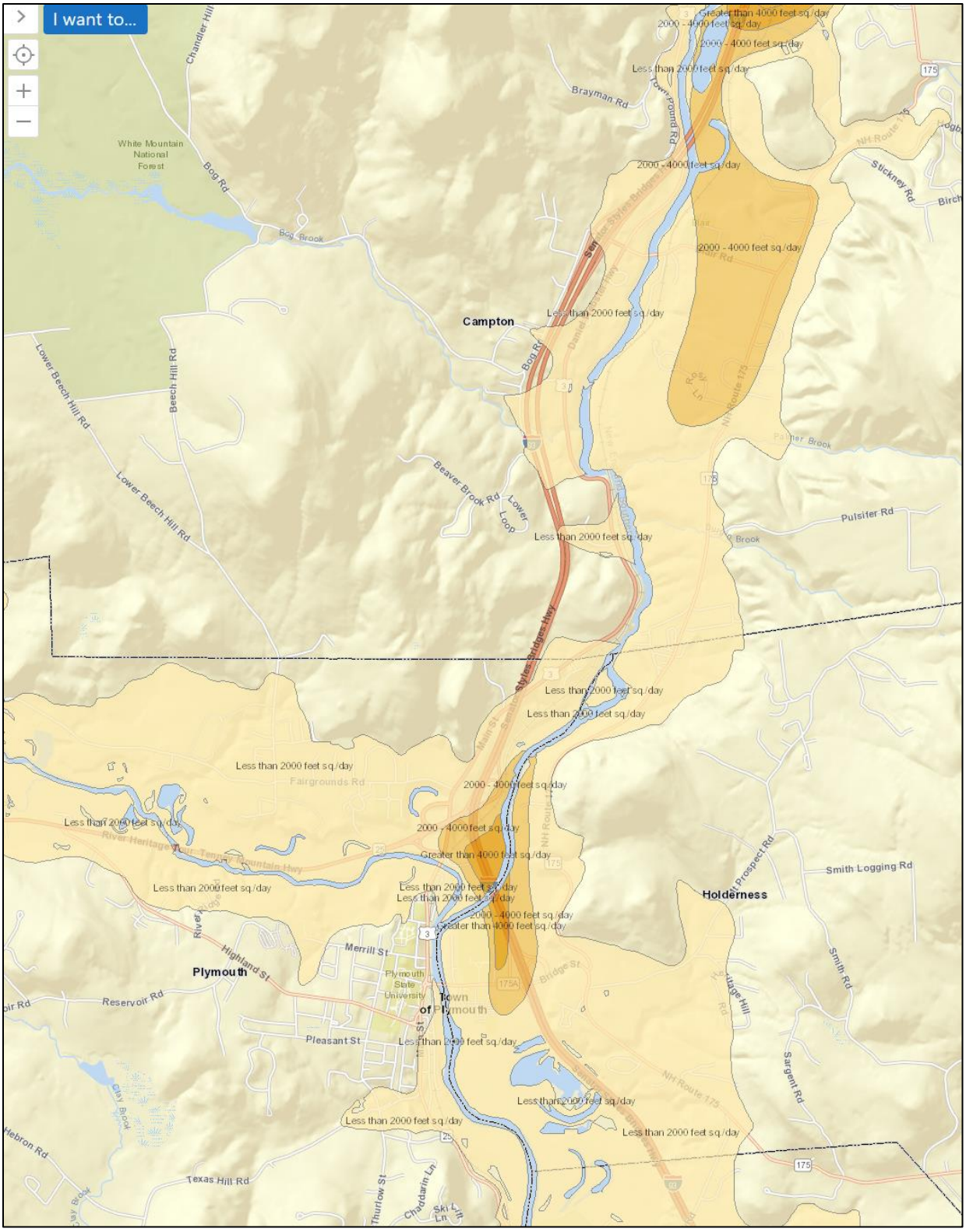

Figure 18. Image of aquifer boundaries and transmissivity, generally an indicator of aquifer productivity (darker is higher) in central portion of the Pemi River. Source: [NHDES OneStop Mapper.]

New Hampshire is a nationally recognized leader in protecting the groundwater and surface water that are the sources of drinking water. Still, landscape change has the potential to degrade our sources of drinking water by contributing contaminants and changing hydrology.

Many public supply wells are in buried valley aquifers that are associated with a nearby stream or river. Most of those wells draw surface water from the stream in a process called induced recharge. Induced recharge occurs when the cone of depression reaches as far as the stream, thereby lowering the water table beneath it. If there are no impermeable barriers such as clay or thick deposits of organic muck in the streambed, the pump will pull water from the stream down through the aquifer and into the well. Under these conditions, polluted surface water can enter the well and degrade the quality of the water supply.

The aquifers associated with the Pemigewasset River follow the path of the river and in some areas extend beyond the corridor.

ii. Discharge Points – NPDES

Discharges - The National Pollutant Discharge Elimination System (NPDES) requires that all dischargers have an NPDES permit. Permitted dischargers on our section of the Pemi (and its 11 tributaries) include five wastewater treatment plants: Lincoln, Woodstock, Plymouth, Ashland, and Bristol.

The complexity of interactions among water quality, quantity, and stream channel integrity must be taken into consideration when tackling resource protection for the Pemigewasset River. Because the river system supports such a wide variety of uses and natural services, a systematic, watershed-level approach is recommended to address issues affecting the river's elemental water resources.

iii. Dams and Hydropower

There are three major dams along the Pemigewasset: Ayers Island (Bristol/New Hampton), Franklin Falls, and Eastman Falls (the last two both in Franklin); all are classified as High Hazard Class where "failure or mis-operation would likely result in loss of human life". The Ayers Island and Eastman Falls dams are used for generation of electricity. The Franklin Falls Dam is a flood control dam built and operated by the U.S Army Corps of Engineers.

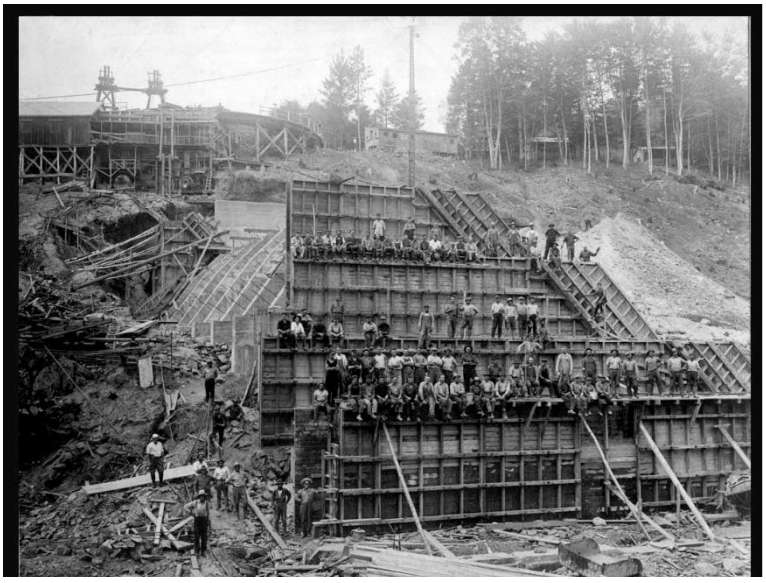

Figure 19: Construction of Ayer's Island Dam, c. 1922.
Source: Ghosts of 'Lectricity

The hydroelectric power generation dams at Ayers Island and Eastman

Falls are now (2022-2023) owned/maintained by LS Power (purchased in 2022 from Central Rivers Power) and licensed by the Federal Energy Regulatory Commission (FERC). The Eastman Falls Dam license was issued in 1987 originally and most recently renewed in 2019. It will expire in 2029. The Ayers Island Dam license was issued in 1996 and expires in 2036. In 2011 PSNH invested several million dollars to reinforce Ayers Island dam against earthquakes.

iv. Bridges, Culverts, and Other Infrastructure

NHDES, New Hampshire Geological Survey (NHGS), UNH Technology Transfer (T2), and the state's regional planning commissions (RPCs) have developed a program for assessing Stream Crossings, usually bridges and culverts. Public Works Departments are finding these useful for identifying and prioritizing maintenance, replacement, and upgrade of these infrastructure elements. Some Conservation Commissions are also interested in this, as it often includes information about Aquatic Organism Passage capabilities. This also includes modeling to indicate whether a structure has adequate capacity to accommodate various storm scenarios.

v. Stormwater Management

Stormwater runoff is one of the most significant threats to surface water quality in New Hampshire, accounting for approximately 80% of listed impairments. Sediments and pollutants are carried into streams and rivers following rainfall events, particularly in developed areas where impervious surfaces (concrete, pavement, roofs, lawns) prevent the infiltration of stormwater into the ground. Vegetated areas along riverbanks, called riparian buffers, help to slow and filter runoff as it drains into the river.

The level of development and distribution of land uses along the rivers directly affects all aspects of the rivers' resources. Impervious surface area associated with development affects the land's ability to absorb and filter stormwater. The closer development is to the river's edge or to a tributary, the greater the impact on water quality unless buffers or some other technique to enhance infiltration are installed.

It is estimated that a minimum of 250,000 gallons of water per year (equivalent to nine inches of rainwater) is lost per acre of impervious surface if the runoff is channeled to a river or stream. The increase in impervious surfaces related to development is a concern.

NHDES requires a Stormwater Management Plan on large projects through the Alteration of Terrain (AoT) permit program. Seven corridor communities (Lincoln, Thornton, Plymouth, Holderness, New Hampton, Hill, Sanbornton, and Franklin) have Stormwater Management regulations for smaller projects; most are incorporated into both their Subdivision and Site Plan Review regulations.

d. Plants, Fish, & Wildlife

i. Habitat & Fish Communities

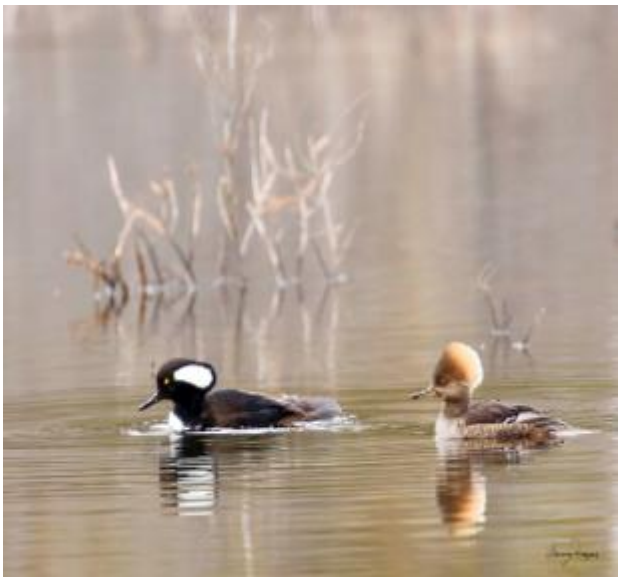

Figure 20. A pair of Hooded Mergansers. Photo credit, B. Draper.

New Hampshire's Wildlife Action Plan (WAP), developed by NH Fish & Game Department identifies more than a dozen different habitat types found in the state. Examples of most of these habitat types are found within the Pemigewasset River Corridor.

The hemlock-hardwood-pine habitat is dominant south of Campton. Associated tree species include red maple, silver maple, ironwood, white ash, white pine, and basswood. From Campton north, a far greater proportion of the land is covered by the northern hardwood-conifer habitat. The species primarily associated with this habitat are sugar maple and balsam fir.
Within the river corridor itself, the hemlock-hardwood-pine forest frequently gives way to floodplain forests, grasslands, and wet meadow-shrub wetland habitats. The flood plain forest is known for its rich soil. Native flora benefits from the silt deposits left by recurrent flooding. Common flowers include boneset, Joe Pye weed, buttonbush and spectacular cardinal flowers. Other native plants such as elderberry, blueberry and shadbush provide an important food source for deer, bear, and birds. The warbling vireo, chestnut-sided warbler and cedar waxwing eat the berries. Red-shouldered hawks hunt rodents attracted to berries and seeds.

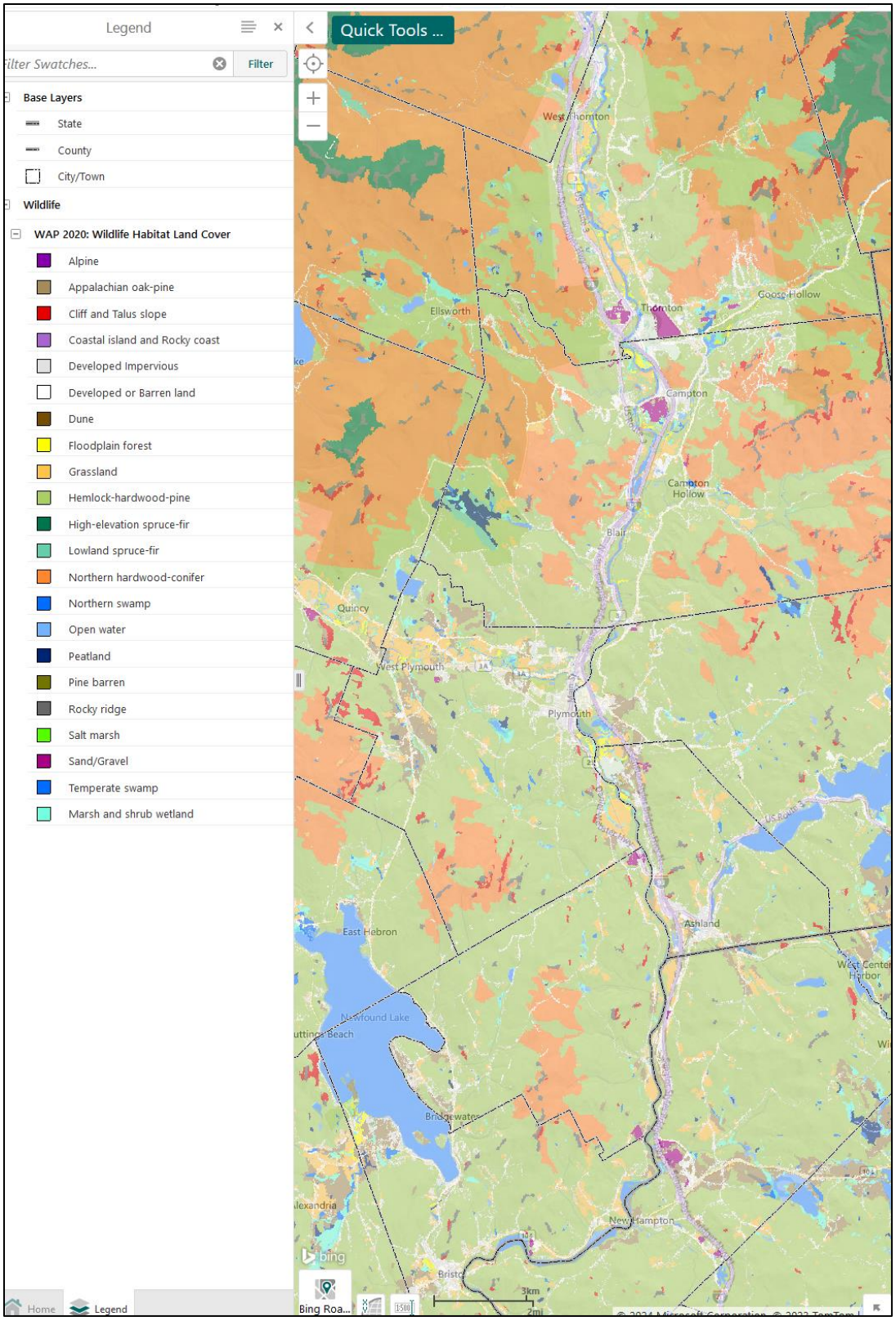

Figure 21. Habitat Land Cover, [WAP 2020]

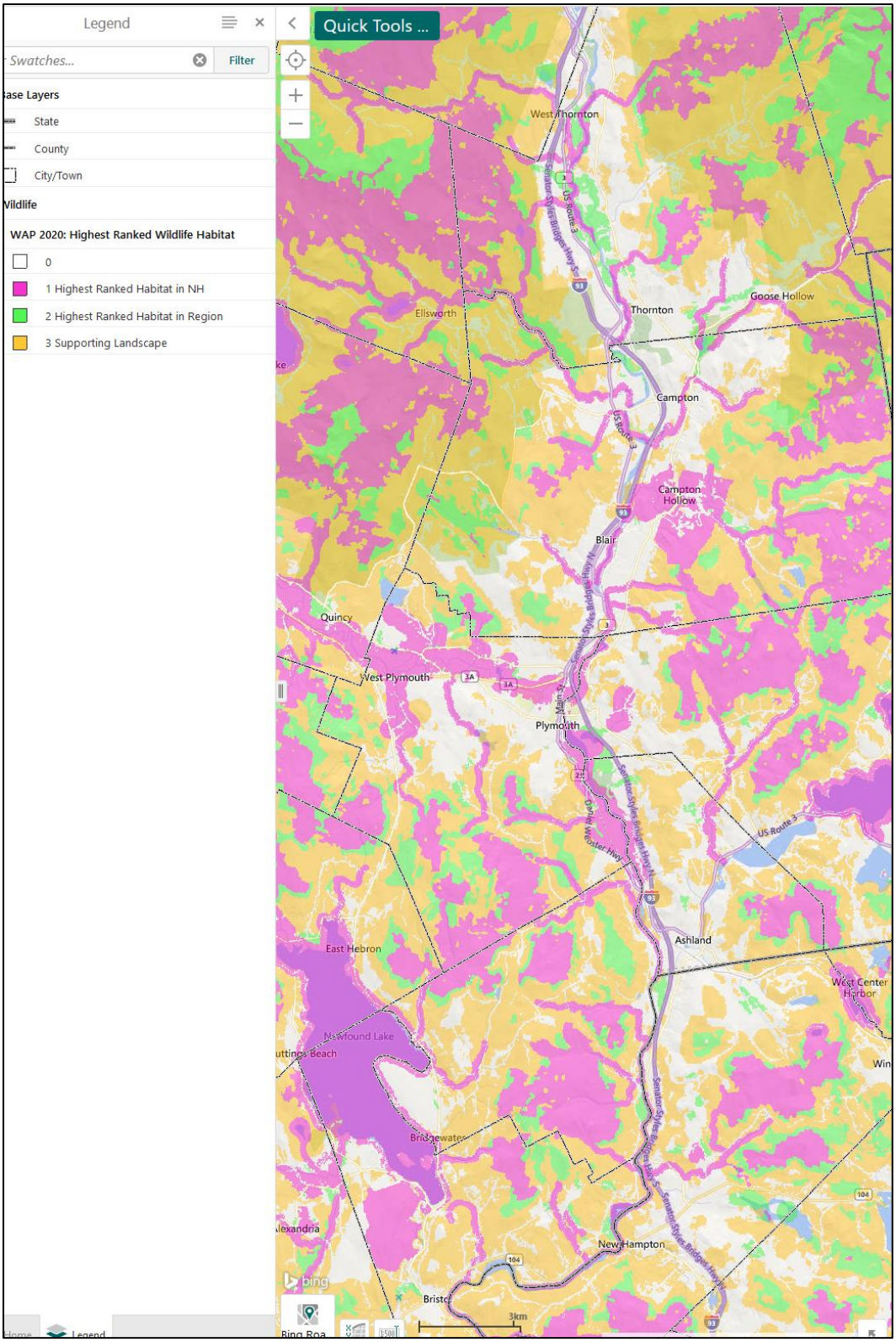

Figure 22. Pemi River communities are home to some of the highest ranked habitat in the state. Source: [WAP 2020]

The New Hampshire Natural Heritage Bureau (NHNHB) tracks exemplary natural communities as well as rare plants and animals. A request for a check on recorded data can be made both by landowners as well as for permits or grant requirements.

Invasive species of aquatic and upland plants have become increasingly problematic along the Pemi, primarily variable milfoil along with Japanese Knotweed. These plants proliferate and crowd out native species, often dominating large areas of impoundments, flowing water, and shore banks. Early detection and rapid response to control small populations of these species might prevent them from becoming fully established in your community.

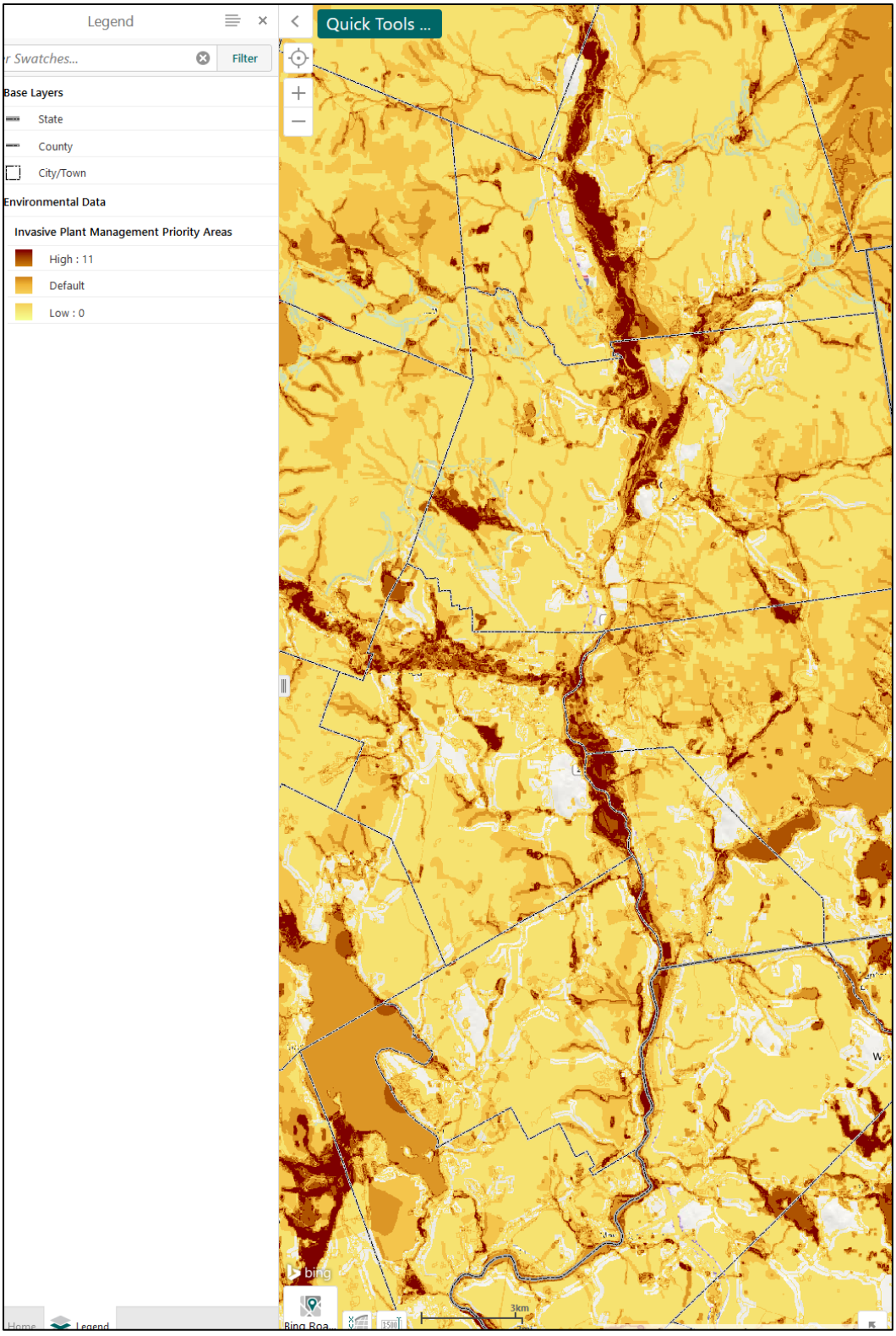

Figure 23. Invasive Plant Management Priority Areas, GRANITView

There are challenges to wildlife in the Pemigewasset River Corridor due to development, climate fluctuation and habitat loss/fragmentation. Community and agency planning must address species diversity - maintenance, restoration, and supervision - as a fundamental measure of the health and long-range success of the watershed.

UNH extension service offers courses, available to community conservation commissions, on the field identification and control of invasive plant species. Some communities, like Woodstock utilize herbicides like knot weed killer during off season.

ii. Plants, Animals, and Fish species

The Pemigewasset River is a species rich area - an ecotone - a place where two habitats meet. Within this ecotone, the watershed supports endangered and threatened species (i.e. dwarf wedge mussels, Blanding's turtles) and a wide diversity of non-threatened plants and wildlife at various points in their life cycles.

The habitats along the Pemi River Corridor provide havens for breeding, feeding, nesting, and cover. Migratory birds rely on this habitat, as do American redstarts, red-shouldered hawks and veery. Wood turtles, a New Hampshire species of special concern, choose very specific sites for laying eggs. They require a shrub-lined shore near sandy outcroppings.

Within the Pemigewasset River Corridor, we find several species of particular interest, including the bald eagle, common loon, osprey, wood turtle, red- shouldered hawk, cerulean warbler, bridler shiner, northern harrier, purple martin, and eastern red bat.

The river, especially south of Campton, supports a fish population of at least 28 species. This includes darters, small mouth bass, trout, salmon, hornpout, perch and a wide variety of shiners and suckers. This diversity of species attracts fisherman for sport. Fish are also an important food source for wildlife along the corridor.

1.1.1. Fish along the river

The NH Aquatic Restoration Mapper shows various fish habitats along the rivers throughout the state along with data from fish surveys. One species of interest in the Pemi is the Eastern Native Brook Trout. The brook trout is the state fish of New Hampshire and is the heritage fish of our state. In the state of New Hampshire, native brook trout are still present in their natural ranges but have been greatly reduced in the state. Causes of habitat loss and fish number decline are due to culverts that prevent fish passage for historic spawning grounds, removal of riparian zones that filter contaminates (change pH of water), negative earth removal that causes runoff, and acid rain effect from western industry. Several tributaries that feed into the Pemigewasset River have populations of native brook trout that live in cold mountain runoff streams that maintain temperatures under 70F year-round.

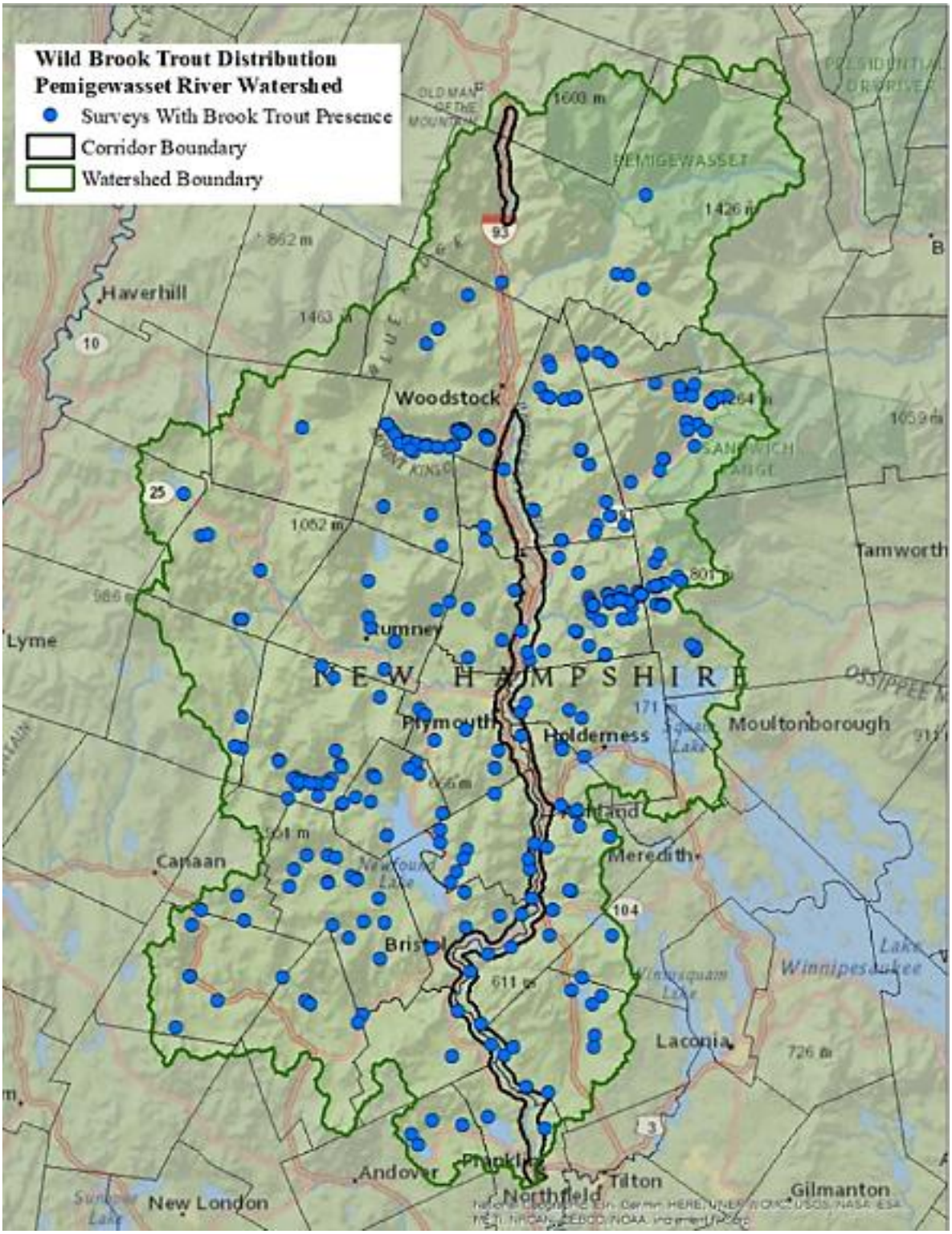

Figure 24. Presence of Wild Brook Trout in the Pemigewasset River Watershed. Source: NH Fish & Game

NH Fish & Game report that there have been 45 fish studies within the river corridor since 1990 for a variety of purposes and using multiple techniques. These studies documented twenty-five different fish species.

1.1.1.1. Franconia to Thornton

Contains: Atlantic salmon, black nose dace, eastern brook trout, lake chub, long nose dace, slimy sculpin, white sucker, rainbow trout and brook trout (hatchery)

1.1.1.2. Campton to Plymouth

Contains: black nose dace, long nose dace, common shiner

1.1.1.3. Mid-River Section of Pemi River (Bristol to Plymouth)

Contains: sunfish, Fall fish, yellow perch, brown bullhead, hatchery brook trout, slimy sculpin, rock bass, small mouth bass. Note: Ashland area near Clay Brook had no fish present.

1.1.1.4. Lower section of Pemi River (Franklin to Bristol)

Contains several native species to NH like sunfish, white sucker, common shiner, Fallfish, Longnose dace, spot tail shiner, Burbot (cusk). Nonnative species consist of smallmouth bass, margined madtom, largemouth bass, rock bass.

American shad, an anadromous species migrates up the Merrimack River in Massachusetts and has been reported as far as Franklin, NH. These fish are not, however, found higher than the Franklin Falls Dam due to impoundments preventing fish passage to historical spawning grounds in the main stem of the Pemigewasset River. This also occurs with American eel that use the river in the same fashion except they are a catadromous species.

iii. Levels of Protection

The NH Heritage Bureau lists plants and animals as endangered, threatened, or special concern in the Pemi Corridor communities, in its town-by-town list including:

American Eel	American Martin	American three-toed woodpecker	Bald Eagle
Blanding's Turtle	Brindle Shiner	Brook Floater mussel	Canada Lynx
Cliff Swallow	Cobble Stone Tiger Beetle	Common Nighthawk	Grasshopper sparrow
Jefferson Blue Spotted Salamander	Long-Eared Bat	Loon	Peregrine Falcon
Pied-billed Grebe	Round white Fish	Rusty Blackbird	Sedge Darner
Smooth Green Snake	Spotted Turtle	The Cora moth	Wood Turtle

e. Recreational Resources

i. Fish stocking

NH Fish & Game is responsible for stocking waterbodies in NH with various species of fish. The NH Fish Stocking Mapper indicates that the Pemigewasset River is stocked in several locations, including Bristol, Campton, Thornton, and Woodstock.

ii. Permitted recreational uses and activities

1. Water-based Recreation

There is extensive boating activity along the entire section of the Pemigewasset River covered in this management plan. Virtually the entire length of the river is suitable for canoeing and kayaking, although some sections are usable only at times of high flow. Between North Woodstock and Plymouth, there are two stretches with challenging rapids. The more popular one begins at North Woodstock and is usually a good Class II run. Above Livermore Falls in Campton there are more fine rapids. From Plymouth to the confluence with the Squam River there is quickwater, but the current weakens over the next three miles. The Ayers Island Dam creates a flatwater section for several miles upstream allowing for use by motorboats, which are restricted to a 6-mph maximum speed. In the first 1.5 miles below the Ayers Island Dam there are several nice Class II rapids. Adequate instream flows for whitewater paddling are maintained on this section at peak hours on weekends and holidays between May 1st and August 1st by the Ayers Island Dam, in compliance with the FERC license. Below the rapids to Old Hill Village, there is quickwater most of the way. The river becomes flatwater again behind the Franklin Falls Dam and the Eastman Falls Dam and continues as a mile-long series of rapids to its confluence with the Winnipesaukee River.

Numerous access points allow for either whitewater or quiet water paddling. Guided kayak trips are offered by at least one outfitter on the Plymouth to Bristol stretch of the river. Fishing is a very popular activity along the river's entire length, drawing anglers from across the state and the region. Many areas that do not provide easy boat access still support shore bank fishing and wading, both on public lands and informally on privately owned land. In summer months, many residents and visitors also use the river for swimming and tubing. This occurs at public facilities such as the Sahegenet Falls Recreation Area in Bridgewater, as well as at some of the campgrounds and boat access points.

2. Land-based Recreation

Land-based recreational activities are supported by several trails and secondary roads in the river corridor. The 3,900 acres of land associated with the Franklin Falls Dam and its potential water storage area are the setting for several multiuse trails. One of the most popular trails is the 1.8-mile Piney Point Nature Trail which loops around a scenic peninsula just downstream of the dam.

All trails maintained by the US Army Corps of Engineers (USACoE) are open to mountain bikes and some trails designed specifically for mountain biking are available as well.

A section of the New Hampshire Heritage Trail, a program of the NH Division of Parks and Recreation to create a trail connecting communities from Massachusetts to Canada, extends 3.8 miles north of the dam to Shaw Hill Road in Sanbornton on the easterly side of the river. On the westerly side of the river, the abandoned road extending from Old Hill Village to the Smith River to the north provides opportunities for mountain biking, hiking, snowmobiling, cross-country skiing, snowshoeing, and dog sled running. There have been efforts in recent years to connect the Army Corps land to downtown Bristol for bicycles. A section of the Heritage Trail in Plymouth forms a 5.6-mile loop which has sections along both the Pemi and Baker Rivers.

New Hampton has hiking trails and exercise pods in an area behind the fire station on Rt 104. There is a one-mile loop trail available in Campton's Blair Woodlands Natural Area. Picnicking is available to Bridgewater residents at the Sahegenet Falls Recreation Area off River Road.

Privately owned campgrounds are in Bristol, New Hampton, Campton, and Thornton. Four golf courses are in this section of the river corridor: the Jack (formerly the Jack O'Lantern Resort) in Thornton, the Owl's Nest Golf Club in Campton and Thornton, the White Mountain Country Club in Ashland, and the Den Brae Golf Course in Sanbornton.

Hunting is a popular activity at the Franklin Falls Reservoir and elsewhere in the river corridor. Turkey, black bear, white-tailed deer, and small game species are plentiful in the area. Many landowners generously allow access to or through their property for various uses if permission is requested. This practice opens much larger areas for recreation beyond publicly owned facilities.

iii. Dams, Bridges, and other water structures

As noted earlier (3.c.iii Dams & Hydropower) there are two major hydropower dams along the slower portion of the river. There is also the Franklin Falls Flood Control Dam and several other dams along the Pemi River corridor.

The Franklin Falls Dam is a flood water control structure for downstream protection as far as Lawrence, Massachusetts on the Merrimack River Corridor. The Franklin Falls Dam Manager explained that the dam's flow rate is normally influenced by the Pemi's natural flow. This means that during normal average flow rates, the Franklin Falls Dam discharges with a fully open penstock. Flow rate changes (closing the spout) only occur seasonally when above average waterflows occur from spring mountain snowmelt runoff, or above average rainfall. Average flow rates (open spout) induce appropriate levels of water for downstream aquatic life on average, however there are no minimum flow requirements for aquatic life because of its naturally occurring flow rates. Flow rates from this dam are also not monitored for recreational reasons. Guidance on dam release rates/controls are determined by the US Army Corps of Engineers main office located in Concord, NH (Reservoir Control Office).

A reason for holding back water during Franklin Falls regular discharge would be that downstream levels are too high and would be prone to flooding (lots of rainfall/hurricane). Another reason would be during

the spring season, when snow begins to melt and drain into the main stem of the Pemi. The maximum storage behind the dam is 50 billion gallons of water but is also surrounded by 4,000 acres of land designated as an overflow area. Franklin Falls Dam does not have a license for operations like Ayers Island and Eastman Falls Dams because it does not have hydro-electric production. The Franklin Falls dam is used solely for flood control purposes.

The dam's significance extends well beyond this section of the river corridor as it is part of a coordinated system of reservoirs designed to protect communities along the Pemigewasset and Merrimack Rivers as far downstream as Lowell, Lawrence, and Haverhill, Massachusetts. The 1,740-foot long, 140-foot-high Franklin Falls dam impounds a permanent pool of 440 acres. The spillway level, which sets the maximum upstream water level, is 82 feet above the normal pool level.

Since its construction in 1943, the dam has prevented over $165 million in damages. Although the ultimate responsibility for management of the project's natural resources rests with the Corps of Engineers, the New Hampshire Department of Natural and Cultural Resources, Division of Forests and Lands is licensed to utilize and manage the fish, wildlife, forest, and other natural resources in the flood storage area.

Active dams along the Pemigewasset River Hazard Class – H-High, S-Severe, L-Low, NM-Non-Menace

Table 4. Active dams along the Pemigewasset River by Hazard Class

HAZCL	NAME	TOWN	RIVER	HEIGHT (ft)	DRAINAGE (acres)
H	AYERS ISLAND DAM	BRISTOL	PEMIGEWASSET	90	746
H	FRANKLIN FALLS FLOOD CTRL	FRANKLIN	PEMIGEWASSET	140	1000
H	EASTMAN FALLS DAM	FRANKLIN	PEMIGEWASSET	27	1013
S	ASHLAND SEWAGE LAGOON DAM	ASHLAND	NA	15	<1
S	NEWFOUND RIVER DAM	BRISTOL	NEWFOUND RIVER	7	98
L	GILES POND DAM	FRANKLIN	SALMON BROOK	37	24
L	NEW HAMPTON SCHOOL LOWER POND	NEW HAMPTON	TRIB TO PEMIGEWASSET	6	<1
NM	CATES BROOK DAM	FRANKLIN	CATES BROOK	6	<1
NM	COLD SPRING BROOK DAM	ASHLAND	COLD SPRING BROOK	4	1
NM	PROFILE LAKE DAM	FRANCONIA	PEMIGEWASSET	1	1
NM	BRIDGEWATER POWER COMPANY	BRIDGEWATER	RUNOFF	13	<1
NM	LIZOTTE POND DAM	BRIDGEWATER	RUNOFF	6	<1
NM	LANDFILL DET POND	THORNTON	RUNOFF	17	<1
NM	FLUME DAM	LINCOLN	UNNAMED STREAM	6	20

The four dam hazard classifications (High, Significant, Low, and Non-Menace) are based on the potential losses associated with a dam failure. High (H) and Significant (S) Hazard dams have the highest potential for damage; this could include damage to state or municipal roadways as well as structures.

Additional dams along Pemi tributary:

- Dam in Campton on the Mad River at the intersection of state routes 175 and 49.

iv. Access by foot and vehicle

Public access to the Pemigewasset River is found in several locations. Boat launch facilities are provided at various points along the river by NH Fish & Game, PSNH, the US Army Corps of Engineers, and others. In addition to these designated facilities, several bridge crossings serve as informal access points to the river, and several spots along the Coolidge Woods Road in New Hampton are used as take-out points by whitewater paddlers who put in just below the Ayers Island Dam. Portage paths are available around all three dams. Most of the launch facilities are designed for carry-in or car-top access but some of them accommodate boat trailers.

Along the Pemi River several access points are available for public use. Some access points are designed as boat launching sites for trailered boats, some are scenic trails along the Pemi that include kayak/canoe access and picnicking areas, the remaining are trail heads for hiking and accessing wilderness areas not accessible by vehicle. Below is a list of access sites by category and town location for recreational public use. NH Fish and Game maintains on-line map for boat launch sites throughout the state.

Table 5. Public Access Points along the Pemigewasset River by Access Type

Town	Facility – Access Point	Access Type
Bristol	Mooney Clark Landing	Motorboat
Franklin	Franklin High - Lower Field	Motorboat
Franklin	Franklin Public Boat Ramp	Motorboat
Sanbornton	Shaw Cove Boat Launch	Motorboat
Bridgewater	Sahegenet Falls Rec. Area	Canoe/Cartop
Bristol	Ayers Island Hydroelectric Station	Canoe/Cartop
Bristol	Ayers Island Hydroelectric Station II	Canoe/Cartop
New Hampton	Coolidge Woods Cartop Facility	Canoe/Cartop
New Hampton	Coolidge Woods Cartop Facility II	Canoe/Cartop
New Hampton	Pemigewasset River Access	Canoe/Cartop
Plymouth	Pemigewasset River Cartop Facility	Canoe/Cartop
Woodstock	River access	Canoe/Cartop
Woodstock	Death Valley Rd. River access	Canoe/Cartop
Woodstock	Woodstock Family Park	Walk-In
Franklin	Ledgeview Overlook	Walk-In
Franklin	Franklin Falls Dam	Walk-In
Hill	Needleshop Brook Recreation Area	Walk-In
Holderness	Livermore Falls	Walk-In
Woodstock/Thornton	The Ledges	Walk-In
Thornton	Memorial Bridge	Walk-In
Campton	Blair Bridge	Walk-In
Campton	Route 49 Bridge	Walk-In
Woodstock	Iron Bridge	Walk-In
Woodstock	Staple Rock Park	Walk-In
Woodstock	Parkers Dam	Walk-In
Woodstock	Cascade Park	Walk-In
Woodstock	Peeling Park	Walk-In
Franconia	Cascade Brook Trail Head, I-93	Trailhead, Other
Franconia	Liberty Spring Trail Head, I-93	Trailhead, Other
Franconia	The Basin East Parking, I-93	Trailhead, Other
Franconia	Basin Cascade trail head, I-93	Trailhead, Other
Franconia	Lafayette East and West Parking, (either side I-93)	Trailhead, Other
Franconia	Boise Rock Parking, I-93	Trailhead, Other
Franconia	Profile Lake Parking, I-93	Trailhead, Other
Franklin	Federal Dam Access Rd. trailhead	Trailhead, Other
Franklin	Franklin Falls Reservoir Parking lot on Coolidge Woods Rd.	Trailhead, Other
New Hampton	New Hampton Fish Hatchery parking lot off NH 104	Trailhead, Other
Thornton	Parking area off Robins Nest Rd	Trailhead, Other
Woodstock	Mt. Cilley Snowmobile trail on US 3	Trailhead, Other
Lincoln	Flume Gorge parking area off US 3	Trailhead, Other

f. Historic and Cultural Resources

i. Historical buildings, dams, bridges, crossings

Construction of the three dams on this section of the river in the first half of the 20th century brought a great deal of change to the southern part of the river corridor. Construction of the Franklin Falls Dam necessitated moving the entire village district of Hill in 1941, leaving behind the old cellar holes, sidewalks, and trees. A popular account of the move entitled *The Story of Hill, New Hampshire* by Dan Stiles was published in 1942. A more comprehensive account entitled, *Hill Reestablishment: Retrospective Community Study of a Relocated New England Town* was prepared for the U.S. Army Corps of Engineers in 1978. A 1989 report prepared by the Lakes Region Planning Commission, *A Report on Hill Village - The Historical Significance of this New England Village* describes the relocation of Hill.

Historically, the Pemigewasset River and its corridor had great importance to the towns through which it passes. Before roads were built, the river served as a primary means of transportation, so that town centers naturally evolved along its banks, particularly at the confluence with other rivers. In addition to providing transportation, the river was used for fishing and provided waterpower for mills along its banks. When roads (and later railroads) were extended to this part of New Hampshire, the rugged terrain made the river valley their logical route, further supporting the development of towns located along the river.

In the first half of the 20th century, the historical uses of the river became less important to the communities in the river corridor. As the towns grew and became more industrialized, there was a need to dispose of municipal sewage and industrial waste, and the communities looked to the river to fulfill that need. Because of inadequate treatment technology and increased use, pollution levels in the Pemi eventually rose to the point that it could be fairly described as an “open sewer,” particularly in times of low flow. Legislation passed in the 1960s set strict standards on discharges into the river and has resulted in the restoration of the river to its current class B status. A history of the restoration effort and its effects was compiled in 1979 for the EPA and is included as Appendix J.

Today, the river is seen as a community resource mainly for its aesthetic and recreational values, which in turn make it a magnet for tourism. For many of the towns along the river corridor, the Pemigewasset is one of their most important natural resources. In addition to the general tourism industry, there are several outdoor recreation businesses that focus directly on the river.

The Pemigewasset River and its tributaries are an outstanding community and cultural resource, offering beautiful scenery, wildlife viewing opportunities, and recreational activities throughout the corridor. Recreation areas constitute important community resources. The river corridor communities contain a couple of parks, a town recreation area, several state forests, a wildlife management area, land associated with the Franklin Falls Reservoir, and the White Mountain National Forest, all of which offer activities such as hiking, canoeing and wildlife viewing.

Buildings in the Historic Register on the Pemi Corridor

1. **Daniel Smith Tavern, New Hampton** - A longstanding landmark in New Hampton Village, the Daniel Smith Tavern welcomed and served travelers and visitors from 1805 to the 1920s.

2. **Whipple House, Bristol** - The Whipple House was built in 1904 for the family of Henry Chandler Whipple, president of the Dodge Davis Woolen Mill, a local mill that was perhaps best known for providing uniforms to major league baseball teams. This well-preserved Queen Anne style home is a landmark in historic downtown Bristol.

3. **Blair Covered Bridge, Campton** - This Long truss bridge was built in 1870 and is the only surviving New Hampshire example of Lt. Col. Stephen Harriman Long's patent design of 1830, one of the first engineered truss designs.

4. The **Norman and Marion Perry House in Campton** was designed by Hugh Stebbins in 1960 and surrounded by a Leon Pearson landscape. With its use of glass to blur the boundary between indoors and out, and its carefully planned open spaces, it represents the residential version of the Modernist architectural movement.

5. The **Rumford House in Franklin** was originally constructed circa 1732 in Concord but was taken apart and moved to Franklin in 1925 by Clyde Brown for use as antiques shop next door to his tearoom. Together, the buildings showcased "authentic New England" to rail and early automobile tourists.

6. Located in Franconia, **"Sam's House"** is a simple one-room dwelling built by Sam Eli, an immigrant who worked as a logger throughout the mid-20th century. While the architectural features of the building itself are not significant, it provides a physical representation of the lives led by an historically important community in the northern forest: itinerant loggers and woodsmen.

7. **Campton Town House**. Built circa 1855 as the Town Hall, Campton's Town House has also served as a library and municipal court. Currently the home of the Campton Historical Society, the building is a well-preserved example of mid-19th century civic architecture.

8. The **Reuben Whitten House** in Ashland is a modest building with an unusual story. 1816, "The Year without a Summer," had snow in June and killing frosts every month. Despite these weather challenges, Whitten managed to raise 40 bales of wheat on a south-facing slope at his farm and dry it on the hearth of this house. He shared this bounty with his neighbors, many of whose crops had failed, and he is still remembered for his generosity nearly 200 years later.

9. The **Bristol Fire Station** served as the first purpose-built fire station in town from 1889 to 1974. It is a physical representation of Bristol's growth and the need for and expansion of town

services. Now home to the Historical Society, the building retains its 19th century hose-drying tower as well as the 1953 addition that was built to accommodate new equipment.

10. **Woodland Rooms and Cabins** in Campton provided lodging for travelers from the early 1930s until 1982.

The table below lists many of the structures and districts in or near the Pemi corridor listed on the New Hampshire and National Historic Registers. Since the last plan the Bristol Town Hall has been added to the National Register.

Historic Resources within the Corridor Communities

Table 6. State and National Historic Register Sites in PRLAC communities.

Community	Site	Year	National or State Register
Franklin	Franklin Falls Historic District	1982	National
Hill	Hill Center Church	1985	National
Bristol	Central Square Historic District	1983	National
Bristol	Minot-Sleeper Library	1988	National
Bristol	Whipple House (75 Summer St)	2005	New Hampshire
Bristol	Bristol Town Hall	2015	National
New Hampton	Washington Mooney House	1997	National
Plymouth	Plymouth Historic District	1986	New Hampshire
Plymouth	Old Grafton County Court House	1982	National
Plymouth	Mary Lyon Hall (3 Highland St.)	2012	National
Campton	Blair Covered Bridge	2009	New Hampshire
Franconia	Abbie Greenleaf Library	2003	National

To find the full town-by-town listings of National and State Historic Register sites within each riparian community, visit the linked websites.

ii. Stone walls

Stone walls from earlier agricultural periods of New Hampshire are still present today throughout NH and along the Pemi Corridor. These walls were made when most of New Hampshire was clear cut and did not have any of the trees you see today.

To find where these stone walls are present and along the Pemi Corridor, please visit the NH Stone Wall Mapper for more detailed information. Substantive work has been conducted in about half of the PRLAC communities, primarily in the south. Although done under the guidance of the NH Geological Survey, much of the work is carried out by volunteers. Instructions on how to contribute are on the website.

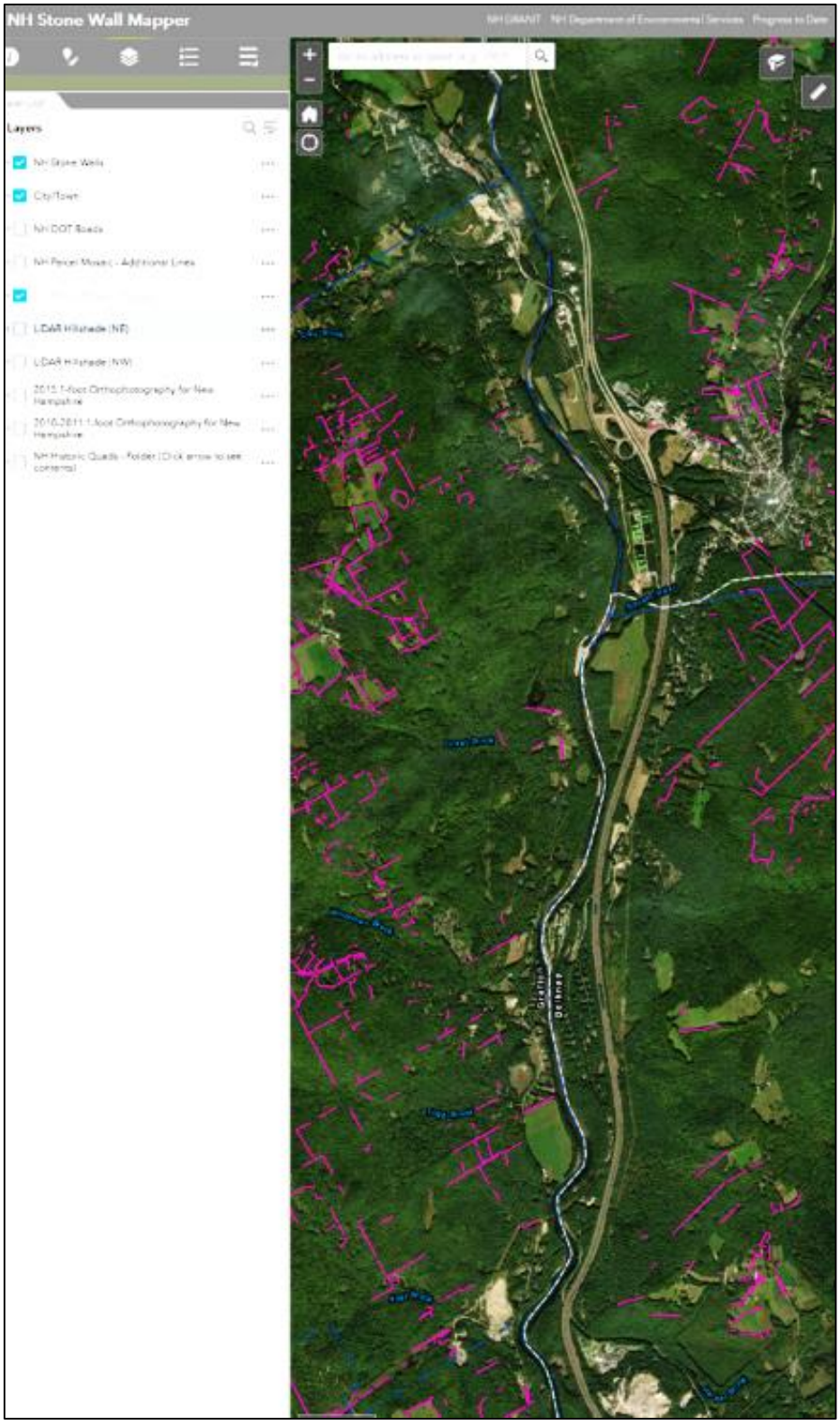

Figure 24. Snapshot from NH Stonewall Mapper at the Ashland/New Hampton town line (stonewalls in pink).

iii. Native American sites or items

Numerous Native American tribes traditionally passed along the Pemigewasset River, most of them from the Algonquin group. Trails, campsites, and tools of these indigenous people have been discovered along the river, presenting artifacts illustrating historical uses of the river. The Abenaki were Algonquian-speaking people who were named after “people of the East” or “Indians from where the daylight comes”. The land now called New Hampshire has been inhabited for approximately 12,000 years.

iv. Archaeological interest sites (EMMIT)

In November 2007, a group of University of Maine students and professors discovered tool fragments they believed may date back to the Late Paleoindian period. The site on the Pemi had been known as an important Native American encampment for summer fishing. However, the University of Maine dig gathered evidence that pushes our understanding of when people began using Pemigewasset River resources as far back as 7000 B.C.

The NH Division of Historical Resources has developed an online inventory of historic and archaeological records (EMMIT)

g. Fluvial Geomorphology

i. Description

Stream channel integrity fluctuates naturally in rivers, depending on soil types, topography, and stream flow characteristics. Stable stream channels help to minimize sedimentation caused by erosion as well as reducing impacts to riparian land uses. Peak flows and flood events represent the most significant threats to channel integrity. Riverbanks can be quickly eroded or even breached during these events causing a change in the river’s course. While erosion and sedimentation are part of the natural life cycle of any river, the best methods for riparian landowners to prevent erosion and promote stream channel integrity are to maintain vegetated riparian buffers, practice proper erosion control methods during alteration of terrain, and protect floodplains to manage water flow and storage during storm events. In 2009 the course of the river was altered in the vicinity of I-93 Exit 31 in Thornton to restore a more natural habitat and flow characteristics.

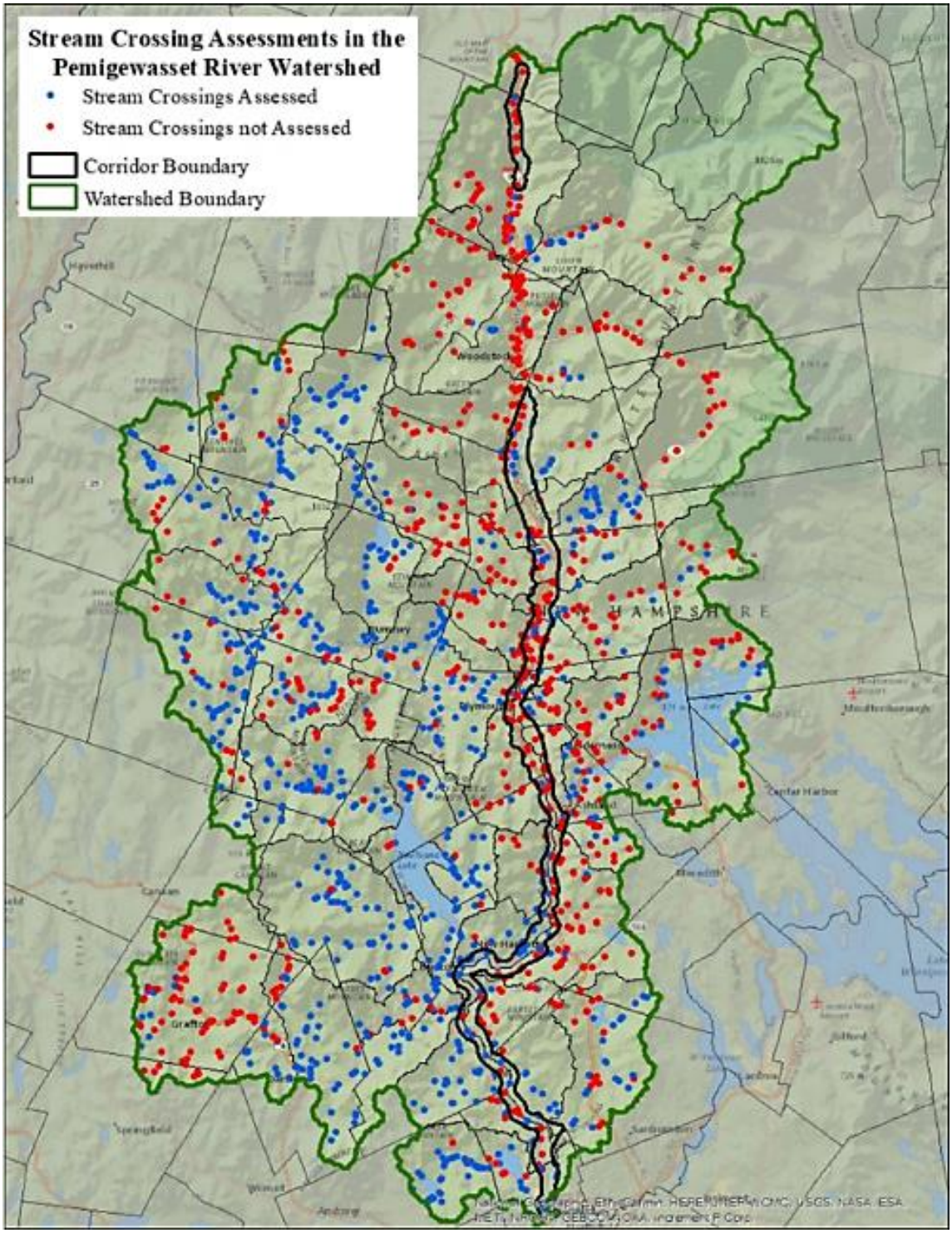

Figure 25. Stream Crossings in the Pemigewasset River Corridor - Assessment Status 2023 Source: NH F&G draft status report

ii. Geofluvial Hazards Assessments

NHDES conducts fluvial erosion hazard studies along the state's rivers to identify areas prone to erosion or channel relocation during storm events. The purpose of these studies is to provide local municipal planners with information on erosion-prone areas so that fluvial erosion hazard overlay districts could be locally established where appropriate. In such districts, underlying zoning would not change; however, limits on structures, land use activities, or even vegetative conditions could be employed through locally adopted ordinances to mitigate erosion hazards.

While fluvial erosion hazard study work has been conducted in some areas (such as the Baker River watershed), a study along the full length of the Pemi has not yet been conducted. Results of this work can be viewed at the NH Stream Crossing Viewer. NH Fish & Game has developed a draft report (2023) of the status of Stream Crossing work in the Pemigewasset Corridor and watershed under the guidance of Geological Survey. Some notable points from this draft report include:

- Local hazard mitigation plans document more than 340 flooding events throughout the watershed.
- There are more than 1,800 stream crossings in the Pemi watershed.
- Slightly less than half of these crossings have been assessed.
- 24% of the structures assessed were found to be mostly or fully incompatible (undersized or poorly aligned), increasing the risk of erosion.
- 29% of the structures were found to prevent any fish passage.

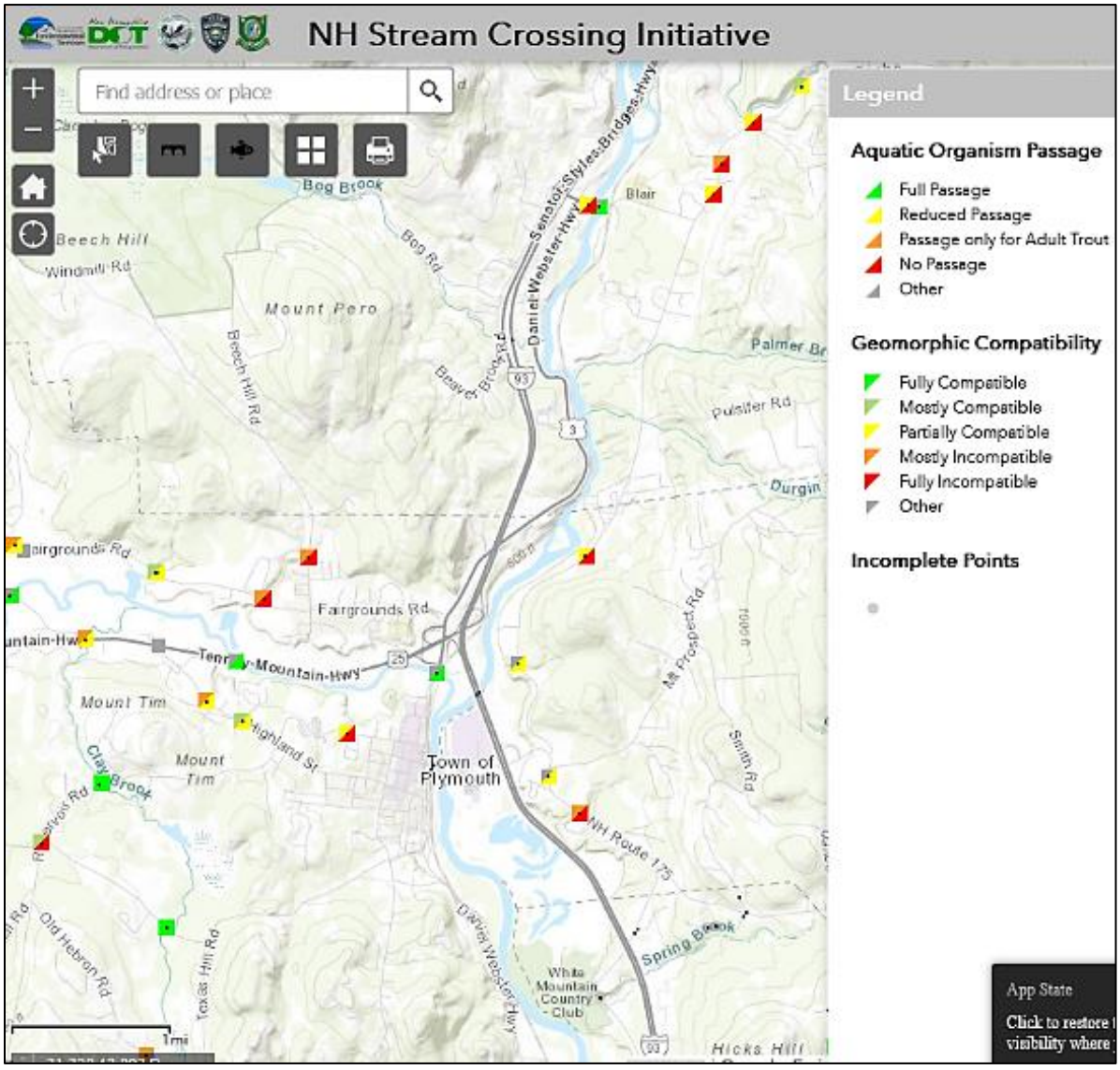

Figure 26; Structure Compatibility (ability to handle storm events) and Aquatic Organism Passage. Source: NH Stream Crossing Initiative.

h. Aquatic Connectivity

i. Stream Crossings & Culvert Assessments

Associated with Geofluvial Hazard assessments are Stream Crossing and Culvert Assessments which address the structures through which water flows. By evaluating each structure's size, construction, conditions, and the associated landscape modelling and planning for maintenance and upgrades may be done. A Culvert Assessment records the location, dimensions, and condition of all drainage structures. It is useful for planning maintenance, repair, and replacement work. A Stream Crossing Assessment looks

at the larger crossings of waterbodies and explores the geometry of the structure and surrounding landscape in detail, enabling modelling of flow and capacity of the structure to handle various sized storm events. As noted above, the Stream Crossing Assessment does also record the ability of aquatic organisms to travel upstream or whether the structure is impeding that movement.

ii. Floodplains & wetlands

From time to time, rivers naturally flood. In their natural state, most rivers have low-lying areas that they can spill over into during flood conditions, called floodplains. Additionally, due to the geography of the landscape and/or the nature of the underlying soils, some areas along the river and throughout the watershed are wetlands. Both types of areas can be important for connecting waterbodies, enabling the flow and drainage of water throughout the watershed. They can also serve the function of slowing the flow of water during times of flood, acting like a sponge, and allowing for a gradual release of water downstream. These areas can also serve as spawning areas and nurseries for aquatic life.

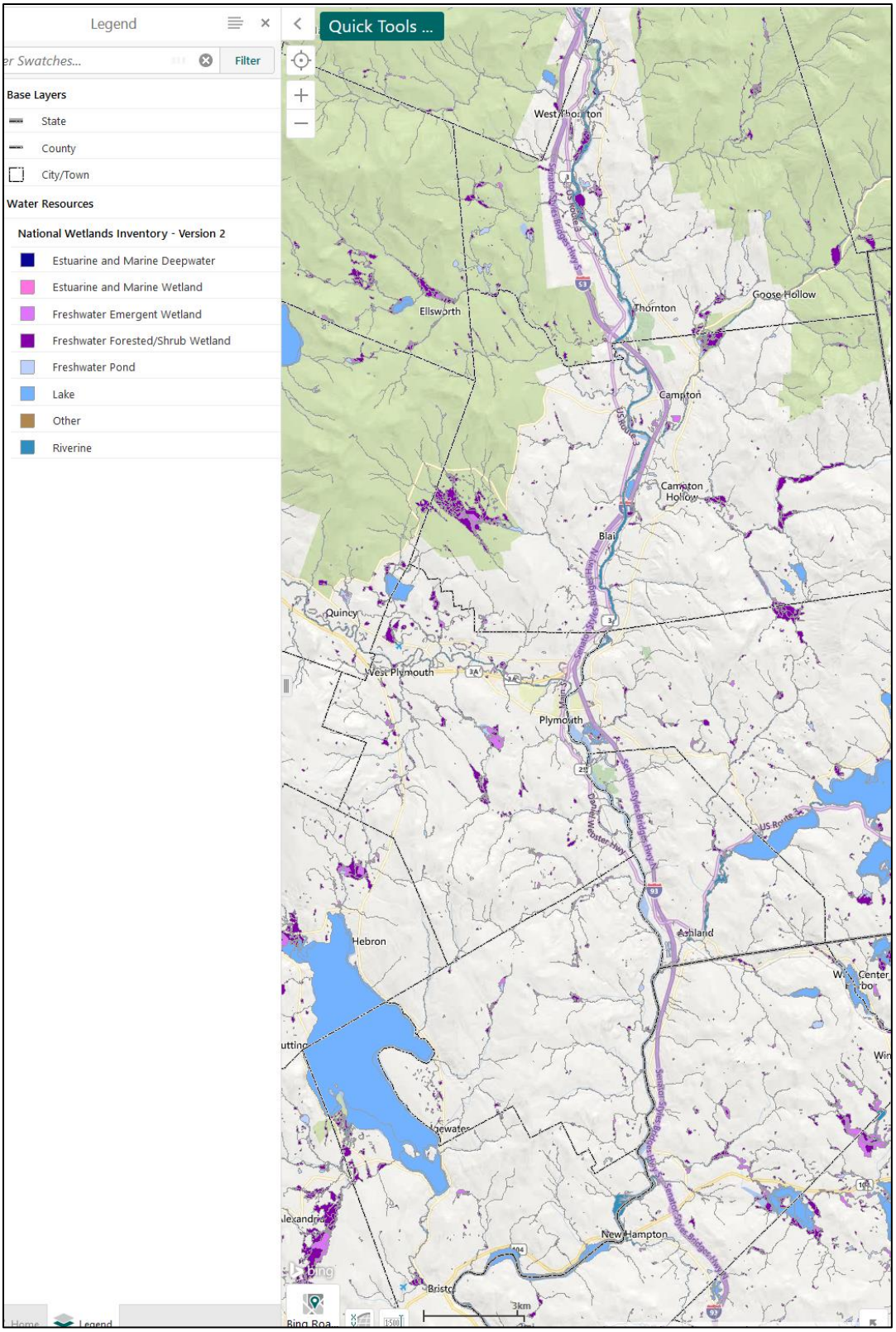

Figure 27: Wetlands in Pemi communities, National Wetlands Inventory on GRANITView.

iii. Meanders

A meander is an extreme bend in a river. Meanders usually occur in mixed, alluvial (stream deposited) sediments. Meandering rivers frequently change shape through erosion on the outer edge of the bend, where the current tends to be stronger. At other times, the river will cut off the big turn, forming an oxbow. The oxbow can then become a wetland. The processes of erosion and cutoff, forming the oxbow can have significant impacts on the landscape.

Figure 28: Aerial view of oxbows/meanders between the river and I-93 near the Holderness/Ashland town line. Also visible are beaches at bends in the river.

A couple of examples of the role or impact of meanders come from the Plymouth/Holderness area. The first is a landowner whose property is on the outer bend of the river that is being eroded. That erosion was exacerbated by removal of vegetation by the farmer to the river's edge. Ultimately the landowner/farmer paid to have a series of 'armoring' pylons and logs designed and installed along the riverbank in an attempt to slow the river current, increase deposition, and reduce erosion. The second example is of a group of oxbows that the local Conservation Commissions are working to protect for their rich wildlife habitat. Trails and boardwalks are being constructed.

iv. NH Aquatic Restoration Mapper

The NH Aquatic Restoration Mapper is a mapping tool used to target restoration and identify mitigation opportunities including stream connectivity, fish habitats, and flood resiliency. As people use, inhabit, and develop the land, there will be times when development activities will impact the aquatic landscape. In most cases this can be addressed through the state and local permit review process. In some situations, if those options have been exhausted, applicants may be considered for the Aquatic Resource Mitigation Fund, a program that helps fund resource mitigation projects within a watershed, protecting some of the functions and values that were compromised by another development project elsewhere within the watershed.

i. Other River Corridor and Watershed Work

i. Conservation Commissions

A NH municipality may establish a Conservation Commission under NH RSA 36-A for the purposes of researching and recommending activities that promote protection and wise utilization of local land and water resources. Conservation Commissions can be strong allies in protecting the river corridor and communicating with local decision-makers. Most of the Pemi Corridor communities have a Conservation Commission.

ii. Local land trusts

Land trusts are formed to conserve habitats, protect water quality, provide access to natural spaces, and more. There are multiple land trusts available to assist landowners and communities along the Pemi River corridor. To see which ones are operating in each community go to the New Hampshire Land Trust Coalition.

iii. Watershed Associations

There are watershed associations throughout New Hampshire. The two that PRLAC members have had the most contact with over the last several years are the Baker River Watershed Association and the Newfound Lake Region Association.

iv. Education

Local public and private schools and state universities draw upon the Pemigewasset River for a variety of educational and recreational uses. The Newfound Area School District has used the natural resources and local agencies (NH Fish and Game, rangers from the Franklin Falls Dam) for River Day, an introduction to New Hampshire history and ecology of the Pemi. The river is a kayak-training course for the Holderness School and the New Hampton School.

Figure 29: High school students learn water testing from PRLAC water monitors. Photo: B. Draper

When PRLAC receives notice of permit applications, representatives frequently arrange with the applicant for a site visit to learn more about the proposed project and consider its impacts on the landscape and river. During these site visits members often end up engaging in informal landowner education as various alternatives are discussed that could result in improved stewardship of the riparian landscape. In a few cases, the applicant has pro-actively approached PRLAC to discuss various options during a monthly meeting.

4. Protections

a. Federal protections

1. Clean Water Act

The Clean Water Act has several provisions to restore and maintain the chemical, biological, and physical integrity of U.S. waters. It establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The US Environmental Protection Agency (EPA) regulates the discharge of pollutants from point sources as well as the disturbance of land in certain situations. If clearing, grading, excavation, or stockpiling will disturb one or more acres of land, a Construction General Permit under the National Pollution Discharge Program (NPDES) is required. This includes disturbance of less than one acre but part of a larger "common plan of development or sale" totaling one or more acres. This requirement applies to private entities as well as municipalities. The Clean Water Act also established permitting processes for the construction of dams and bridges as well as certain dredge and fill activities in navigable waters.

2. Federal Power Act

Every hydroelectric project on a navigable stream requires a Federal Energy Regulatory Commission permit.

b. State protections

1. Shoreland Water Quality and Protection Act (SWQPA)

The Shoreland Water Quality Protection Act (SWQPA) (RSA 483-B) establishes a "protected shoreland" by regulating certain land use activities. All lakes, ponds, and impoundments greater than ten acres and all rivers and streams greater than 4th order are subject to SWQPA (the Pemi is a fourth order river). This establishes a permitting process for new construction, excavation, or filling. It limits certain uses, establishes structural setbacks, requires some vegetated buffers, and limits the use of impervious surfaces.

2. Wetlands

The wetland rules were established to protect the public trust and other interests of the state of New Hampshire, by: (a) Establishing requirements for the design and construction of structures in order to prevent unreasonable encroachment on surface waters of the State; (b) Preserving the integrity of the surface waters of the state by requiring all structures to be constructed so as to ensure safe navigation, minimize alterations in prevailing currents, minimize the reduction of water area available for public use, avoid impacts that would be deleterious to fish and wildlife habitat, and

avoid impacts that might cause erosion to abutting properties; and (c) Ensuring that all projects are constructed using the least impacting alternatives, in a manner that meets the requirements of RSA 483-B and shoreline and bank alteration or stabilization requirements.

3. Alteration of Terrain (AoT)

Permits are issued by the NHDES Alteration of Terrain Bureau to protect New Hampshire's surface waters, drinking water supplies and groundwater by controlling soil erosion and managing stormwater runoff from developed areas. An AoT permit is required whenever a project proposes to disturb more than 100,000 sf of contiguous terrain (50,000 sf, if any portion of the project is within the protected shoreland) or disturbs an area having a grade of 25 percent or greater within 50 feet of any surface water. In addition to these larger disturbances, the AoT Permit by Rule applies to smaller sites.

This permitting program applies to earth moving operations, such as industrial, commercial, and residential developments as well as sand pits, gravel pits, and rock quarries. Permits are issued by DES after a technical review of the application, which includes the project plans and supporting documents.

4. Rivers Management and Protection Program (RMPP)

The Rivers Management and Protection Program (RSA 483:15) applies to rivers that have been nominated locally and designated by the NH Legislature. Designation provides some added protection to the river corridor and enables the creation of a Local Advisory Committee (LAC), affording additional local input on land use activity in the corridor.

Sixty miles of the Pemigewasset River Corridor was designated in 1991 (the towns of Lincoln and Woodstock chose not to have the ten-mile segment through them be designated). All four Designated River Classifications are found along the Pemi Corridor from its headwaters in Franconia to Franklin where it joins with the Winnipesaukee River.

c. Local protections

Matrix of Local Protections by Municipality – The 2013 Pemi Corridor Management Plan introduced a matrix to track local land use and water protection tools for each of the thirteen riparian municipalities. During this plan update process (2023), PRLAC representatives and local planners updated the status of these local planning tools (on the following pages). Almost every community made some sort of change in their ordinances/regulations, elements that have changed in the past decade are shown in **bold RED font** in the matrix.

A discussion of each category (column in the matrix) follows the matrix.

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Pemigewasset River
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Pemi Regulation Matrix See Note & Key.	Floodplain Regulation	Steep Slopes Ordinance	Erosion & Sediment Control	Storm water Management Plan	Cluster or conservation Subdivision	Wetlands Ordinance	Prime Wetlands	Aquifer or Groundwater Protection Ordinance		Dimensional		Pemi Overlay	Ground Cover/Green	Open Space Min. Requirements	Additional
	Adopted?	Adopted?	Adopted?	Required?	Permitted?	Adopted?	Designated?	Adopted?	River Frontage Min./Max.	Min. Setback, Structures	Impervious Surface Max.	Distance from river			
State									150' if no sewer	SWQPA - 50'	SWQPA -30%	SWQPA - 250'			
Franconia 2023	Yes	No*. Does give PB some discretion.	State regs would control. Gives PB some discretion.	State regs would control.	Yes.	Yes. ZO	No	Yes	n/a	n/a	15% in Aquifer District: 30% for multi-family, commercial, or industrial lot	n/a	No.	As part of PUD (Planned Unit Development) and Cluster Subdivision	
Woodstock (not in RMPP but included in plan for information purposes)	Yes	No	No. State Regs. Cover	YES SUBDIV 4.10 XIII	N/A	No	No	No	150'	April 1, 2008, all primary structures must be set back at least 50' from the reference line. Towns may maintain or enact their own setback only if > 50'.	Limited to 20%. May be increased: • 25% based on tree coverage and a no cut deed restriction. • 30% based on the above plus a DES approved stormwater management plan.	250'	Within 150 feet of the reference line, 50% of the area not covered by impervious surfaces shall be maintained in an undisturbed state.	N/A	
Lincoln (not in RMPP but included in plan for information purposes)	Yes (1993) Amended 1994, 2004 & 2023.	No	**Yes.** Part of Sub & Part of Stormwater Management Ordinance (SMO) & Also State Regs	**SUB & SPR amended 2022.** Applies to all developments & residential lots which disturb either (1) 17,000 SF+ or (2) 55% or more of square footage of lot. Development may not increase stormwater runoff from the site.	**Yes.** Cluster development allowed in Zoning Ordinance (Land Use Plan Ordinance) & Per Sub.	No	No	No	N/A - Lincoln has municipal water & sewer	**ZO - SPD Primary buildings** - min. of 50' from river reference line or as allowed by state regulations whichever is less stringent. **Accessory buildings** - shall be minimum of 15' from river reference line.	(ZO) - SPD - No special maximum Impervious Surface within the SWQPA area. **Regular Maximum Lot Coverage:** 80% SBD District 70% GU, VC District 60% VR District 50% GR, RR, MR Districts	**Shoreland Protection District (SPD)** - Part of Zoning Ordinance or Land Use Plan Ordinance	**Natural Woodlands Buffer:** Where exisiting, all reasonable attempts shall be made to maintain a natural woodlands buffer within 150' of the "public boundary line" (i.e., public waters)	**Lot Coverage:** Open space may include sidewalks, walkways, outdoor patios, courtyards, terraces, and permanent planters (up to 10%). Treed islands within parking areas shall be included in this area.	
Thornton 2023	Yes updated 2023	No	No	Yes. Sub & SPR	Yes	No	No	No	n/a	n/a	n/a	n/a	n/a	n/a	
Campton 2023	Updated 2023	No*	No	No. Sub regs encourage clearing and increasing size of water courses to take care of runoff	Yes	NO. Wetlands cannot count toward minimum lot size.	No	No	Min. 200'	n/a	n/a	River Corridor Protection Zone 100-year floodplain and 500' from normal channel (w/some	n/a	Only in Open Space development: 15 acres and cluster 25%	
Plymouth 2023	Yes	No	Yes. Sub & SPR	Yes. Sub & SPR	Yes	No	No	No	150' per unit	Depends on zone and septic.	75% maximum lot coverage	Environmentally Sensitive Zone: 500' out from all river banks w/ prohibitions in Zoning	No	Formula in ZO Article V Open Space Development	
Holderness 2023	Yes	Yes. No development on slopes > 25%	Yes. No development on slopes > 25%	Yes. SPR	Cluster - Yes	No. However. PB notifies CC on all applications involving wetlands. CC may request Wetlands Inventory if digging will occur.	Yes	Yes. ZO Covers most of Pemi Corridor except for a section east of NH 175 in CD. Extends beyond corridor in some areas.	200'	In Pemi overlay: 150'	In Groundwater Protection Dist: 15%. Elsewhere ranging from 15 - 50% depending on zone.	500' or 1,000' in floodplain mirrors the CSPA (pre-2008).	GR ≥ 65% CD ≥ 50%	GR ≥ 65% CD ≥ 50%	

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Pemi Regulation Matrix See Note & Key.	Floodplain Regulation	Steep Slopes Ordinance	Erosion & Sediment Control	Storm water Management Plan	Cluster or conservation Subdivision	Wetlands Ordinance	Prime Wetlands	Aquifer or Groundwater Protection Ordinance		Dimensional		Pemi Overlay	Ground Cover/Green	Open Space Min. Requirements	Additional
	Adopted?	Adopted?	Adopted?	Required?	Permitted?	Adopted?	Designated?	Adopted?	River Frontage Min./Max.	Min. Setback, Structures	Impervious Surface Max.	Distance from river			
State									150' if no sewer	SWQPA - 50'	SWQPA -30%	SWQPA - 250'			
Bridgewater 2023	Yes (Updated version up for adoption at 2023 Town Meeting)	Yes 15% no construction	Yes. ZO	Yes referenced under Erosion & Sediment	Cluster - Yes	No	No	No. ZO: The aquifer is referenced in the Pemi Overlay description	150' - 20' for each add'l unit	50'	GR zone: 30% C/I Zone: none	250'	GR. C/I: none; Pemi Overlay: Yes (CSPA)	No	
Ashland 2023	Yes	Yes - ZO: Pemi & Squam Overlays No Structures on slopes > 15%. Unrestricted elsewhere.	Sub: General statement on the topic. Elsewhere not required.	BMPs as part of approval process	Yes	No	No	Yes March,13,2018	• Min. frontage: 150' • Min. lot size: 2 acres	RR Zone: 200' from river I/C Zone can be reduced to 50' through Special Exception	RR: 30% building coverage	500'	No	No	Adopted local Commercial Earth Excavation Regulations
New Hampton 2023	Yes	Yes - ZO.	Yes. Sub & SPR	Yes. Sub & SPR	Yes	Sub & SPR 0.25 ac. - 25" 1 ac. - 75'	No	No	200'	200' (Industrial Park: 500')	GR: 20% B&I: 50%	Yes in ZO. 500' from normal high water mark	"Open Area devoted to landscaping or natural growth"	No	
Bristol 2023	Yes	Yes. ZO Restricts development when > 15% and forbids any structures where > 25%	Yes. The controls which exist Pemi Overlay were extended townwide in	Required under Steep Slope Application	Cluster - Yes	Yes. ZO.	No	No	200'	100'	Within Pemi Overlay: 10%.	Extends 500' back unless the 500' line crosses Merrimack St., Summer St., or River Road	No	No reference to "open space is made, but the 10% limit on impervious surfaces guarantees open	
Hill 2023	Yes	Yes. ZO 15%	No, nothing beyond Steep Slopes Ordinance	Yes ZO: Under Steep Slopes ordinance SPR	No	No	No	No. Wellhead Protection Overlay prohibits Special Exceptions.	n/a	n/a	No	No Overlay	No	No	
Sanbornton 2023	Yes	Yes. ZO 15% (6 acre minimum) Stormwater Plan required. Subject to PB waiver.	Yes. Zoning Ordinance and Site Plan Regulations.	Yes. Zoning Ordinance. Required in Steep Slope Conservation District.	Yes. Zoning Ordinance.	Yes - ZO. There are a variety of specific buffers from 50' - 150' plus Watershed Protection Area.	Yes. Zoning Ordinance	Aquifer Conservation Overlay District.	n/a	50' structures; 100' septic.	Yes. Aquifer Conservation District-60%	No Pemi Overlay. Aqifer CD follows the boundaries of the aquifer.	Yes. Site Plan Regulations.	50% for Cluster Development	
Franklin 2023	Yes	Sub 15%	Yes. Sub & SPR	Yes. Sub & SPR	Cluster - Yes,	Yes	No	No	n/a	n/a	No. Only in the Webster Lake Overlay	No	SPR: "adequate green space"	Sub: Addressed in Cluster Subdivision ordinance (66%) SPR: "adequate	

Red text indicates a change for 2023.

Notes
- Steep slopes may not be counted as part of area.

Key

ZO: Zoning Ordinance
SUB: Subdivision Regulations
SPR: Site Plan Review Regulations
PB: Planning Board
GR: General Resdential
RR: Rural Residential
I/C: Industrial/ Commercial
CD: Commercial District
CC: Conservation Commission
SWQPA: Shoreland Water Quality Protection Act
AqCD: Aquifer Conservation District

1. Permitted Uses

All communities permit residential uses within the corridor (except that the Franconia section is within Franconia State Park). Commercial activities are permitted in the corridor by most communities and industrial uses are permitted in several.

2. Pemi Overlay Districts

As was the case ten years ago, ten of the fourteen communities along the Pemi have some form of a Shoreland Overlay District which protects the land abutting the river with greater restrictions than the state restrictions. These districts are locally defined areas which enhance the regulations of the underlying local zoning districts based on environmental characteristics. Thornton, Franconia, Sanbornton, Hill and Franklin do not have an overlay district. While Franconia and Sanbornton do not have this overlay, they do have an aquifer overlay district (and much of the riverfront land in Hill and Franklin is under federal control through the US Army Corps of Engineers).

In Campton, Plymouth, Holderness, Ashland, New Hampton, and Bristol the protections extend at least 500' out from the river's edge. In Woodstock and Bridgewater, the overlay extends 250' from the river's edge. Common uses prohibited in these districts are automobile repair shops or junkyards; underground petroleum tanks; excavation of sand, gravel, or other earth materials; the use of common fertilizers on lawns; landfills and other solid and hazardous waste facilities; and various industrial uses. In a couple of communities, their local ordinances mirror earlier versions of the state's Shoreland Protection Act. Even where local standards are stricter, enforcement or lack thereof plays a critical role in the effectiveness of the regulations.

3. Aquifer Overlay Districts

Three municipalities have Aquifer Protection Overlay Districts to protect groundwater resources (Franconia, Holderness, and Sanbornton). There has been no change since 2013. The areas under protection are commonly land overlaying stratified drift aquifers. The districts typically ban the same types of facilities as Shoreland Protection Districts: automobile repair shops or junkyards, underground petroleum tanks, excavation of sand, gravel or other earth materials, landfills and other solid and hazardous waste facilities, and other industrial uses.

4. Dimensional requirements (Frontage, Setbacks, Lot Size)

A couple more communities (Campton and Ashland) now have minimum frontage requirements for lots along the river, where none previously existed. Sanbornton has established setbacks from the river.

A vegetated buffer enables more space for water to percolate into the ground, reducing the amount of runoff from a particular property. There is a difference between a setback and a vegetated buffer. A setback is merely a linear measurement, what covers the ground between the river, a vegetated buffer is an area with plant growth along a waterbody that stabilizes the shoreline and provide wildlife habitat and shade. Such buffers can play an important role in how much absorption of stormwater and filtering of pollutants occurs.

5. Impervious Surfaces

There are state-wide standards regarding impervious surfaces through the Shoreland Water Quality Protection Act; however, communities may establish stricter limits. Woodstock has established some limitations on coverage by impervious surface. In many cases, if a developer proposes to exceed a particular threshold of impervious surface, they must present a plan for retaining and slowing the stormwater runoff.

6. Stormwater Management

Five communities have established or bolstered their Stormwater Management requirements, many through Subdivision or Site Plan Regulations, some in conjunction with Steep Slope Ordinances.

7. Steep Slopes

Some of the functions of an ordinance limiting development on steep slopes are to manage stormwater runoff, control erosion, and reduce sedimentation downstream in the watershed. Communities in the downstream section of the corridor tend to have steep slope controls, less so in the upstream communities.

8. Floodplain Management

All municipalities have had Floodplain ordinances. As newer, more detailed, digital mapping has been adopted in the past decade, most communities have worked with NH Office of Planning and Development through their Floodplain Management Program to update their Floodplain ordinances.

9. Master Plan

Each riparian municipality has its own Master Plan, developed by the Planning Board, and adopted by the community. The Master Plan sets out the values and goals of the community, it is the foundation for local zoning. **The planning board may adopt this corridor management plan as an adjunct to the town's master plan (RSA 483:8-a. IIIc).** In New Hampshire, the local master plan should be reviewed and updated every five to ten years.

5. Threats

PRLAC members reviewed the status of actions identified in the 2013 Corridor Management Plan, the status of resources in the corridor, the status of Protections in corridor communities, and took stock of activities observed in the corridor. With input from the public at the September Kick-Off meeting, the representatives identified (or re-affirmed) several "Concerns' or 'Threats'. From these emerged several Goals. Fulfillment of these Goals will be accomplished through the implementation of several Actions, some feeding into a set of Objectives.

PRLAC representatives noted that many of the "Actions" identified in the 2013 plan were either things that the group does on a regular basis or quite broad interdisciplinary statements, touching on many different areas of watershed management planning. "Things done on a regular basis" include the regular review of state Wetland, Shoreland, and Alteration of Terrain permits. This process often involves a site walk with the applicant and comment to NHDES. Many topics related to stewardship of the riparian landscape are often discussed on these walks and in comments.

At the outset of this update process, the group expressed a desire to have more targeted, achievable actions. This, however, was tempered with the acknowledgement that the watershed IS broad, it DOES have many interacting pieces that comprise its ecosystem, and that part of the role of a river corridor management plan is to keep the big picture in mind while directing efforts to address some of the individual threats.

Several of the "Concerns" identified in the prior plan continue to exist; they are renamed as "Threats" in this version of the plan. Identification of these threats led to the naming of several Goals with outcomes or Objectives. Actions were identified to reach those Objectives.

Threats:

1. Overall Cumulative impacts of development – especially water withdrawals
2. Stormwater Runoff
3. Encroachment on Steep Slopes and Disturbance of Soils that lead to erosion
4. Invasive Species
5. Concern about condition of some public access points (esp. Mooney-Clark)
6. Impacts resulting from the use of the corridor as a transportation and possible energy corridor.
7. Reduction in permeable surfaces within the Pemigewasset River watershed.

Because management plans are nonbinding unless adopted by the municipalities (RSA 483:8-a IIIc), the action items included in the plan should focus on items that can be done by LAC members or are within the direct control of PRLAC.

Note: Stakeholders may include municipalities, planning boards, conservation commissions, NH F&G, UNH Cooperative Extension, County Conservation Districts, Nature Conservancy, SPNHF, Trout Unlimited, and land trusts – in addition to the public.

6. Goals and Objectives

To address the threats identified above, PRLAC members developed a set of Goals.

Goal # 1: Understand and facilitate communication regarding the sustainable water budget for both the natural habitat as well as human needs (Instream Flow program).

Goal #2: Ensure that PRLAC membership and communities are informed about the status of water quality along the Pemi River and factors that can impact it.

Goal #3: Encourage appropriate and sustainable vegetative buffers and structural setbacks be developed and maintained to limit erosion.

Goal #4: Maintain or reduce the areas and impacts from Invasive Species along the river.

Goal #5: Ensure that there are adequate, safe, and pleasant access points along the Pemi River.

Goal # 6: Identify existing impacts to the river from transportation and potential impacts from energy transmission along the corridor.

Goal #7: Encourage maintenance of sustainable habitats for diverse wildlife along the river corridor.

Goal #8: Encourage greater local awareness by municipalities and property owners of threats to the river corridor and stewardship tools.

For each rather broad Goal, between one and three targeted Objectives was stated. Then for each Objective between one and five specific Action Items were developed along with identification of entities that would likely be involved with implementation of these Actions and a relative time frame for completion.

These are all shown in the color-coded Action Plan matrix in Section 7. Goals are highlighted in orange, Objectives blue, and Action Items white.

PRLAC representatives were attentive to the concern (expressed by both representatives and community members) that they develop a relatively limited number of specific Actions that are achievable and within the group's purview.

7. Action Plan

Goal # 1: Understand and facilitate communication regarding the sustainable water budget for both the natural habitat as well as human needs (Instream Flow program).

Objective # 1: Understand the existing water capacity and needs within the river corridor.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. The water capacity and needs are being determined by the NH DES Instream Flow program. Get regular updates to understand the program and status.	NHDES (Instream Flow Prog. Mgr.), PRLAC	Annual

Objective # 2: Convey PRLAC's concern about cumulative water withdrawals and surface/groundwater capacity to stakeholders (NHDES and municipalities).

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Communicate concerns regarding cumulative water withdrawal activities to NH DES and local municipalities.	PRLAC Chair	Year 1

Goal #2: Ensure that PRLAC membership and communities are informed about the status of water quality along the Pemi River and factors that can impact it.

Objective #1: Address concerns with NH DES that water sampling might be missing some things – either due to sampling site location or types of sampling tests.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Meet with VRAP Coordinator to discuss aspects of the program, Pemi data trends, and implications.	NHDES VRAP, PRLAC VRAP	Year 1
1. Reassess *e. coli* sampling locations and timing.	NHDES VRAP, PRLAC VRAP	Year 1
2. Review possible addition of chloride testing.	NHDES VRAP, PRLAC VRAP	Year 2
3. Review monitoring sites relative to point source pollution (See objective #3).	NHDES VRAP, PRLAC VRAP	Year 3

Objective #2: Communicate concerns and potential protections associated with stormwater management issues to local communities.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Outreach to local Planning Boards and Cons. Coms to discuss several land management topics including: • runoff from new development projects, • runoff from roads & the pollution it can transport, as well as • infrastructure issues like culverts and combined stormwater and wastewater flows	PRLAC VRAP	Year 3

Objective #3: Better understand the individual and cumulative water sampling data along with the impacts of point source pollution along the river corridor.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Identify point source pollutant data.	NHDES VRAP, PRLAC VRAP	Year 2
2. Seek expert analysis of the impacts of the point source pollutants.	NHDES VRAP, PRLAC VRAP	Year 3

Goal #3: Encourage appropriate and sustainable vegetative buffers and structural setbacks be developed and maintained to limit erosion.

Objective #1: Improve protection of steep slopes.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Encourage the communities that do not have a steep slope ordinance (towns in northern half of the corridor) to develop and implement one.	Local PRLAC rep.	Year 2
2. Encourage local implementation/enforcement of existing steep slopes ordinances.	Local PRLAC rep.	Year 1
3. Discuss with Planning Boards how certain steep slope situations (such as adjacency to a steep river bank) are addressed.	Local PRLAC rep.	Year 1
4. Encourage communities to adopt a locally adapted version of the Shoreland Protection model ordinance (from Innovative Land Use Guide) to restore critical shoreland protection to levels achieved with the CSPA.	Local PRLAC rep.	Year 3
5. Make sure that maintenance of vegetative buffers, especially near steep slopes are discussed on Site Walks with each owner/applicant.	PRLAC representative	Ongoing

Objective #2: Improve protection of flood prone areas.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Educate communities on the hazards and costs of allowing people to disturb area in the mapped floodplain, including the loss of floodplain storage capacity in one place that increases flood levels in another.	Local PRLAC rep. (assist from state or regional planning)	Year 3

Goal #4: Maintain or reduce the areas and impacts from Invasive Species along the river.

Objective #1: Better understand where invasive species exist and might spread.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Work with NHDES to update mapping infestations of invasives (milfoil, Didymo, Japanese Knotweed)	NHDES, interested PRLAC reps	Year 3

Objective #2: Coordinate with NHDES, UNH Cooperative Extension, and Conservation Commissions to limit the spread of these organisms through: Outreach, Education, and Removal/Treatment.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Help raise awareness of invasive species and actions to limit the spread through presentations and training.	NHDES, UNH CoopExt, PRLAC, ConsCom	Year 3
2. Explore options for removal and treatment of invasive species with NH DES.	NHDES, UNH CoopExt, PRLAC, ConsCom	Year 4

Goal #5: Ensure that there are adequate, safe, and pleasant access points along the Pemi River.

Objective #1: Make property owners and other appropriate stakeholders aware of maintenance concerns at public access points.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Actively work with NH Fish & Game to establish ongoing maintenance responsibilities for Mooney-Clark Landing.	NHF&G, PRLAC	Year 2
2. Report concerns at access points to owners (and copy NHDES).	NHDES	Ongoing
3. Work with State Legislators regarding state maintenance of certain access sites.	Bolton	Year 2
4. Work with landowners on user stewardship education, especially public entities regarding Carry-In, Carry-Out signage.	NHDES, America the Beautiful, towns	Year 3
5. Work with landowners, especially public entities, to define maintenance needs and expectations.	NHF&G, PRLAC	Year 2, Ongoing

Goal # 6: Identify existing impacts to the river from transportation and potential impacts from energy transmission along the corridor.

Objective #1: Identify instances and potential impacts due to transportation and energy transmission and communicate with stakeholders.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Identify instances and impacts of stormwater runoff from roads.	NHDOT, Local DPW, Cons. Com., PRLAC	Ongoing
2. Identify instances and impacts of salt in roadway runoff, such as Thornton Town Hall water supply	NHDOT, Local DPW, Cons. Com., PRLAC	Ongoing
3. Stay up to date on efforts to install large-scale power transmission lines and towers along the corridor or other projects that might have impacts on the scenic aspects of the corridor.	PRLAC	Ongoing

Goal #7: Encourage maintenance of sustainable habitats for diverse wildlife along the river corridor.

Objective #1: Communicate with stakeholders regarding conservation priorities and opportunities.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Meet with NH DES, NHF&G, and RPCs regarding tools and opportunities that support local land, water, and habitat protection efforts.	PRLAC, LRPC	Year 2
1. Develop a handout summarizing PRLAC's conservation priorities.	PRLAC, LRPC	Year 2
2. Meet with local stakeholders to discuss conservation priorities.	Local PRLAC rep	Year 3

Goal #8: Encourage greater local awareness by municipalities and property owners of threats to the river corridor and stewardship tools.

Objective #1: Outreach to local stakeholders, especially planning boards and conservation commissions about the updated Pemi River Corridor Management Plan.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Publicize the Pemi River Corridor Management Plan upon publication. (local stakeholders)	Local PRLAC rep	Year 1
2. Create and distribute 1–2-page summary of the Management Plan and its Actions.	PRLAC, LRPC	Year 1
3. Encourage local municipalities to consider adopting the Pemigewasset River Corridor Management Plan as part of their Master Plan [RSA: 483:8a(III)c].	Local PRLAC rep., Planning Board	Year 2

Objective #2: Outreach to stakeholders about water monitoring efforts.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Create and distribute 1-2 page summary of the water monitoring program and results.	PRLAC, LRPC	Year 2
2. Meet with local stakeholders, including schools.	Local PRLAC rep., Planning Board	Year 3

Objective #3: Outreach to local stakeholders, especially planning boards) about the purpose, development, promotion, and implementation of various river protections that communities can govern.

Action Item(s)	Responsible Party / Parties	Anticipated Completion (yr)
1. Host presentations on river corridor protection topics such as Steep Slope, Erosion & Sediment Control, Stormwater Protection, or Groundwater Protection ordinances. These would be aimed at Planning Board and Conservation Commission members. Presenters from LRPC & NCC, NH Office of Planning & Development, and NH DES.	PRLAC, in coordination with LRPC & NCC	Year 2
2. Engage with the State Floodplain Manager to provide education and tools for protecting the riparian flood plain.	PRLAC, NH OPD	Year 2

8. Summary

New Hampshire's Pemigewasset River emerges from Franconia's Profile Lake, is joined by many tributaries, flows through a dozen towns, under numerous bridges, over several dams, and emerges in downtown Franklin to join with the Winnipesaukee River and they become the Merrimack River, ultimately reaching the Atlantic Ocean in Newburyport, MA. At various points along its path, the Pemi flows through all four types of land classifications – natural, rural, rural-community, and community. There are now more than 40,000 people living in these communities in 25,000 housing units in addition to commercial activities in some areas. Traffic, much of it associated with tourism, continues to rise.

While there has been consistency of late in the state and federal rules governing uses along the river and there have been some enhanced protections locally, PRLAC members noted that more might be done in some communities regarding regulations, education, and enforcement.

A primary recommendation of PRLAC's original management plan, the group's volunteer water monitoring program has now provided more than twenty years' worth of publicly available data to NHDES and EPA. This program will continue (and possibly expand their work) while PRLAC also works with NHDES staff on the multi-year launch of the In-Stream Flow program to develop a responsible budget for the various sources and uses of water in the river.

In the past decade nearly half the stream crossings in the Pemi watershed have been assessed and 20-30% of them were found to be deficient in some way, often an indicator of excessive runoff or inadequate maintenance. This can have impacts on aquatic organisms, habitats, infrastructure, structures, and even human safety.

Stormwater runoff continues to be a one of the major challenges facing the communities on the Pemi River corridor (and watershed). It has the potential to drive erosion, pollution, and reduction in land use (and value). It is a topic running through all that PRLAC does.

PRLAC does not regulate or enforce. The group is provided the opportunity to comment on certain activities that can impact the river corridor. PRLAC takes that role seriously, often going on site walks with permit applicants, engaging in discussions in a public forum. Over the past decade the number of PRLAC representatives has grown and more have taken on leadership roles. Through this management plan update process there was a resolve to further raise awareness of river stewardship to a wider audience.

In this update to the Pemigewasset River Corridor Management Plan, PRLAC has identified eight Goals and fifteen distinct Objectives to serve as a foundation and three dozen specific Actions to guide the organization's activities in the years ahead.

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9. Appendix

a. A Supplemental list of Tributaries to the Pemi River

a. West Branch Brook in Campton
b. Bog Brook in Campton
c. Connor Brook in Campton
d. Horner Brook in Woodstock
e. Moosilauke Brook (aka Lost River) is a tributary of the Pemigewasset. It is a 3.2-mile-long stream. It begins in Kinsman Notch, where the Lost River joins Jackman Brook. Moosilauke Brook runs from the northwest, passing through the granite gorge of Agassiz Basin. Gordon Brook joins it just below a bridge on Route 112 and joins the Pemigewasset River just below the village of North Woodstock.
f. The tributary known as The East Branch of the Pemigewasset River is 15.8-mile-long. Its tributaries include the North Fork of the Pemigewasset and the Franconia Branch before reaching the Kancamagus Highway. The East Branch meets the Hancock Branch coming from the southeast and flows into Woodstock and ends at the Pemigewasset River just downstream from the Interstate 93 highway bridges.
g. Glover Brook is a stream that joins the Pemigewasset River from the west just north of Woodstock Town Hall after crossing the Daniel Webster Highway (Rt 3).
h. Although primarily in Thornton, NH the Eastman Brook descends from the east and joins the Pemigewasset in Woodstock close to Sugar Plum Lane and the Bradley Field - NH49 airstrip.
i. Russell Pond Brook descends from the east and joins an overflow channel of the Pemigewasset River on the west side of Rt 175 (across from 437 Eastside Road.)
j. Leemans Brook joins the Pemigewasset River from the west in the I-93 corridor just north of Exit 30.
k. Hubbard Brook
l. Eastman Brook

b. Recreation Areas/Access Points – local details

a. Mirror Lake is located on Mirror Lake Road near the Hubbard Brook Experimental Forest in Woodstock. While the shoreline is all privately owned, there is a right of way to the public beach and boat launch. The Town does some trash clean up, but mainly this is a Carry in/Carry out area with the Town providing a year-round portable toilet, The outflow from the lake enters Hubbard Brook, but this tributary enters the Pemigewasset River in Thornton, NH.
b. Baston Falls is on Eastman Brook (Pemi tributary) in Woodstock near the intersection of Rt 175 and Thornton Gore Road. It is used for swimming. The town provides a portable toilet in the summer. Carry-in/Carry-out.
c. The Town of Lincoln has secured legal access to the "Old Hole" swimming area on the East Branch. Locals and visitors have used this area along the levee for decades. The Town now has a parking easement along Rte. 112 immediately west of the NHEC Substation. This parking area remains undeveloped and mostly unused as other places historically used to park on private land are more convenient. The Town has no immediate intent to develop this car park.
d. The Town also has an easement to pass that allows foot traffic and connects the parking area to the upstream end of the levee. This legal easement is across a steep slope and will need improvement to make it passable. Again, this permanent easement will be crucial if and when the current access across private property becomes blocked. As of now, it is not easily passable and more accessible historically used access routes are still being used.
e. Finally, the Town has a recreation easement that allows recreational use of the levee from the water line to the crest of the levee from its upstream end to a point 150' downstream, and from the water line to a point halfway up the levee for an additional 150' downstream. The easement is only on the north side of the river along the levee.
f. The "Ladies Bathtub" swimming hole parking has been limited to the taxpayers and residents of Lincoln and Woodstock. This swimming hole is on the north side of the East Branch, a short distance upstream from the "Old Hole". The parking area and access are located within the Riverfront Condominium community. The parking lot contains just a small number of parking spaces and leads to a small beach/rock area. During 2020-2021, the parking and use of this small swimming hole became uncontrollable with cars parking in emergency lanes and private condominium areas. Crowds expanded beyond the Town controlled area and trespassed on the condominium grounds causing damage and creating messes. With the new easement to "Old Hole," the Town decided to limit this smaller swimming hole to residents and taxpayers with a required parking sticker.
g. Eddy Day Use Area in Campton (White Mountain National Forest) for picnicking and cooling off in a pool of the Mad River.
h. Golf course in Woodstock, now named The Jack

i. Parkers Dam is located on Town land at the site of an old mill, just north of the center of North Woodstock on Route 3 across from The Christmas Loft, 259 Main Street. It dates to the area's logging era and is a site for fishing and occasional swimming.
j. Cascade Park is in the center of North Woodstock just off Route 3. Across from the Woodstock Inn. There is a picnic area which leads to the river. There are smooth sloping rocks and lots of small cascades. Popular for swimming and tubing, this site is also a popular spot for weddings, but town permits are required and access to the river may not be closed. Trash is Carry-in/Carry-out. Parking in on the main street or in the town's municipal lot. Town provides portable toilets in the summer.
k. Peeling Park – Children's Playground at Municipal Parking Lot in North Woodstock. Town supplies portable toilets in summer.
l. Woodstock Family Park behind Fire Station – A small park behind the fire station in the town of North Woodstock, New Hampshire on the banks of the Pemigewasset River. There are a few tables and a small playground, and access to fishing and trails along the river. Access from I-93, Exit 32. Picnic, Fishing, Boating No Ramp No Fee. No facilities. Carry-in/Carry-out.
m. Iron Bridge is a small sandy beach with both shallow and deep sections on the Pemigewasset River. Located just off Rt 175, just south of North Woodstock Access to it crosses property at 27 Old Dump Road owned by Dead River Co., but the Town of Woodstock owns the property on the same shore both north and south of the storage tanks. This beach has recently become very popular. It is easily spotted when looking north (upstream) from the green bridge. No facilities.
n. Parking along Rt 175 (controlled by state) provides access to river by fishermen and swimmers at various points in Woodstock.
o. A road to a site locally known as Sandy Beach on State of NH land north of Fire Station Road has recently been closed by a gate. Should not be accessed.
p. There is a canoe launch on State of NH off Rt 175 and Death Valley Road. Town has placed portable toilet in summer. Carry-in/Carry-out.
q. The Woodstock Town Well is located on town property at 31 Well Road east of the Pemigewasset River. It draws its water from an aquifer, not the river.
r. Staple Rock Park is on town-owned land on the east bank of the Pemigewasset River. Used for picnics, tubing, and swimming. Access is on Staple Rock Road, a left-hand turn, just after crossing the Woodstock I95/093 Bridge RT 175. Town supplies portable toilets in summer. Carry in/Carry-out.
s. Local outfitters use the Pemigewasset River for canoe and kayak rental and tours.

c. Additional Resources

a. Historic and Cultural Woodstock, NH website "About Woodstock"
ii. White Mountains, NH "Things to Do" Town of Lincoln 250th Anniversary website with links and photos
b. Heritage – Logging Lincoln
c. 2020 NH Forest Action Plan: Department of Natural and Cultural Resources Division of Forests and Lands
d. "Picking Our Battles": An Invasive Plant Control Strategy for Woodstock, NH illustrates some of the factors that go into identifying and prioritizing habitats invasive species.

d. List of Acronyms:

303(d) list – federal list of “impaired” waterbodies
AADT – Average Annual Daily Traffic
AoT – Alteration of Terrain
BMP – Best Management Practices
CSPA – Comprehensive Shoreland Protection Act
DO – Dissolved Oxygen
DRED – Department of Resources and Economic Development
EPA – Environmental Protection Agency
FEH – Fluvial Erosion Hazards
FEMA – Federal Emergency Management Agency
FERC – Federal Energy Regulatory Agency
GPD – Gallons per day
ILU – Innovative Land Use planning techniques
LID – Low Impact Development
LRPC – Lakes Region Planning Commission
NCC – North Country Council
NFIP – National Flood Insurance Program
NHDES – New Hampshire Department of Environmental Services
NHDOT – New Hampshire Department of Transportation
NHF&G – New Hampshire Fish & Game
NHOPD – New Hampshire Office of Planning and Development
NHNHB – New Hampshire Natural Heritage Bureau
NPDES – National Pollutant Discharge Elimination System
PSU – Plymouth State University
PRLAC – Pemigewasset River Local Advisory Committee
PSNH – Public Service of New Hampshire
RMPP – Rivers Management and Protection Program
SWQPA – Shoreland Water Quality Protection Act
USACE – United States Army Corps of Engineers
VRAP – Volunteer River Assessment Program
WAP – Wildlife Action Plan