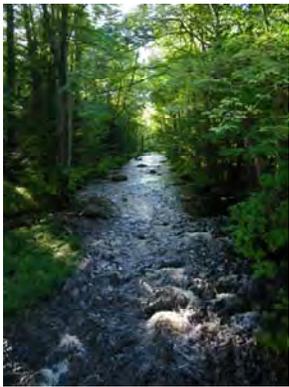




PISCATAQUOG RIVER MANAGEMENT PLAN UPDATE



2010



Piscataquog River Local Advisory Committee

Special Acknowledgements

**In Memory of:
Beverly Yeaple, PRLAC Committee Member**

From the time of its formation, Beverly Yeaple served on the Piscataquog River Local Advisory Committee (PRLAC) as the representative from Deering. She contributed significantly to the publication of the first edition of this River Management Plan and participated regularly in the business of the Committee, serving for a time as its Chair. As this update to the plan is prepared, Bev unfortunately passed away. Her knowledge, dedication, good humor, and commitment to the protection of the Piscataquog River Watershed has set a high standard for those who follow and will not be forgotten.

June 2010



Cover photos provided by Southern New Hampshire Planning Commission

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June 2010



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EXECUTIVE SUMMARY

This update to the Piscataquog River Management Plan aims to enhance the overall protection and functioning of the Piscataquog River and its tributaries. Specifically, it is designed to assist and provide guidance to municipalities and other decision makers in protecting the river for its value as drinking water, natural areas and fish and wildlife habitat and mitigating threats and impacts that may result from human activities or natural causes.

One of the main goals of this plan is to maintain the high quality of all the natural resources found along the river and to promote a sustainable use of the water and the adjacent land for the benefit of the Public. An important theme in water management is to view the entire river and its tributaries as a single, comprehensive watershed system. All water resources in a watershed are hydrologically connected. Impacts of pollution to one part of the watershed can impact the entire system, and this is particularly true with respect to the river's headwater streams.

Protecting water quality all the way to the headwater streams is a watershed protection approach which is essential to preserve the water quality of the river for future generations. Even as improvements in wastewater and other treatment facilities are made or expanded, water quality goals continue to become harder to meet. Significant regional issues such as stormwater management, nonpoint source pollution, and flooding need innovative and cooperative solutions among all units of government, both state and local. Protection of the river and all of its tributaries is an ongoing watershed management issue, particularly in an era of dwindling financial resources as watershed protection can dramatically reduce the costs of providing safe, clean drinking water to the public.

For all these reasons – ecology, quality of life, and financial - municipalities must think and act on both a local and regional scale to protect the Piscataquog River in a responsible way and be mindful of the impacts of growth and the increasing demands for use of the river. As such, this plan aims to educate the public about the key natural resource issues related to the river and provide the latest tools to help shape future river management decisions and actions for the benefit of the public.

Frequently Used Acronyms

- BMP – Best Management Practices
- CSPA – Comprehensive Shoreland Protection Act
- CTAP – Community Technical Assistance Program
- DES – Department of Environmental Services
- EPA – Environmental Protection Agency
- FEMA – Federal Emergency Management Agency
- IFPPP – Instream Flow Piscataquog Protection Program
- LAC – Local Advisory Committee
- NHB – Natural Heritage Bureau
- NH DES – New Hampshire Department of Environmental Services
- NHFG – New Hampshire Fish & Game
- PLC – Piscataquog Land Conservancy
- PRLAC – Piscataquog River Local Advisory Committee
- PWA – Piscataquog Watershed Association (formerly the Piscataquog Land Conservancy)
- RMPP – River Management Protection Program
- VRAP – Volunteer River Assessment Program



1. INTRODUCTION

1.1 Purpose

The Piscataquog River Management Plan was developed by the Piscataquog River Local Advisory Committee (PRLAC) in accordance with the guidelines of RSA 483 to create a framework for long-term use and protection of the Piscataquog River. This Updated 2010 Management Plan achieves this purpose by defining a future for the river that respects the legitimate interest of property owners while recognizing that the river is an important community resource.

It is the goal of the PRLAC that all eleven (11) municipalities located within the Piscataquog River watershed adopt this 2010 Updated Management Plan as part of their Master Plan. These eleven municipalities include: the towns of Deering, Dunbarton, Francestown, Goffstown, Greenfield, Henniker, Lyndeborough, New Boston, Mont Vernon, Weare, and the City of Manchester. It is the hope of the PRLAC that this Updated Management Plan can become the basis for guidance that these communities and other organizations will use when undertaking any efforts that will affect the Piscataquog River or its watershed.

In association with this Updated Management Plan, the Southern New Hampshire Planning Commission (SNHPC) is also preparing a Land Conservation Plan for the entire Piscataquog River Watershed. The purpose of this conservation plan will be to seek and ensure further protection of ecologically important land and aquatic resources both within the watershed and along the river. The primary focus of the plan is to protect water quality, significant terrestrial and aquatic plant and wildlife habitat, riparian zones, intact and productive forest blocks, and headwater streams. The Land Conservation Plan will build upon previous work, including the

Conservation Plan for the Piscataquog Watershed prepared in 2005 by the Piscataquog Land Conservancy (PLC), formerly known as the Piscataquog Watershed Association (PWA).

Together the Updated Piscataquog River Management Plan and the Piscataquog Watershed Land Conservation Plan will provide the scientific documentation necessary for communities to pursue the protection of important lands and aquatic resources as well as enact necessary and innovative land use and environmental ordinances designed to bring about wise and smart use of the land and river system.

1.2 Background

In 1988, the NH General Court passed the Rivers Management and Protection Act. This Act was enacted in recognition of the fact that river protection is essential to the integrity of the state's public waters. The NH Rivers Management and Protection Program was implemented as a result of RSA 483:6 which allows any New Hampshire organization or resident to nominate a river for protection. In 1992, the PWA submitted the required nomination documentation to NH DES and the state legislature approved the incorporation of the North, South, and Middle Branches and the Main Stem of the Piscataquog River into the Rivers Management and Protection Program.

As part of the nomination process, RSA 483:8-a also provides for the appointment of a local river management advisory committee for each designated river. Municipalities located along the designated river can have at least one member on a local river management advisory committee. Members are nominated by the local governing body and appointed by the Commissioner of the NH DES.

The municipalities that currently make up the PRLAC are Deering, Frankestown, Goffstown, Manchester, New Boston, and Weare. Local river advisory committees are required to have at least seven members, representing a broad range of interests in the vicinity of the designated river.

Below is a list of all the current New Hampshire designated rivers (a map of all the designated rivers can be found in Appendix 9.7).

NEW HAMPSHIRE DESIGNATED RIVERS	
Ammonoosuc River	Lamprey River
Ashuelot River	Lower Merrimack River
Cochecho River	Pemigewasset River
Cold River	Piscataquog River
Connecticut River	Saco River
Contoocook- North Branch Rivers	Souhegan River
Exeter River	Swift River
Isinglass River	Upper Merrimack River

1.3 Duties of the Local River Advisory Committee

RSA 483:8a defines four major duties of a Local River Advisory Committee (LRAC). These are as follows:

- To advise the Commissioner, the state advisory committee, and the municipalities through which the river flows on matters pertaining to the management of the river. Municipal officials, agencies and boards are responsible to inform the advisory committee of regulating action considered in managing the river corridor.
- To comment on any federal, state or local government project that would alter the resource values and characteristics for which the river was designated.
- To develop and assist in the adoption of a local river corridor management plan under RSA 483:10, Rivers Corridor Management Plans. In the absence of the local planning board, the local governing body may adopt these plans in accordance with RSA: 675:6, method of adoption, in relation to the adopted Master Plan.
- To report annually to the state advisory committee and Commissioner on the status of compliance with federal, state, and local regulations, ordinances and plans relevant to the designated river corridor.

It is important to note that under recent changes to RSA 482-A:3 effective July 1, 2010, Excavating and Dredging Permit, all local river advisory committees are required to receive a copy of wetland permit applications submitted to the municipal clerk that are located within a designated river corridor under RSA 483:4. River corridor means the river and land area located within a distance of 1,320 feet or ¼ quarter mile of the normal high water mark or the landward extent of the FEMA 100-yr floodplain. Copies of Alteration of Terrain, Shoreland and Wetland Permit applications are currently forwarded to LRACs at this time.

1.4 Content of the Plan

RSA 483:6 identifies various qualities that can be considered in the designation of a river for protection under the Rivers Management and Protection Act. The PRLAC focused on eight of these qualities in the creation of this Plan, including:

Water Quality, Instream Flow Streambank Stabilization, Shoreland Protection, Recreation Opportunities, Natural Resources, Scenic Resources and Cultural Resources
--

For each of these attributes, background information is presented, goals discussed, and a table is provided to summarize key actions and implementation methods required to achieve the stated goals.

The Plan also contains various maps that pertain to the subject matter, several appendices providing reference material pertaining to fish, mammals, birds, amphibians and reptiles, and plants of the Piscataquog River Watershed, a matrix of federal state and local regulations pertaining to the river, and a bibliography of community, state and federal reports and references.

It should be noted that much of the information contained in the “background” section of each river attribute, has been taken from the nomination papers originally prepared by the PLC. This non-profit conservation organization was founded in 1970. Its main goal is to protect and preserve the river and its natural habitats. The PLC nominated the Piscataquog River in 1993 and actively pursued its adoption into the New Hampshire Rivers Management Protection Program.

1.5 Basis for Nomination of the Piscataquog River

The Piscataquog River consists of three branches: South, Middle and North, all of which were accepted into the New Hampshire Rivers Management and Protection Program in July 1993. Despite its proximity to Manchester, the largest city in New Hampshire, the Piscataquog River is predominantly a quiet stream. Its total length is approximately 70 miles, the North Branch consists of 29.3 miles, the Middle Branch 10.6 miles, the South Branch 20.5 miles and the Main Stem 11.9 miles. Over ninety percent is free-flowing, a claim few rivers in New England can make. A relatively large watershed, comprised of over a hundred thousand acres, much of the land along the river is protected and open to the public, providing for multi-recreational and educational use as well as affording excellent water quality. For a display of the Piscataquog watershed and its larger sub-watersheds refer to Map 1.

For nearly 30 years, the Piscataquog Land Conservancy, the Society for the Protection of New Hampshire Forests, the New England Forestry Foundation, the Audubon Society of New Hampshire, riverfront towns, state agencies and dozens of private landowners and river stewards have worked to protect the watershed of the Piscataquog River. As a result, over twenty-five thousand acres of land along the river are protected that make up twenty percent of the watershed these include private holdings and publicly owned lands. Large tracts of protected land are carefully managed for both timber production and protection of natural habitat.

The Piscataquog watershed is rich in geologic formations, especially glacial deposits. Most notable is an esker train along the South Branch which runs four miles along the river marking the remnants of a stream which once coursed its way through glacial ice. Other significant formations include glacial kettles, a gorge on the Lyndeborough/New Boston town line, and “the plains,” a glacial deposit of sand and gravel which may have been the site of New Boston’s first settlement. An ever-running natural spring southeast of the Lyndeborough/New Boston town line is yet another geologic highlight of the area.

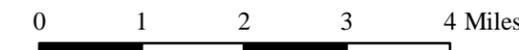
PISCATAQUOG RIVER MANAGEMENT PLAN

WATERSHED MAP

-  Watershed Boundary
-  Lakes
-  Streams
-  Town Boundaries
- HUC 12 Watersheds**
-  Everett Lake
-  Lower Piscataquog River
-  Middle Branch Piscataquog River
-  Rand Brook-South Branch
-  South Branch Piscataquog River
-  Upper Piscataquog River
-  Weare Reservoir

Note:
The Piscataquog River Watershed encompasses 220 square miles in 14 communities.

The Piscataquog River Corridor lies within 7 communities and includes the River and lands 1/4 mile on each side of the River, measured from the high water mark.

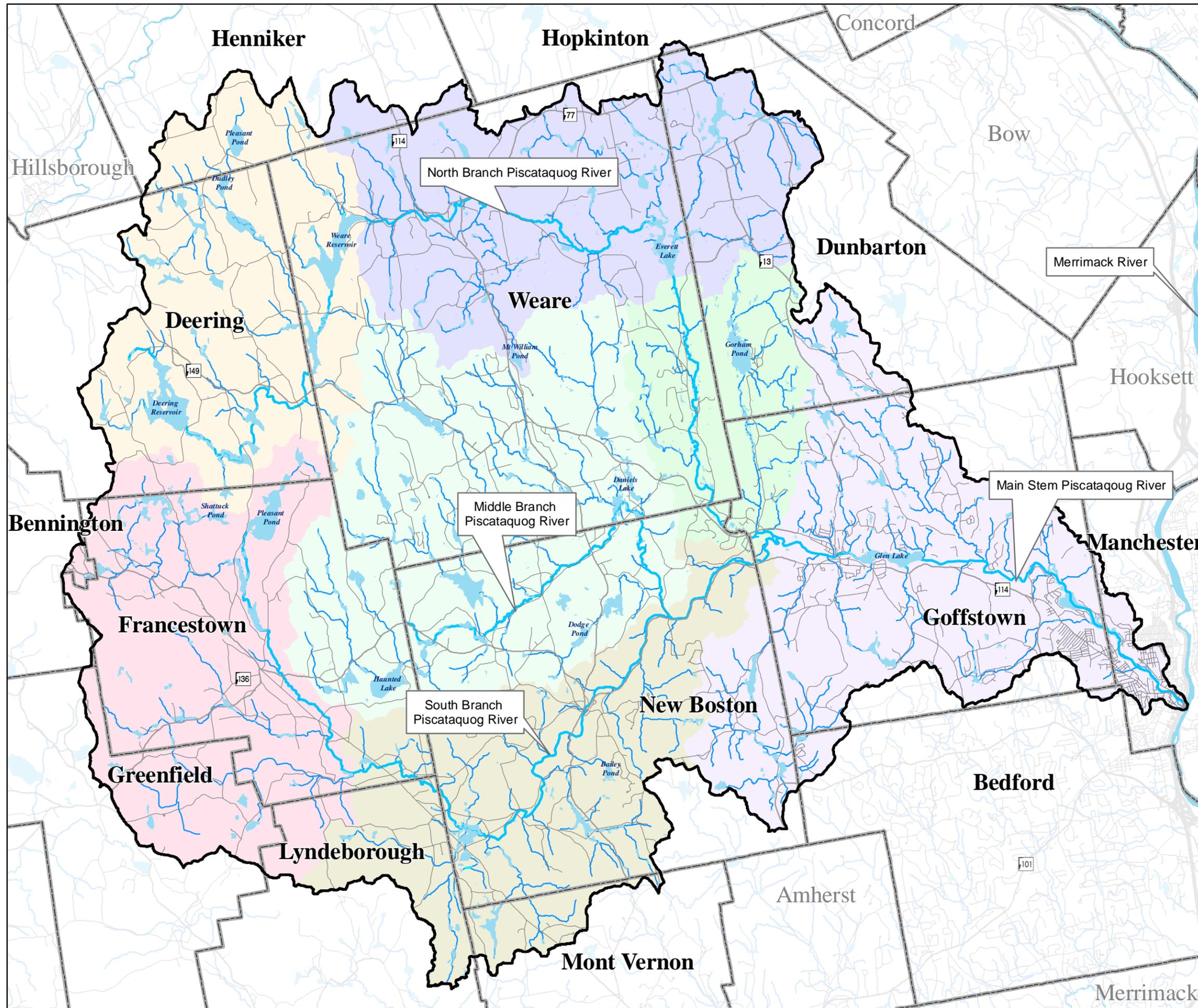
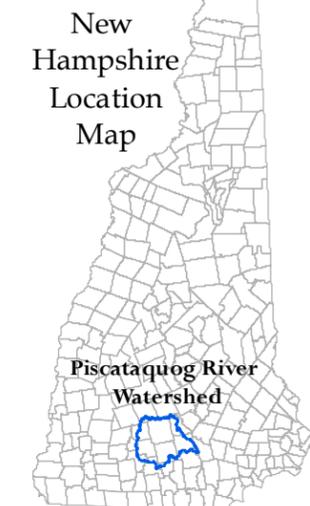


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NH Department of Transportation
NH Department of Environmental Services

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1.6 Piscataquog River Description Covered by Plan

The portions of the Piscataquog River designated for protection under the Rivers Management and Protection Act are:

North Branch

- As a **NATURAL RIVER** from the outlet of Deering Lake Dam in Deering, 6.25 miles to the Abijah Bridge in Weare.
- As a **RURAL RIVER** from the outlet of Lake Horace Dam in Weare, 8 miles to the Everett Dam flowage in Weare. Additionally, from the outlet of the Everett Dam in Weare, 8 miles to the river's convergence point with the South Branch.

Middle Branch

- As a **NATURAL RIVER** from the natural outlet of Haunted Lake in Francestown to the inlet of the upper cranberry bog at the New Boston town line, approximately 11.5 miles to its mouth in New Boston.

South Branch

- As a **NATURAL RIVER** from the outlet of Pleasant Pond in Francestown, 11.5 miles to New Hampshire Route 13 in New Boston.
- As a **RURAL RIVER** from New Hampshire Route 13 in New Boston, 7 miles to the confluence with the North Branch.
- As a **RURAL-COMMUNITY RIVER** from the confluence with the North Branch, 1.7 miles to New Hampshire Route 114 in Goffstown.
- As a **COMMUNITY RIVER** from New Hampshire Route 114 in Goffstown, one mile to Gregg Dam in Goffstown.
- As a **RURAL-COMMUNITY RIVER** from Gregg Dam in Goffstown, 6.9 miles to the river's mouth at Bass Island in Manchester.

The specific criteria for river classification (i.e.; **natural, rural, rural-community, community or rural-community**) are provided in RSA 483:7-a. and are summarized below and in the following Table 1.

Natural Rivers: Free flowing rivers or segments characterized by the high quality of natural and scenic resources; shoreline primarily in natural vegetation; development limited to forest management and scattered housing; five mile minimum length; existing water quality shall not be lower than Class B (suitable for swimming and fishing - suitable for drinking with treatment).

Rural Rivers: Rivers or segments adjacent to lands partially or predominantly used for agriculture, forest management, dispersed or clustered residential development; some instream structures may exist resulting in minor modifications; three mile minimum length; existing water quality shall be at least Class B or have the potential for restoration to Class B.

Rural-Community Rivers: Rivers or segments which flow through developed or populated areas that possess existing/potential community resources values defined in plans or land use controls; have mixed land use reflecting some combination of open space, agriculture, residential, commercial and industrial land uses; are readily accessible by road or railroad; may include impoundments or diversions; three mile minimum length; existing water quality shall be Class B or have the potential for restoration to Class B.

Community Rivers: Rivers or segments which flow through developed or populated areas that possess existing/potential community resources values defined in plans or land use controls; mixed land use reflecting some combination of open space, agriculture, residential, commercial and industrial land uses; are readily accessible by road or railroad; may include impoundments or diversions or potential sites for new impoundments or diversions for hydropower, flood control or water supply purposes; may include urban centers of municipalities; one mile minimum length; existing water quality shall be Class B or have the potential for restoration to Class B.

The location of the above river classifications within the Piscataquog Watershed are shown on the following Map 2.

1.7 Piscataquog River Base Line Data

The PLC along with NH DES continues to monitor the Piscataquog River working with volunteers from schools and various organizations. This data provides valuable information regarding the environmental quality of the river and watershed.

While the importance of this data is recognized, it is also understood to be constantly changing. Therefore, it is recommended that individuals access the Surface Water Quality Assessment Program at the NH DES Watershed Management Bureau at the following web-site for up to date information: <http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>.

In addition, it is important that the public and municipalities understand that this river management plan is only an advisory guide and that it provides a reference and base line for future work, goals development, and implementation.



Table 1- River Classification & Regulations

Table 1- River Classification & Regulations				
	River Classification			
Protection Standards	<u>Natural</u>	<u>Rural</u>	<u>Rural-Community</u>	<u>Community</u>
<u>Dams and Encroachments</u>				
Construction of New Dams	No	No	No	Yes
Reconstruction of Failed or Breached Dams	No	Yes (Only within 6 years of failure in same location & same level of impoundment)	Yes (Only within 6 years of failure in same location & same level of impoundment)	Yes (Anytime only if consistent with management and protection of river designation)
Channel Alterations	No (Except for public safety projects and the NH DES Commissioner may approve temporary alternations for repairs to grandfathered infrastructure, roads, or riprap or permanent alterations that restore channel's geomorphic characteristics to natural conditions)	No (Except for public safety projects and approved maintenance of a project, including public water supply intake, and NH DES shall encourage use of native vegetation to stabilize banks, and public safety projects)	No (Except for public safety projects and approved maintenance of project, including public water supply intake, and NH DES shall encourage use of native vegetation to stabilize banks)	No (Except for public safety projects and approved maintenance of project, including public water supply intake, and NH DES shall encourage use of native vegetation to stabilize banks)
<u>Water Quality/ Water Quantity</u>				
Water Quality	Maintained or restored to Class A or maintained at Class B	Maintained or restored to at least Class B	Maintained or restored to at least Class B	Maintained or restored to at least Class B

Table 1- River Classification & Regulations				
Protection Standards	<u>Natural</u>	<u>Rural</u>	<u>Rural-Community</u>	<u>Community</u>
Interbasin Transfer	No	No	No	No
Protected Instream Flow	Yes	Yes	Yes	Yes
<u>Waste Disposal</u>				
Any New Solid Waste Storage or Treatment Facility	Not (within 250 ft or less of normal high water mark – outside setback must have natural screen)	Not (within 250 ft or less of normal high water mark - outside setback must have natural screen)	Not (within 250 ft or less of normal high water mark – outside setback must with natural screen)	Not (within 250 ft or less of normal high water mark – outside setback must have natural screen)
New or Expansion of Existing Landfills	Not (Within river corridor or < 100 ft from 500-yr. floodplain, whichever is greater - outside setback must have natural screen)	Not (Within river corridor or < 100 ft from 500-yr. floodplain, whichever is greater - outside setback must have natural screen)	Not (Within river corridor or < 100 ft from 500-yr. floodplain, whichever is greater - outside setback must have natural screen)	Not (within 500yr Floodplain or < 100 ft from 500-yr. floodplain, whichever is greater - outside setback must have natural screen)
New Hazardous Waste Facilities	Not (Within designated river corridor)	No Standard	No Standard	No Standard
Resource Recovery Operation at Existing Landfill	No Standard	Yes	Yes	Yes

Protection Standards	<u>Natural</u>	<u>Rural</u>	<u>Rural-Community</u>	<u>Community</u>
<u>Fertilizers/Land Application</u>				
Manure, Lime, and Wood Ash	No Standard*	Yes When used for agricultural purposes	Yes When used for agricultural purposes	Yes When used for agricultural purposes
Sludge and Septage	No Standard	Not Within 250 ft or less of normal high water mark – outside setback must be immediately applied to soil	Not Within 250 ft or less of normal high water mark – outside setback must be immediately applied to soil	Not Within 250 ft or less of normal high water mark – outside setback must be immediately applied to soil
<u>Recreation Use</u>				
Motorized Watercraft	No	Yes ("6 mph" speed only within 150 ft. of shoreline)	Yes ("6 mph" speed only within 150 ft. of shoreline)	Yes ("6 mph" speed only within 150 ft. of shoreline)

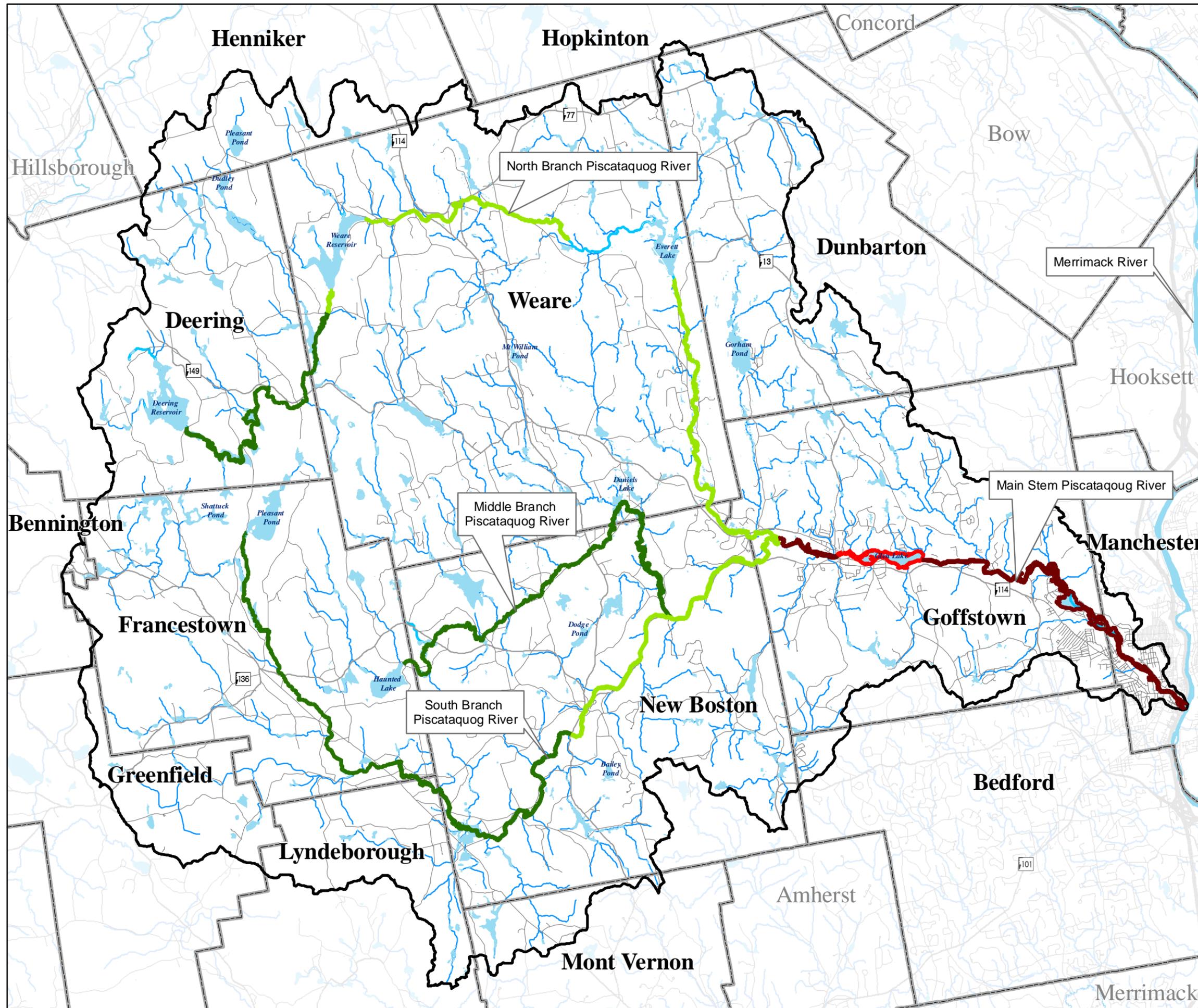
***NOTE:**

Effective April 1, 2008 under the NH DES Comprehensive Shoreland Protection Program no fertilizer, except limestone is permitted within the 50 foot wide Waterfront Buffer and all pesticide and herbicide applications must be by a licensed applicator only.

Low phosphorus and slow release nitrogen fertilizer, however, may be used beyond the 25 foot wide Buffer.

PISCATAQUOG RIVER MANAGEMENT PLAN

RIVER CLASSIFICATIONS MAP



- Watershed Boundary
- Lakes
- Streams
- Town Boundaries
- River Classifications**
- Community
- Natural
- Rural
- Rural-Community

Note:
The Piscataquog River Watershed encompasses 220 square miles in 14 communities.
The Piscataquog River Corridor lies within 7 communities and includes the River and lands 1/4 mile on each side of the River, measured from the high water mark.

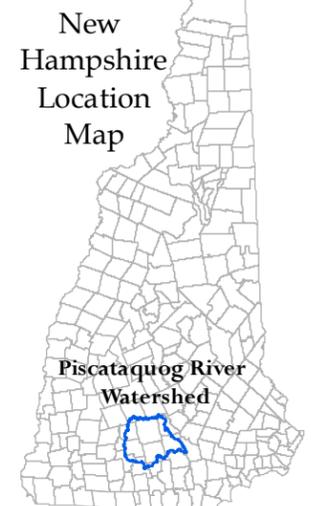
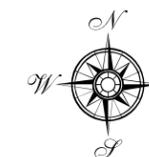


Data Sources:
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2. WATER QUALITY

2.1 Goals

- To identify and minimize present pollution problems and restore water quality.
- To prevent future degradation of water quality from both point source and non-point source pollution.

2.2 Key Actions to Achieve these Goals

TABLE 2: WATER QUALITY	
Key Action	Implementation
Establish additional water quality monitoring stations to supplement those already being monitored by the PLC and DES for the purpose of bracketing potential sources of water pollution, increasing the baseline of data, and providing additional educational opportunities.	Local area schools such as St. Anselm, UNH-Manchester, and others to undertake additional monitoring in coordination with the PLC. PRLAC to work with PLC, DES, and Volunteer River Assessment Program (VRAP) to coordinate and assist existing volunteer monitoring programs.
Encourage communities to continue to follow the New Hampshire Office of Emergency Management Guidelines for hazardous response and work with the surrounding communities on a regional plan to minimize the impact of any spills that could impact the Piscataquog River	Local fire departments along the river corridor to continue coordination and training in dealing with hazardous waste spills that may enter the Piscataquog River. Local fire departments continue to identify opportunities to improve hazardous waste incident response to protect the river.
Encourage communities containing portions of the Piscataquog River not covered by the Comprehensive Shoreland Protection Act (CSPA), to consider adopting Local Shoreland protection ordinances. These regulations should be equal to or more stringent than the State standards and be based on the State model ordinance.	PRLAC members to contact conservation commissions, planning boards, town officials and local environmental organizations to make them aware of the benefits of the ordinance. PRLAC to set up presentations on the CSPA and model ordinances by NH DES and Office of State Planning (OEP). In addition communities should consider other opportunities in water quality protection through the efforts of riparian buffers and/or a wetland setback zoning protection ordinance.

TABLE 2: WATER QUALITY	
Key Action	Implementation
Encourage communities and the Southern New Hampshire Planning Commission to take steps in creating a stormwater management plan for the river and its watersheds, documenting and mitigating the amount of impervious surfaces and non-point source pollution sites <i>to</i> improve water quality, aquatic habitat, and threats to infrastructure.	Coordination between each community, the PLC, PRLAC, and through the expertise UNH Stormwater Center and NH DES can help to formulate a strategy that is appropriate for the community and its goals.
Eliminate Combined Sewer Overflow (CSO) on the Piscataquog River in the urbanized areas.	Manchester Environmental Protection Division (EPD) to continue work towards separation of storm water and sewer. EPA and NH DES to provide assistance and support with this Key Action. Communities to identify ways of treating stormwater runoff.
Reduce or eliminate impact from leach fields, non-point source pollution and land application of sludge and septage.	PRLAC and conservation commissions to educate town officials and property owners regarding the effects of non-point source pollution. Local health officials to continue enforcing septic system rules. Local road agents and highway officials to pursue alternatives for deicing of roadways in the vicinity of the river.
Increase public awareness through education and training regarding the benefits of high water quality.	PRLAC and PLC to encourage area schools and colleges to incorporate the study of water quality in their biology curricula. PRLAC and PLC to host forums and speakers to increase awareness of the importance of water quality.

2.3 Background

The waters of the Piscataquog River are of high quality. Maintenance of this quality is fundamental to the value of the river and should be a high priority of the communities along the 65 miles of the river corridor.

The headwaters of each of the three branches of the river is a lake: Deering Reservoir (North Branch), Pleasant Pond (South Branch), Haunted Lake (Middle Branch). These lakes and the entire length of the river are fed by numerous streams. (See Map 1)

The Piscataquog River's water quality is directly affected by the quality of each of these sources. Continuing monitoring of water quality, strict control of point and non-point pollution sources and adequate planning for dealing with hazardous waste spills that can reach the Piscataquog River, are key objectives to insuring preservation of water quality.

The main governing regulations on water quality is the Federal Water Pollution Control or Clean Water Act (33 U.S.C.§ 1251 et. seq.) and its amendments. This Act established in 1972 facilitates rule legislation on an assortment of issues pertaining to water quality. The Clean Water Act over the years has gained more authority and enforcement ability through the persistence of the Army Corps of Engineers by the additions of amendments and court decisions defining their jurisdiction. In the past decade, the jurisdiction of the Clean Water Act has been challenged with several important decisions that restrict the Act's ability to protect some waters in the US, such as isolated wetlands. One of the most important cases was a split decision in *Rapanos v. United States* 547 U.S. 715 (2006) that questioned the Army Corps of Engineers' use of the term "waters of the United States" to include isolated wetlands that weren't physically "navigable waters". This decision has made the Clean Water Act unclear in many cases.

In recent decisions, it has been the courts task to decide whether or not there is a "significant nexus" or important hydrologic connection between non-navigable headwaters, such as first order streams and wetlands, to that of downstream navigable waters. Ongoing research suggests headwaters play a major role in influencing the quality of downstream river segments and will lead to their degradation if regulations aren't applicable. In the attempt to restore what many feel as the true intentions of the Clean Water Act when it was written, the Clean Water Restoration Act has been proposed by U.S. Senator Russell Feingold. This pending piece of legislation put forth in 2009 will effectively define "waters of the United States" to include all waters and remove the term "navigable waters" from the Act.

The Piscataquog River is considered a Class B River, meeting drinking water standards that can be remedied with treatment and the recreational purposes of the river. Many of the waters contained within the Piscataquog River are of high quality. Maintenance of this quality is fundamental to the value of the river and should be a high priority of the communities along the river corridor. Under rule Env-Ws 1702.24 "High Quality Surface Waters" are defined as follows:

“all surface waters whose water quality is better than required by any aquatic life and/or human health water quality criteria contained in these rules or other criteria assigned to the surface water, or whose qualities and characteristics make them critical to the propagation or survival of important living natural resources.”

Numerous headwaters of the river meet this definition, but to date the NH DES does not have an official listing of "High Quality Waters" found in the state. NH DES plans to include such a listing in their future 305b monitoring report (2010) to EPA and they are currently receiving feedback on how this listing should be structured on the DES website (<http://des.nh.gov>).

Recognizing the importance of high quality waters in New Hampshire, the state has enacted rule Env-Ws 1702.36 which defines "Outstanding Resource Water" (ORW) as "surface waters of exceptional recreational or ecological significance." This additional definition helps distinguish waters that are designated as "natural" waters and their upstream portions and also includes waters within national forest lands. The Piscataquog River, containing the "natural" designation for all three upstream portions of its branches, has a very large area delineated by NH DES as ORWs that is depicted in Map 3.

Under RSA 485-A:12 of the Federal Water Pollution Control Act, the NH DES maintains a list of impaired waters that are produced under the 305b monitoring report that is published every two years. This report includes a number of assessments for the entire state of New Hampshire. The impaired waters list, section 303d, lists waters that do not meet water quality standards, are in need of clean-up, and require that no further violations that would further degrade water quality occur.

A particular water assessment includes tests on various attributes that affect the abilities of the water to support a healthy environment for aquatic life and human uses. To aid in the number of assessments required by the 305b report produced by NH DES, the New Hampshire River Assessment Program (VRAP) is a voluntary group that tests and monitors the water quality of rivers throughout the state. Through this volunteer effort many samples are added to the 305b, providing valuable water quality data. For the most up to date 305b report, see NH DES's Surface Water Quality Assessment Program.¹

To assist in identifying the existing impaired waters in the Piscataquog Watershed (see Map 3), a list of impaired waters within the watershed is provided in Appendix 9.2.2 and an additional data supplement is provided in Appendix 9.2.3, referencing information found on Map 3. This information is important in developing strategies on how to mitigate impacts to waters where water quality is compromised. It is also helpful in applying for future funding opportunities through the NH DES Watershed Restoration Grant that specifically addresses Impaired Waters clean-up.

One of the largest threats to water quality within the state is unidentifiable sources of pollution termed non-point source pollution. Non-point source pollution is caused by rainfall or snowmelt and carries natural and unnatural contaminants to different components that make up a watershed's streams, rivers, lakes etc.

To address this problem, NH DES has targeted different land uses that contribute to this source of pollution. These particular land uses include landfills, septic systems, agriculture, deforestation and impervious surfaces such as parking lots and roads. It is critical that these land uses and impervious surfaces be identified and mapped and that appropriate measures be enacted to minimize non-point source pollution to the river.

¹ See: <http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>.

PISCATAQUOG RIVER MANAGEMENT PLAN

IMPAIRED WATERS

-  Comprehensive Shoreland Protection Act Protected Lakes
-  Comprehensive Shoreland Protection Act Protected Streams
-  Impaired Waters with 1 mile buffer
-  Outstanding Water Resource
-  Watershed Boundary
-  Lakes
-  Streams
-  Town Boundaries

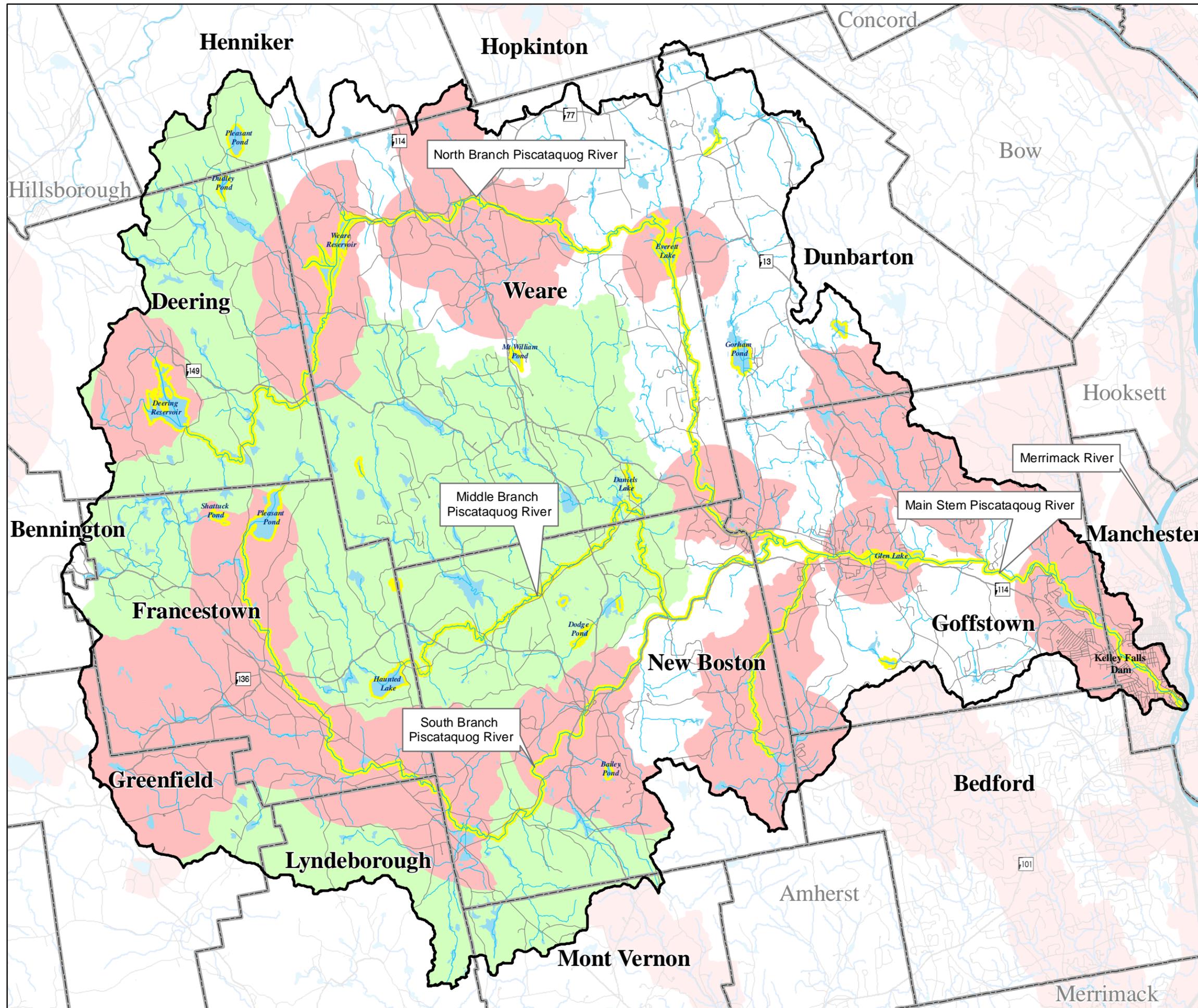
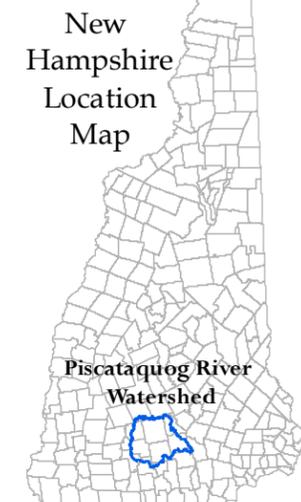


Data Sources:
 NH GRANIT Digital Data (1:24,000)
 NH Department of Transportation
 NH Department of Environmental Services
 Society for the Protection of New Hampshire Forests

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Impervious surfaces with the addition of carrying oils and solvents from use are subjected to salting in the winter further contributing to the possibility of contamination. Several studies indicate that impervious coverage percentages of the watershed ranging from four to twenty percent could pose a threat to stream health and aquatic life. Studies on NH coastal watershed place this range within seven to fourteen percent displaying effects on habitat, water quality, and aquatic life. It is the hope that in the near future more impervious coverage studies will be done within the NH region including the Piscataquog to understand these impacts on the entire watershed.

The NH DES has established the Non-point Source Pollution Program but stresses that all levels of government must work together to limit this problem. One local initiative that seems to be gaining popularity is the consideration of porous pavement installations. With many restrictions already in place for businesses to expand infrastructure, such as retention ponds that require costly upkeep, the installation of porous pavement could look more attractive in the future. This pavement limits the amount of run-off and recent research suggests it requires less salting. It is an important goal of this river management plan that in order to better understand these impacts, studies be undertaken to calculate the amount and potential impact of impervious surfaces within the watershed. This information will allow communities to effectively formulate strategies to address these impacts. Assistance can be obtained from the NH Rivers Council and the UNH Stormwater Center in developing impervious and porous pavement strategies.

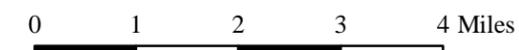
Stratified Drift Aquifers in NH cover approximately fourteen percent of the entire state and are a major source of water for commercial, industrial, domestic and public uses. The central and southern portions of the state contain the largest and highest yield stratified drift aquifers that provide nearly a third of the water supply; surface waters and bedrock aquifers account for the rest. These areas are composed of sand and gravel that were formed during periods of cyclic deposition as the glaciers began to melt and retreat at the end of the last ice age. Aquifers are measured by their material composition and their ability to retain water, this value is called hydraulic conductivity. Scientists use this measure along with the saturated thickness of an aquifer to calculate the overall yield of an aquifer, otherwise known as transmissivity. The USGS standard for a relatively high yield or high quality aquifer is a transmissivity value of 2,000 ft³/day.

Watershed systems like the Piscataquog contain the most continuous sections of high yield stratified drift aquifers adding to the watershed's already high resource value. Added benefits are groundwater discharge and recharge areas which help maintain streamflow volume. Concerns to the quantity of this resource include water withdrawal and increased impervious surfaces slowing recharge rates. Concerns to the quality of this resource include potential contamination from hazardous waste sites, landfills, underground storage tanks and waste water discharge areas. In an effort to control and monitor these uses NH DES has created several programs such as Large Groundwater Withdrawal Permitting and Groundwater Discharge Permitting found under the Groundwater Protection Act. A map displaying the stratified drift aquifer distribution within the Piscataquog can be seen on Map 4. This map also shows areas identified by DES that could be of a potential threat to groundwater resources. A table of these areas can be found on the NH DES website under the OneStop information tool.

PISCATAQUOG RIVER MANAGEMENT PLAN

STRATIFIED DRIFT AQUIFERS

- Site Remediation and Ground Water Hazards
- Stratified Drift Aquifers
- Watershed Boundary
- Lakes
- Streams
- Town Boundaries

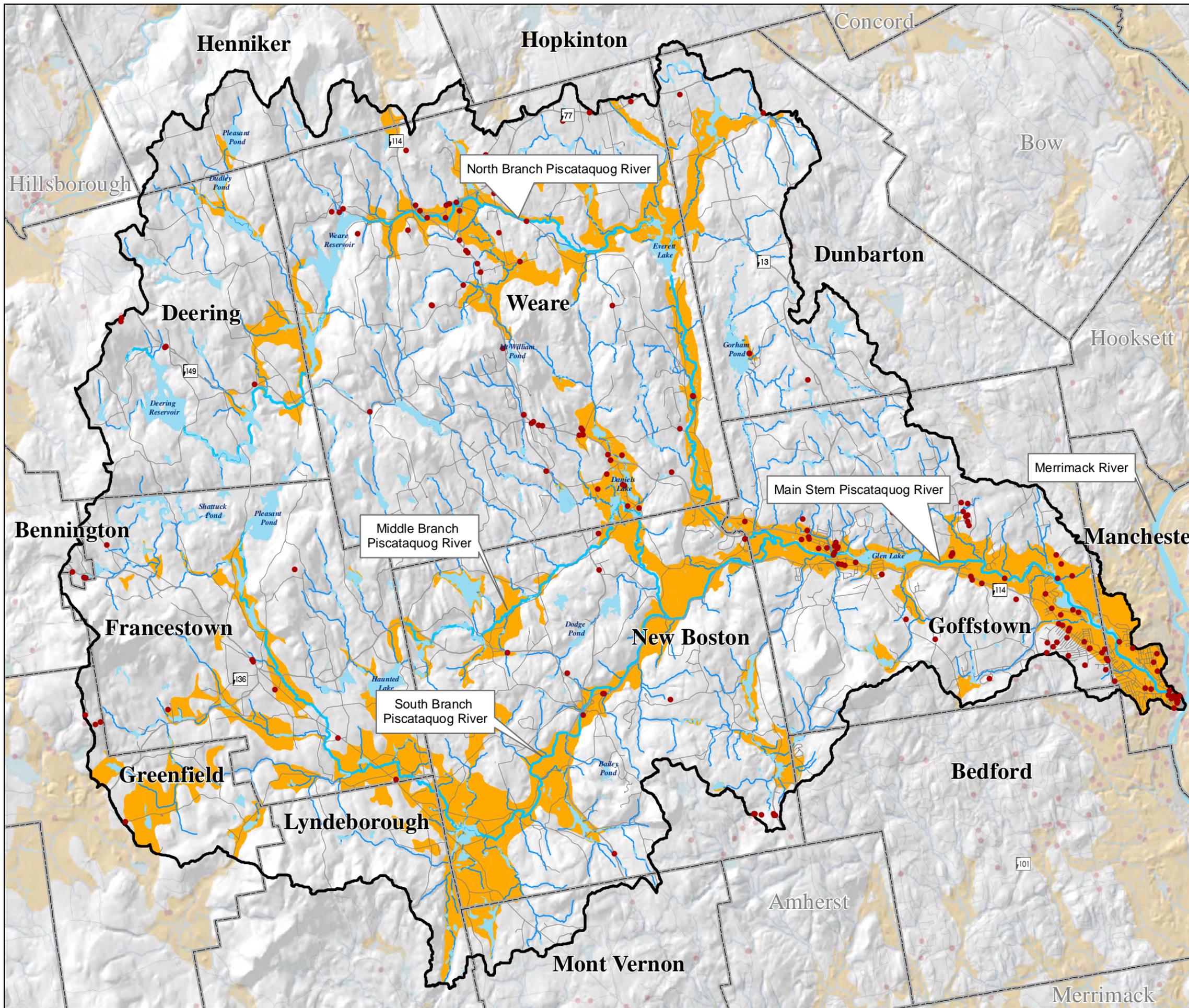
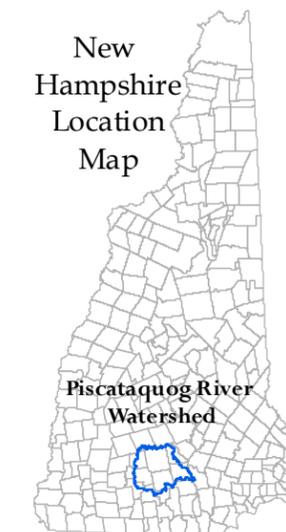


Data Sources:
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 NH Department of Transportation
 NH Department of Environmental Services
 United States Geological Survey, 2000

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PISCATAQUOG RIVER MANAGEMENT PLAN

NATURAL SERVICES NETWORK

-  Natural Services Network
-  Watershed Boundary
-  Lakes
-  Streams
-  Town Boundaries

The Natural Services Network (NSN) identifies lands that provide important ecological services that are difficult and/or expensive to replicate. The four components that make up the NSN data layer are:

- Water Supply Lands
- Productive Soils
- Important Wildlife Habitats
- Flood Storage Lands

The Natural Services Network was created in 2007 as part of the I-93 Community Technical Assistance Program (CTAP) by New Hampshire GRANT. New Hampshire Natural Services Network. Complex Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH.

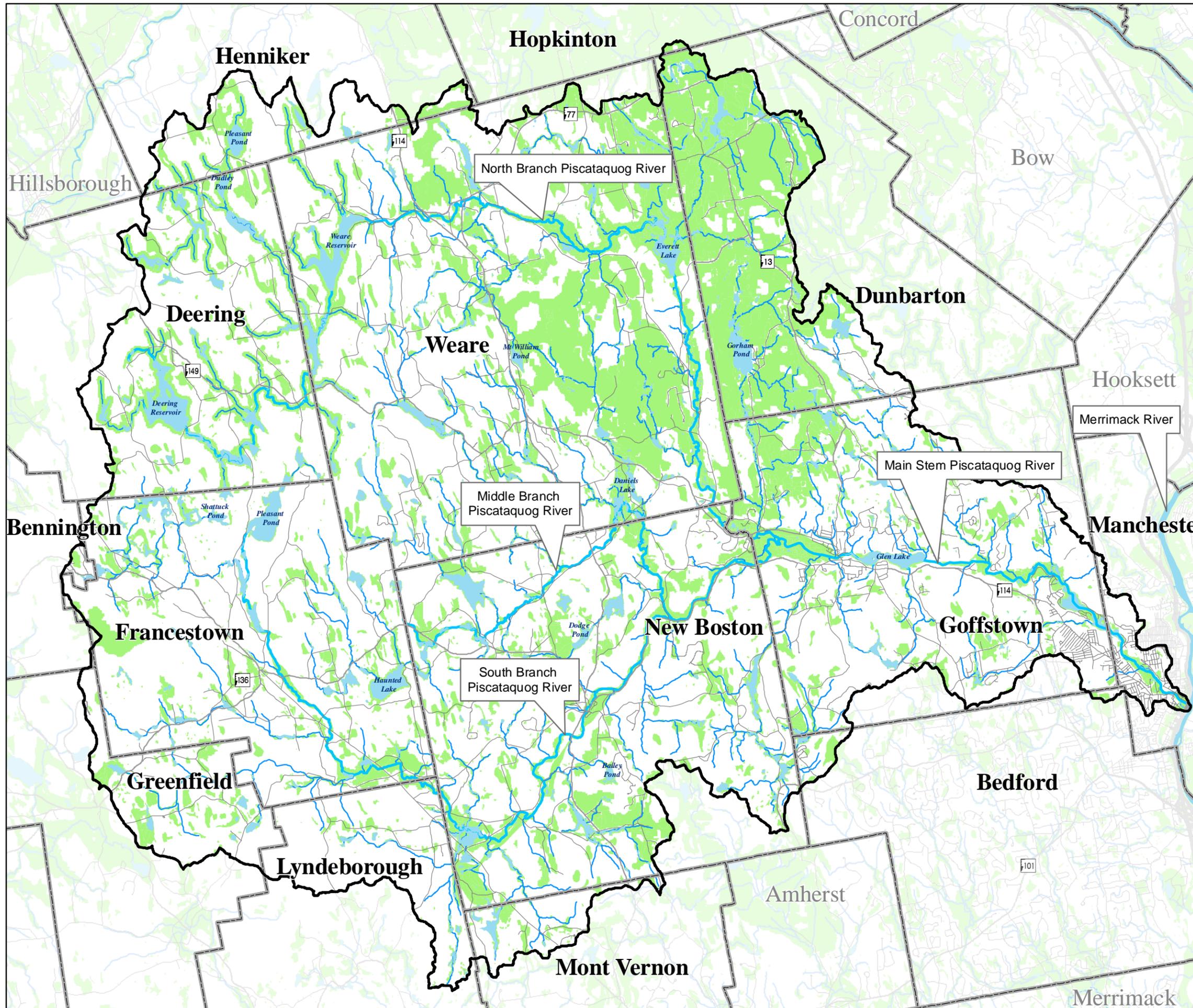


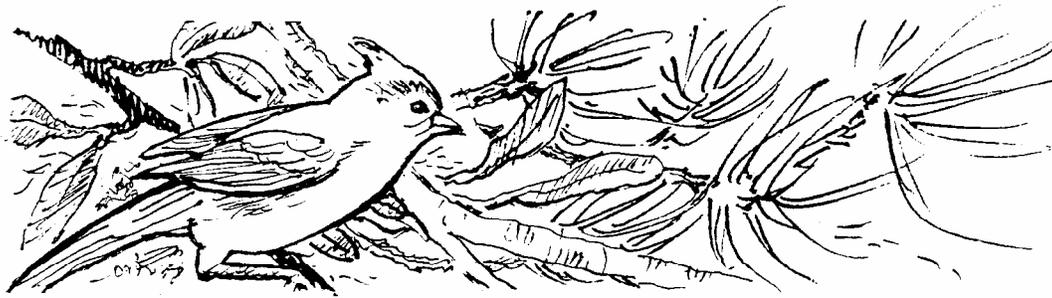
Data Sources:
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The Natural Services Network was created in 2007 under the Community Technical Assistance Program (CTAP), a program designed to assist communities that will be affected by the rebuilding of I-93 in NH. This spatial tool is being implemented by NH communities to identify important natural resources that are vital to human health, the environment, and the economy. This network portrays lands that contain high quality agriculture soils, flood storage lands, water supply lands, and important wildlife habitat. The combination of these resources into this one overlay allows communities to identify their “green infrastructure” or areas of natural importance. Identification of these areas could lead to careful planning, specifically from a watershed perspective, on how to protect these resources and avoid their future degradation. A map of this network can be seen on Map 5.

2.4 Watershed Grants and Protection Programs

To improve the water quality of the identified impaired waters or to ensure further protection of existing pristine high quality waters in the Piscataquog River Watershed, the Department of Environmental Services provides a variety of watershed restoration grants and programs to assist communities in achieving the goal of protecting the health of the Piscataquog River. The following is an updated list of a variety of watershed assistance grants and programs provided by NH DES:

- Impaired Waters - Watershed Restoration Grant
- High Quality Waters - Watershed Assistance Grant
- NH DES Drinking Water Source Protection Program
- Agricultural Nutrient Management Grant Program
- NH DES 604(b) Water Quality Planning Activities in Support of Rivers and Lakes Management and Protection Programs

To find more information or to participate in any of the above NH DES programs visit: http://des.nh.gov/organization/divisions/water/wmb/was/categories/grants.htm#warg_



3. INSTREAM FLOW

3.1 Goals

- To maintain sufficient water quality and quantity for instream public uses including: navigation, recreation, fishing, storage, conservation, maintenance and enhancement of aquatic life, fish and wildlife habitat, wildlife, protection of water quality and public health, pollution abatement, aesthetic beauty, and hydroelectric power production.
- To create an awareness of the NH DES Instream Flow Rules.
- To encourage water conservation.

3.2 Key Actions to Achieve these Goals

TABLE 3: INSTREAM FLOW	
Key Action	Implementation
To seek NH DES and State adoption of instream flows for the Piscataquog River.	PRLAC to work with other LACs' and interested parties to encourage NH DES to study and establish protected instream flows and water management plan under RSA 483 for the Piscataquog River. Upon completion of study and plan, work with NH DES to finalize and submit proposed rules to the Joint Legal Committee on Administrative Rules (JLCAR).
Educate community officials, businesses, and private water users about the need for Instream Flow Rules for the Piscataquog River.	Conservation Commissions to verify that significant users (> 20,000 gal/day) are registered with the State. (See Matrix reference in Appendix 9.3 for the source of these rules.) NH DES, PRLAC, and local conservation commissions to host a forum on the purpose and need for instream flow rules for the river.
Educate public on the finite nature of our water resources.	Include this topic as part of a forum on Instream Flow Rules.
Encourage water conservation.	City and or town officials to encourage water conservation when reviewing development along the river corridor. Towns to develop and regularly update their local water resource plans.

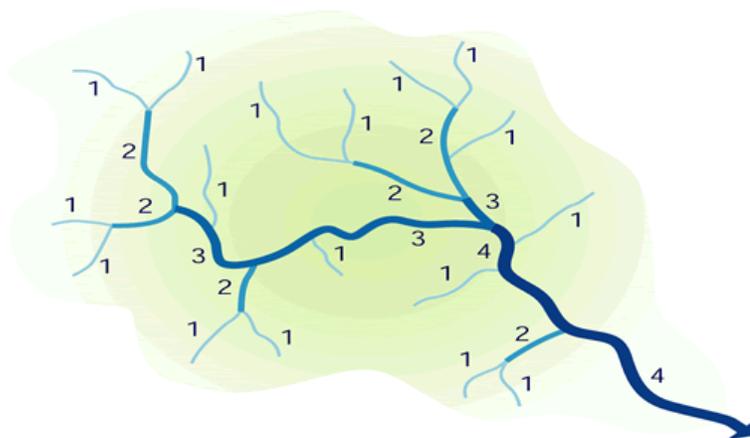
3.3 Background

The Rivers Management and Protection Act RSA 483 provides authority to establish protected instream flow rules for each designated river in New Hampshire. RSA 483:9-c gives the State the authority and responsibility to maintain a certain quality and quantity of water in the designated rivers for the support of instream public uses. The Act provides for the State's interest in surface waters; identifies the permitted instream public uses; and authorizes the NH Department of Environmental Services (NH DES) to adopt rules for their protection. In 2002, NH DES adopted instream flow rules for the Souhegan and Lamprey River under an Instream Flow Pilot Program (see website: <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/index.htm>).

Under RSA 483, instream public uses are defined as including the flow-dependent components of navigation, recreation, fishing, conservation, maintenance and enhancement of aquatic life, fish and wildlife habitat, protection of water quality and public health, pollution abatement, aesthetic beauty, public water supply, and hydropower production. Establishment of river-specific numeric criteria for stream flow protection and development of water management plans to implement these criteria and the above identified public uses are important and necessary elements of river management and protection.

Critical to establishing instream flow protection is the identification of stream order within a river system. Stream Order is a fundamental element of the hydrology of a river system and consists of a hierarchy of streams based on size. A first (1st) order stream is the stream's smallest headwaters. A second (2nd) order stream is formed when two first order streams merge. A third (3rd) order stream is formed when two second order streams merge and so forth.

The Piscataquog River features five different stream order classifications as it continues through the watershed. The largest segment, 5th order, is found along the portion of the river where the three different branches merge before Glen Lake. The diagram below illustrates the stream ordering process. A map of the all the stream orders found within the Piscataquog watershed is provided on Map 6.



Source: www.uwm.edu

Currently, close to six miles of the Piscataquog River is classified as impounded. Hydroelectric dams include the Greggs Falls Hydro Association, Hadley Falls, and Kelly Falls Hydro Company. Other dams along the river account for approximately 1,000 acres of water storage which includes Everett dam, a non-nominated section of the river. A map depicting these sites can be found on Map 7. It should be noted that many of the dams shown on this map are historical references only as many of these dams are destroyed or dilapidated and pose no threat or obstruction to the river. Currently, the only water withdrawal is the Berry Good Farm located in the Town of Goffstown. Berry Good Farm is a commercial blueberry operation that uses the river to supply its irrigation needs. There are currently no NH DES or EPA approved discharges into the Piscataquog River. In accordance with the Federal Power Act, under RSA 483:5 Coordination with Federal Statutes, once a designated river management plan has been developed, it is submitted to the Federal Energy Regulatory Commission (FERC) to be included in the Comprehensive Plans in the FERC's licensing process.

3.4 Instream Flow Protection Pilot Program

Currently no protected instream flow regulations exist for the Piscataquog River, however, a new law enacted in 2002 (HB 1499-A) put into place a pilot program that would protect instream flow on two of New Hampshire's designated rivers. As previously noted, the Lamprey River (Coastal Watershed) and the Souhegan River (Merrimack Watershed) were selected as the first two rivers to be inducted into the Instream Flow Protection Pilot Program.

The instream flow studies for these rivers have now been completed by NH DES and watershed management plans are currently under development. In addition, NH DES recently adopted Instream Flow Rules for the Souhegan River and is in the final stages of doing so for the Lamprey River. The Instream Flow Protection Pilot Program describes the process of conducting the required Instream Flow Study and developing a Watershed Management Plan addressing the implementation of the study results. Based upon the results of these two pilot programs, the rules will then be modified based on the recommendations of the Legislative Instream Flow Committee and applied to the remaining designated rivers across the state, including Piscataquog River.



PISCATAQUOG RIVER MANAGEMENT PLAN

STREAM ORDER

-  Watershed Boundary
-  Lakes/Reservoirs
-  Town Boundaries
- Stream Order**
-  5
-  4
-  3
-  2
-  1



Data Sources:
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