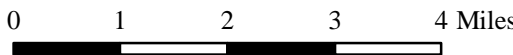


# PISCATAQUOG RIVER MANAGEMENT PLAN

## DAMS AND 100-YEAR FLOODPLAINS

- 100 Year FEMA Floodplain
- Major Dams
- Dams
- Watershed Boundary
- Lakes/Reservoirs
- Town Boundaries
- Streams

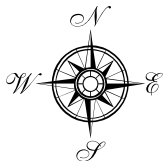


Data Sources:  
NH GRANIT Digital Data (1:24,000)  
NH Department of Transportation  
NH Department of Environmental Services

The individual municipalities represented on this map and the SNHPC make no representations or guarantees to the accuracy of the features and designations of this map.

Map Produced by  
GIS Service SNHPC 2009.  
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Ph: (603) 669-4664

This map is for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.







## 4. STREAMBANK STABILIZATION

### 4.1 Goals

- To recognize that the power of the river flow cannot be reduced with a streambank stabilization project.
- To develop guidelines which consider the effects of each streambank stabilization project.
- To avoid projects which are detrimental to the value of the river, to fish and to wildlife by altering the streambed in a way that destroys habitat.
- To preserve the natural beauty of the river.
- To work with NH DES in implementing a fluvial geomorphological study of the river and its tributaries. This study would aid in identifying fluvial erosion hazards and local mitigation strategies and encourage municipal adoption of fluvial erosion hazard ordinances to prevent human encroachment into these hazard areas.

### 4.2 Key Actions to Achieve these Goals

TABLE 4: STREAMBANK STABILIZATION	
Key Action	Implementation
Establish regulations for streambank stabilization.	NH DES to develop fact sheets and policies for streambank stabilization.  Community planning boards to adopt regulations that consider the effects of development projects within the river corridor.  Community conservation commissions to establish contact with the U.S. Army Corps of Engineers for information resources and assistance.

**TABLE 4: STREAMBANK STABILIZATION**

<b>Key Action</b>	<b>Implementation</b>
Minimize the erosion and degradation of streambanks caused by human activity.	<p>Planning Boards adopt and enforce setback requirements consistent with the Comprehensive Shoreland Protection Act, as amended under RSA 483-B applicable to all designated rivers.</p> <p>Department of Public Works (DPW) and road agents to use best management practices for culvert and road maintenance.</p> <p>Planning Boards and Code Enforcement Officer(s) ensure that appropriate erosion and sediment controls are installed before and maintained during, and after construction.</p>
Support NH DES in conducting a fluvial geomorphologic study of the river and its tributaries.	Planning Boards review and incorporate identified fluvial erosion hazard mitigation strategies into local hazard mitigation plans and consider adopting local fluvial erosion hazard ordinances.
Ensure the proper design and construction of replacement and new stream crossings.	<p>NH DES has adopted rules for the permitting of stream crossings.</p> <p>PRLAC and municipalities actively seek funds and partners for replacement of stream crossings that currently impact the stream and/or aquatic passage.</p>
Limit stabilization projects to places where erosion is caused by human activity or threatens a road or structure.	<p>PRLAC to distribute educational information such as Living with the River, published by the Connecticut River Joint Commission.</p> <p>PRLAC to review permit applications and make appropriate recommendations.</p> <p>DPW, road agents and landowners to encourage the planting of riparian species along the river corridor.</p>

<b>TABLE 4: STREAMBANK STABILIZATION</b>	
<b>Key Action</b>	<b>Implementation</b>
Encourage the use of native vegetation to stabilize streambanks, where possible.	<p>PRLAC to identify sites and owners for demonstration projects.</p> <p>PRLAC and local Conservation Commissions to seek grants to help provide the resources to accomplish this key action (e.g. Natural Resource Conservation Service District or NH DES).</p>
Promote projects that will eliminate non-native invasive species along the river corridor.	<p>Conservation Commissions to pursue grants for funding to assist with the elimination of non-native invasive species.</p> <p>Conservation Commissions to pursue volunteers for work projects to eliminate non-native invasive species.</p>

### 4.3 Background

A river is a dynamic system, constantly though subtly changing its course within its corridor. This cycle of erosion and deposition and gradual movement of the river channel is a natural process and inherent in the dynamics of the Piscataquog River. Throughout history, human communities have built structures along rivers. When the natural dynamics of the river threaten these structures, it is typical for landowners to protect their investment by undertaking construction to attempt to control the river and prevent erosion of stream banks. Often, this simply leads to shunting the erosive force of the river to locations downstream, leading to more streambank erosion. Achieving a logical and well thought out balance between the force of the river and the built environment should be the objective of streambank stabilization efforts.

To further understand the natural dynamics of a river system the science of fluvial geomorphology has been gaining momentum to help communities plan for the future. Over time, a stable river's course changes subtly within its banks and floodplains, and this stability buffers the river from dramatic changes during floods. Scientists assess the river system with regard to outside factors and a river's current erosion or aggregating status. Things that cause instability, and thus changes to a river's course, include nutrient deposition from agricultural activities, removal of shoreland vegetation, and physical manmade constructions like dams and stream crossings (culverts and bridges). A Fluvial Geomorphological study can identify and help to eliminate these potentially dangerous factors from interfering with a river's natural course within its valley. These factors over time have had the effect of disconnecting rivers from many of their important energy dissipating floodplains. This energy is diverted further downstream causing flooding and erosion to areas that are not well equipped for it.

A Fluvial Erosion Hazard Program uses on-site assessment techniques and spatial analysis to create an overlay of the areas susceptible to erosion damages from high flow events and flooding. The identification of these hazard zones can lead to ordinances that protect these areas, potentially saving lives, property, and infrastructure damages that could save property owners and municipalities thousands of dollars. Fluvial hazard areas differ from the National Floodplain Insurance Program flood hazard maps, which identify primarily flood prone areas that are at risk for inundation.

The Exeter River Geomorphic Assessment and Watershed-based Plan was the first New Hampshire study to utilize this science to identify and assess future damages to this watershed. Raymond was the first town in New Hampshire to work on a Fluvial Erosion Hazard Program and developed a local ordinance designed to protect these areas along the Exeter River and Fordway Brook. Unfortunately, the ordinance did not pass in the town, but on a positive note, the NH DES Innovative Land Use Planning Techniques Handbook was updated to include a model fluvial erosion hazard ordinance for the entire state. Recently, the state legislature put into place local enabling legislation, RSA 674:56 II. (a) and (b), which allows municipalities to adopt local fluvial erosion hazard ordinances.

Currently the management of these river/watershed based fluvial assessments is directed by NH DES and the State Geological Survey. Federal and state funding has been provided through the EPA under section 319 of the Clean Water Act, the U.S. Department of Homeland Security through the NH Department of Safety, and NH DES grants.

Working with NH DES and the State Geological Survey, the Southern New Hampshire Planning Commission successfully requested, and the state has agreed, to schedule and conduct a fluvial geomorphological assessment of the Piscataquog River and some of its tributaries within the next several years (possibly as soon as 2012/2013). When completed, this study will provide important information on streambank erosion, channel migration issues as well as the identification and implementation of strategies for local hazard mitigation.

Previous streambank restoration efforts located along the Piscataquog River have mostly included the removal of old dams that could replace natural flow. To learn more about the science behind the applied methods used for naturalized river channel design and bank stabilization projects, NH DES published a document in May 2006 called “White Paper: River Restoration and Fluvial Geomorphology”.

To access this literature, visit the Commissioner Publications section of the NH DES website at: <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/r-wd-06-27.pdf>.

To view a current map of the watershed’s 100-year floodplain provided by the Federal Emergency Management Agency (FEMA), refer to Map 7.

## 4.4 Recent River Restoration/Streambank Stabilization Projects

Recent river restoration projects relating to streambank stabilization efforts within the Piscataquog River Watershed have taken place within the City of Manchester and the Town of New Boston. In 2003, the Piscataquog Land Conservancy completed the Piscataquog River Streambank Restoration Project along the South Branch of the Piscataquog River in New Boston at Gregg Mill Bridge. The goal of this project was to correct water quality and instream biological problems resulting from streambank erosion by achieving the following objectives:

1. Protect and restore streambank and riparian vegetation by using bioengineering techniques.
2. Install a berm along an adjacent highway to redirect the runoff from the road to an area of extensive riparian vegetation.

Additional motivation for this project was focused upon protecting the endangered fresh water brook floater mussels and improving fish habitat. Project details included the installation of two rock vanes and a porous rock weir 250 feet upstream from where Gregg Mill Road crosses the Piscataquog River. Additionally a large rock ice bumper was installed on the bank upstream from the vanes to minimize ice damage. The primary funder and technical onsite assistance provider was NHDES. Other project assistance partners included NH DOT, St. Anselm College, NRCS, Trout Unlimited, NH Fish & Game, Thibeault Sand & Gravel Company, Dunbarton Fire Department, and the Piscataquog Land Conservancy.

Bass Island Park is a 1.2 acre passive recreational park located on the Piscataquog River on the West Side of Manchester. Prior to the 2006 Mother's Day flood and 2008 October floods, site improvements were made to this location to provide a new shoulder vessel boat launch, seating and trailway access along the edge of the river. These improvements, however, were demolished by flood damage.

The City of Manchester is currently in the process of repairing this site; complying with the original plan. In addition to reconstructing the shoulder vessel boat ramp and trailway access, streambank stabilization protection measures are being incorporated into site improvements, including slope stabilization and reinforcing the river bank in an effort to minimize erosion. Additional vegetation and landscaping will also be incorporated into the site. Site improvements are being funded by FEMA.

To find out more information regarding the Bass Island Park project, contact the City of Manchester's Parks and Recreation Department at (603) 624-6565.

To find out more about available funding related to river restoration projects for the Piscataquog River Watershed see the following NHDES link:

<http://des.nh.gov/organization/divisions/water/wmb/was/categories/grants.htm#warg>.

### **Streambank at Bass Island Prior to Stabilization**



(Source: City of Manchester)

### **Streambank at Bass Island After Stabilization**



(Source: Southern New Hampshire Planning Commission)



## 4.5 Establishing Streambank Stabilization Guidelines

Stream crossing structures have been used for decades; however, they have a tendency to alter a stream's natural channel and its process of sediment transport, and species migration due to changes in erosion and depositional patterns. Stream crossing infrastructure can reshape the natural geomorphology of a stream causing streambank and streambed instability.

Undersized crossings produce a higher stream velocity within them and at their outlet, reducing the ability of aquatic organisms to migrate upstream through the crossing. They also often create a scour pool immediately downstream leading to a phenomenon called perching, in which the streambed is gradually eroded to a lower elevation.

Stream crossings additionally can restrict the natural flow of sediment, organic material and ice, leading to changes in the stream's morphology downstream. In an effort to address these problems related to stream crossing infrastructure, NH DES convened a stakeholder group comprised of representatives from non-governmental organizations, towns, state and federal government agencies. Two years of stakeholder workgroup meetings culminated with the University of New Hampshire publishing the New Hampshire Stream Crossing Guidelines in May 2009 (visit the following website at: [http://www.unh.edu/erg/stream\\_restoration/nh\\_stream\\_crossing\\_guidelines\\_unh\\_web\\_rev\\_2.pdf](http://www.unh.edu/erg/stream_restoration/nh_stream_crossing_guidelines_unh_web_rev_2.pdf)).

It is the intent of this management plan to minimize the impact of stream crossings on aquatic ecosystems, road infrastructure and private landowners. To guide in this effort, the Department of Environmental Services has adopted Stream Crossing Rules which can be found at: <http://des.nh.gov/organization/commissioner/legal/rulemaking/index.htm>.

The practice of naturalized river channel design and bank stabilization has expanded over the past several decades. In February 2007, NH DES published "Guidelines for Naturalized River Channel Design and Bank Stabilization", which can be found at: <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/r-wd-06-37.pdf>.

With these guidelines in place, users participating in the planning, design, review, or construction of river management activities can now draw from an expanded toolbox containing a broad range of well established empirical, analog, and analytical channel and bank stabilization design methods. These guidelines have created the primary focus of river management in the State of New Hampshire; however, applicability will extend beyond state limits and beyond the region, given the widespread use of the topics addressed.





## 5. SHORELAND PROTECTION

### 5.1 Goals

- To assist and encourage municipalities to adopt land use and environmental ordinances designed to protect the shorelands of water bodies and water courses of the Piscataquog River system not subject to protection under the CSPA. These water bodies and water courses should include first and second order (headwater streams and tributaries), third order streams and rivers, lakes and ponds, and other impoundments.
- To encourage municipalities to work with the State Shoreland Protection Program to enforce the provisions of the CSPA within their communities.
- To assist those municipalities which have urbanized shorelands, such as within the City of Manchester and the Town of Goffstown which are eligible for exclusion from the requirements of the CSPA.
- To encourage communities and the public to attend NH DES outreach and educational workshops and training on the CSPA.
- To assist and encourage communities to adopt riparian buffer ordinances and regulations which would help to protect and restore these critically important shorelands.

### 5.2 Key Actions to Achieve these Goals

TABLE 5: SHORELAND PROTECTION	
Key Action	Implementation
Assist and encourage adoption of local shoreland and riparian buffer ordinances.	<p>SNHPC to provide information and educational materials, model ordinances and other shoreland protection guidelines to municipal planning boards and conservation commissions.</p> <p>SNHPC to assist planning boards and conservation commissions in developing these regulations.</p> <p>SNHPC to assist the NH DES and municipalities in understanding and enforcing the provisions of the CSPA as applicable.</p>

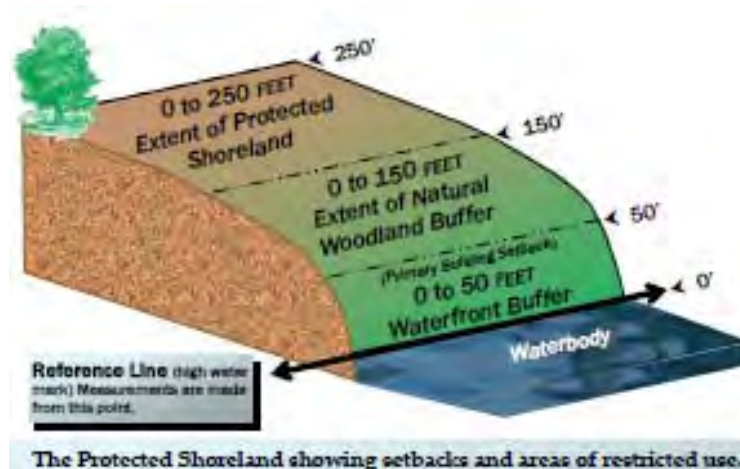
## 5.3 Background

There is nothing more important in maintaining the environmental health and quality of the Piscataquog River and its tributaries than protecting the shoreland and the riparian vegetation which lies adjacent to these waters. Perhaps one of the most important pieces of environmental legislation enacted by the State of New Hampshire is the Comprehensive Shoreland Protection Act (RSA 483-B), which is administered by the NH DES Shoreland Program.

The CSPA establishes minimum standards for activities within the Protected Shoreland that are designed to protect the water quality of the state's larger water bodies and to fulfill the state's role as trustee of those waters. Currently, the Protected Shoreland extends 250 feet landward from the reference line of public waters and fourth order and higher streams (see diagram below). To implement the CSPA, Shoreland Program staff provide permitting, compliance, outreach, and educational services related to activities within the Protected Shoreland.

The CSPA was originally enacted into law in the 1991 session of the Legislature. The Act establishes minimum standards for the subdivision, use, and development of the shorelands of the state's larger water bodies which includes: all lakes, ponds and impoundments greater than 10 acres, all 4th order and greater streams and rivers, all designated river segments under RSA 483 (The Rivers Management & Protection Act), and all waters subject to the ebb and flow of the tide (including tidal marshes, rivers and estuaries). These water bodies and water courses within the Piscataquog River watershed are shown in yellow on Map 3.

In April and July of 2008, the act was amended and several changes took effect, including limitations on impervious surfaces, new vegetation maintenance requirements and the establishment of a permit requirement for many, but not all, activities relating to construction, excavation and filling within the Protected Shoreland. Included in the Protected Shoreland, there are setbacks and restricted use areas.



Source: NH DES Shoreland Program Brochure

Two of the most important setbacks and restricted use areas within the Protected Shoreland include: the **Waterfront Buffer** which extends 0-50 feet from the Reference Line; and the **Natural Woodland Buffer** (NWB) which extends 0-150 feet from the Reference Line.

Within the Waterfront Buffer, all new primary structures must be set back 50 feet from the reference line. Municipalities may have a greater setback, but not a lesser one. A 50-foot waterfront buffer must be maintained and tree coverage within this buffer is managed with a 50' x 50' grid and point system. Cutting trees and saplings is allowed as long as the sum of points for remaining trees and saplings equals 50 points or more per each 50'x 50' grid. To assist property owners and municipalities in enforcing this provision, the NH DES Shoreland Program has prepared a measuring template or ruler to determine tree size.

Natural ground cover (lawns excluded), including leaf litter, shall not be removed within the Waterfront Buffer. No cutting or removal of vegetation below 3 feet in height (excluding lawns) is allowed, except for an allowable footpath to the water (up to 6 feet wide) that does not concentrate stormwater or cause erosion. Stumps, roots and rocks must remain intact in and on the ground, and pesticide use is allowed only by a licensed applicator. In addition to these requirements only slow release nitrogen and low phosphorus fertilizer may be used beyond 25 feet from the reference line.

Within the Woodland Buffer, for lots over half an acre, fifty percent (50%) of the area of the lot within the buffer can not be covered by impervious surfaces and must remain in an unaltered state. For lots a half an acre or less, twenty-five percent (25%) of the area of the lot within the buffer must remain in an unaltered state. An unaltered state means native vegetation must be allowed to grow without cutting, limbing, trimming, pruning, mowing, or other similar activities. Impervious surface refers to modified surfaces that cannot absorb water, such as roofs, decks, patios, paved and gravel driveways (excluding bedrock).

The simplest and most effective way to protect streams, rivers, lakes and ponds and other water bodies is to leave an area of undisturbed native vegetation adjacent to the water body. These undisturbed areas act as buffers by performing functions that protect water quality and enhance wildlife habitat. Preserving and restoring riparian buffers is essential to surface water quality protection.

Clean water is an important part of New Hampshire's economy, shoreland property values, recreation and wildlife habitat. Vegetated shoreland buffers play a critical role in protecting water quality by managing stormwater to prevent erosion. Erosion can result in sediment reaching the water which can cause:

- Harm to fish and other species and their habitat.
- Algae blooms that can result in decreased water clarity, decreased dissolved oxygen, odor, and public health problems.
- Accelerated lake aging.

Under the general planning and zoning legislation of the state (RSA 674:17) and innovative land use controls (RSA 674:21), municipalities may adopt land use ordinances (zoning, subdivision,



site plan, etc.) to protect the shorelands of lakes, ponds, wetlands, rivers and streams and other water bodies within their boundaries which do not fall under the jurisdiction of the CSPA. In addition, these local ordinances can be more stringent than the minimum standards of the CSPA (see RSA 483-B:8, Municipal Authority). In fact, the CSPA encourages municipalities to adopt land use control ordinances designed to protect the shorelands of water bodies and water courses not subject to the CSPA. These waters can include 1<sup>st</sup> and 2<sup>nd</sup> (headwater streams and tributaries) as well as 3<sup>rd</sup> order streams and rivers, lakes and ponds, and other impoundments.

Examples of model ordinances designed to provide for local shoreland protection are available in the NH DES publication: *Innovative Land Use Planning Techniques, A Handbook for Sustainable Development* (October 2008). See following website for a copy of the handbook: <http://des.nh.gov/organization/divisions/water/wmb/repp/documents/iluptcompletehandbook.pdf> Also ordinances can be found in the publication of the Audubon Society of New Hampshire, UNH Cooperative Extension, Natural Resource Conservation Service and NH Office of State Planning (now Office of Energy and Planning) entitled: *Buffers for Wetlands and Surface Waters, A Guidebook for New Hampshire Municipalities* (Revised May 1997).

In addition to these various ordinance approaches, municipalities may elect to enforce the provisions of the CSPA by issuing cease and desist orders, and by seeking injunctive relief of civil penalties as provided by RSA 483-B:8, III (a) and (b). One of the advantages of local enforcement is that any civil penalties and fines collected by the court can be remitted to the treasurer of the municipality prosecuting violations, for use of the municipality. In order to enforce the provisions of the CSPA, however, municipalities must have a knowledgeable code enforcement officer on hand who understands and can apply the provisions of the act on a case by case basis.

Under the CSPA, exemptions are provided for forestry and agricultural activities and these exemptions must also be considered when establishing a local ordinance. The CSPA also provides an urban exemption for situations in which specialized urban conditions exist. This exemption requires the governing body to make a formal request to the NH DES Commissioner to grant an exemption from the CSPA.

In summary, the CSPA minimum standards are designed to overlay other state and municipal permitting programs. This means that the state permitting programs such as Subsurface, Wetlands, and Alteration of Terrain as well as local building officials must ensure that any permits issued are in compliance with the CSPA.

## **5.4 Comprehensive Shoreland Protection Act: History of Changes**

On July 1, 2005, Senate Bill 83 established a commission to study the effectiveness of the CSPA. Among other things, the Commission was charged with assessing land-use impacts around the state's public waters; size, type, and location standards pertaining to structures as outlined in the CSPA; shoreland buffer and setback standards; and nonconforming use, lot, and structure standards.

The Commission was comprised of 24 members representing a variety of stakeholders including the General Court, the conservation community, the regulatory community, natural resource scientists, agricultural interests, business and economic interests, and members of the general public. The final report of the Commission contained 17 recommendations for changes to the CSPA. Sixteen of those recommendations for change were enacted into law and became effective April 1, 2008. The changes are broad in scope and include impervious surface allowances, a provision for the waterfront buffer in which vegetation removal is restricted, shoreland protection along rivers designated under RSA 483 (Designated Rivers), and the establishment of a permit requirement for many construction, excavation or filling activities within the Protected Shoreland.

One of the important changes to the CSPA is that effective July 1, 2008 in accordance with RSA 483-B, a State Shoreland Permit is now required for construction, excavation and filling activities within the designated Protected Shoreland area, 250 ft from the reference line (ordinary high water mark for rivers). This provision applies to all designated rivers, however, exemption from the CSPA update is permitted for the following situations:

- Forest management not associated with shoreland development or land conservation and in compliance with RSA 227-J:9
- Management not associated with shoreland development or land conservation and in compliance with RSA 227-J:9 that served the purpose of managing a water supply watershed
- Agriculture conducted under best management practices as specified in RSA 483-B, 3
- Projects that receive a permit under RSA 482-A (Ex: dredge and fill in wetlands)

For more information regarding eligibility for exemption from the Shoreland Protection Permit review the Shoreland Administrative rules Env-Wq 1406 under the DES Water Division.

In addition to the State Shoreland Permit, effective April 1, 2008 are the Primary Building Setback regulations which require within the Waterfront Buffer all primary buildings to be set back at least 50 feet from the designated reference line. Under the CSPA, municipalities may enact their own setbacks only to enforce a greater protection distance further than 50 feet.

More recent updates to the CSPA include several fee changes which became effective September 13, 2009. In addition, developers will now be able to build multifamily housing within the Protected Shoreland as long as they meet zoning and septic requirements and the old provision requiring a minimum of 150 feet of frontage per household was removed. Also, a number of small ponds were removed from the act that did not meet the requirements of at least 10 acres or more. Because the new law is based on single surface area instead of flowage rights, a number of ponds may drop off the list of protected waters under the act.

For more information regarding the CSPA, visit the following NH DES website: <http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm>. Found on the NH DES website are Shoreland Protection Program Fact Sheets, permit application forms, frequently asked questions, publications and all the CSPA rules and regulations.



## 6. Recreation Opportunities

### 6.1 Goals

- To provide adequate access points in each community from which the public can enjoy the river.
- To establish access points in appropriate locations using sound conservation and design practices.
- To prevent overuse and decline of public access areas.
- To alleviate the occurrence of trespass on private property by those seeking to use a public resource.

### 6.2 Key Actions to Achieve these Goals

Table 6: Recreation Opportunities	
Key Action	Implementation
Encourage maintenance of existing public access points.	Conservation organizations to adopt public access areas and portions of the river.  Communities to encourage a “carry in / carry out” policy and/or provide trash receptacles at locations where regular collection can occur.
Develop guidelines for appropriate use of public areas.	Communities to assign policing, sign posting, trash removal and maintenance to the appropriate municipal agencies.  Communities to avoid development of access points on undeveloped areas of the river, sections designated as natural, or areas that could be considered dangerous for access.
Evaluate the need for additional public access areas and identify potential locations.	Communities to identify current public access points and determine need for additional access.  Communities to determine feasibility of obtaining easements on lands currently used for informal access to the river.



<b>Table 6: Recreation Opportunities</b>	
<b>Key Action</b>	<b>Implementation</b>
Create travelways adjacent to the river.	<p>Communities to develop recreational paths along the river corridor in a manner which will not adversely affect the natural environment or wildlife corridors. Former railroad rights-of-way should be utilized where possible.</p> <p>Communities to consider limiting motorized vehicles on travelways and public areas along the river corridor.</p>

## 6.3 Background

History does not record the earliest time when the Piscataquog River was used for recreation, however, the river has served a wide range of uses over the years. In the early 1900's, the Boston Chapter of the Appalachian Mountain Club used a section of the river in New Boston for paddling instruction and canoe races. At about the same time, property near the river in Manchester and Goffstown became desirable for its recreational value. Summer camp colonies developed along the river for nearby city dwellers, offering a peaceful place to relax and enjoy nature.

The river has always attracted diverse interests reliant upon the flowing waters. The tranquility of the river attracts some people, providing them a visit with nature, or a quiet place to read or relax besides perpetually flowing water. When the river is swollen and the water is far from tranquil, people come with canoes, kayaks and other means of flotation looking for adventure. The river calls anglers and those that fly-fish to waters teeming with life. For some, the river simply provides spectacular scenery in their daily travels. The river offers each person a unique experience, and the recreational opportunities afforded by the river are limited only by one's imagination.

The Piscataquog River is home to hundreds of boating enthusiasts. Whether on the quiet, more private sections or on the lakes, boaters can enjoy four seasons of rural New Hampshire at its finest. The lakes provide space for water skiing as well as other recreational endeavors favored by the boating public. The numerous access points along the river often include launch sites and parking. Known public access sites to water are displayed on Map 9.

The river corridor provides excellent and diverse recreational opportunities. Trails along the Piscataquog provide opportunities for hiking, biking and horseback riding; and during the winter, people can enjoy cross-country skiing, snowshoeing and snowmobiling in some designated areas. Abandoned railroad lines are ideal for conversion into recreational pathways. Manchester and Goffstown have recently been converting these railroad corridors into pedestrian-friendly, paved trails that will run from Goffstown Village to downtown Manchester. This project will connect the Goffstown Rail Trail to the Piscataquog Trail connected by the recently built Hands

Across America pedestrian bridge crossing Interstate 293 and the Merrimack River. Featured in the Appendix 9.6 is a map portraying the system of rail trails provided by the Friends of the Goffstown Rail Trail Organization. Additional trails extend out into New Boston. Map 9 shows areas featuring railroads and also class VI roads, roads often used for walking or biking.

The Piscataquog is home to many beaches, parks, and swimming holes throughout. Popular spots include public beaches on Glen Lake in Goffstown and Everett Lake featured in Clough State Park in Weare. To ensure minimal human health risks in pursuit of the use of these beaches, DES has monitored these waters for twenty years with the Public Beach Inspection Program. Bacteria levels are tested June through August and reported on over 170 different freshwater locations in NH. The program also makes the effort to determine where contamination sources could be coming from and participates in public outreach to educate on sanitation. To learn more or see local reports visit the NH DES Water Division Public Beach Inspection Program at: <http://des.nh.gov/organization/divisions/water/wmb/beaches/index.htm>.

Beaches considered Impaired by DES are included in the Impaired Waters Data Supplement found in Appendix 9.2.3 and are also depicted on Map 3. To view the public and private conservation lands of the watershed please refer to Map 8. A number of parks or other recreational points of interest are depicted on Map 9 provided by the Office of Energy and Planning (OEP Recreation Points).

## **6.4 Recreation Projects**

A great example of a successful recreation project within the watershed has been the work to improve access along Glen Lake in Goffstown, New Hampshire. In June 2003, the Town of Goffstown received a Federal EPA 319 grant for \$64,625 provided by the NH DES to perform this work. The Town of Goffstown had secured additional non-federal matching funds in the amount of \$49,417.50 to contribute to this project. Recreation access improvements along Glen Lake during the construction of this project included the following:

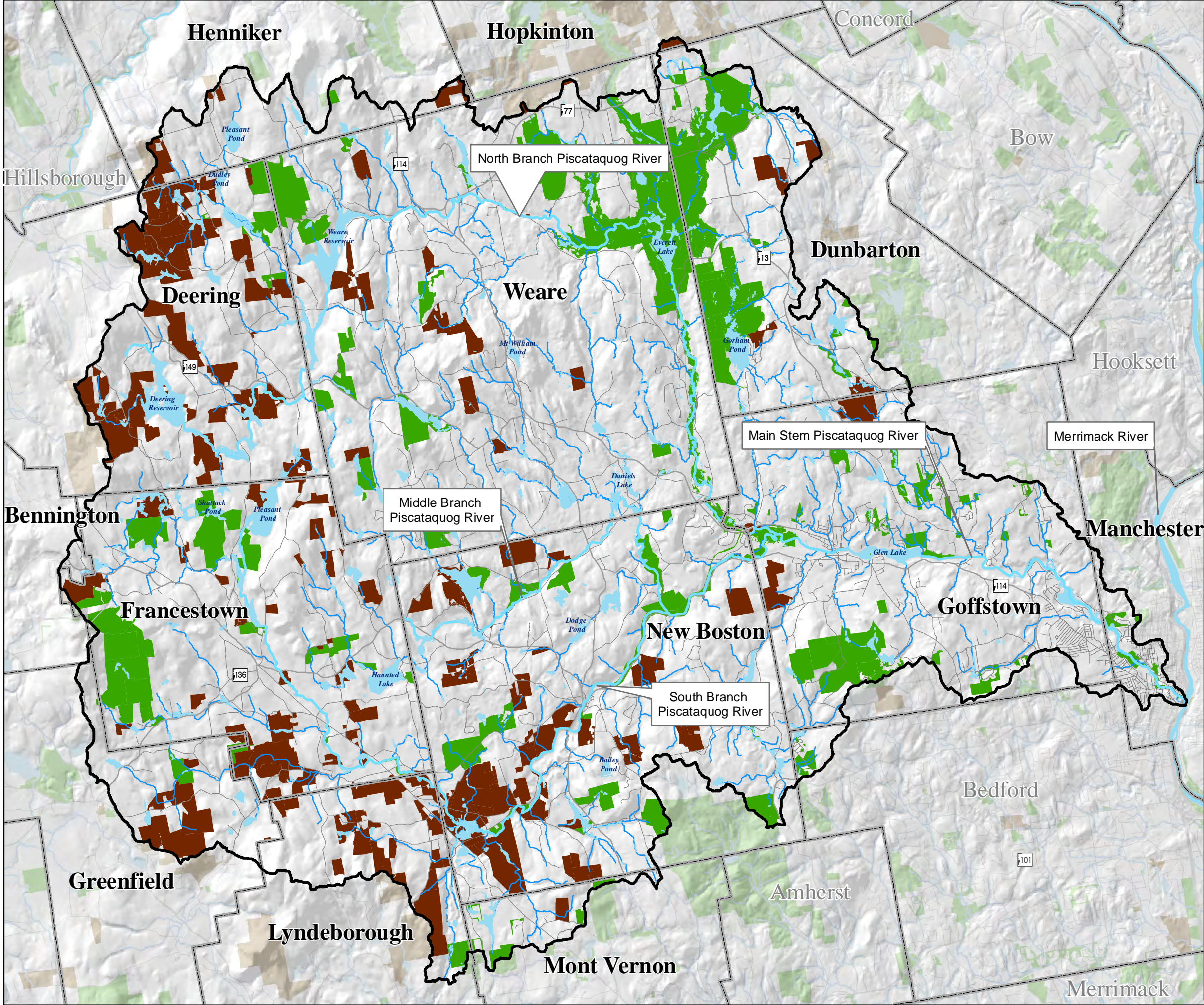
1. Construct a concrete plank boat ramp with readying lanes. Install Best Management Practices (BMPs) to collect and treat runoff coming from the ramp.
2. Relocation of the autos with trailer parking from the immediate shoreline area between Elm Street and Glen Lake to across the road on the north side of Elm Street. Direct stormwater runoff to vegetated filter strips and/or treatment swales.
3. Construct a guardrail to limit parking along Elm Street and install boulders to confine automobiles with trailer parking to the newly constructed area.
4. Construct walkways to control and direct pedestrian traffic so as to avoid particularly sensitive areas and enhance safety.
5. Construct BMPs along Elm Street at the top of the slope to Glen Lake to control and treat stormwater runoff from Elm Street and the surrounding area.

6. Terrace the steeper slopes along the shoreline to reduce slope length and steepness factors.
7. Plant terraced area with islands of low maintenance, indigenous species of grasses, shrubs, and trees.
8. Construct an informational kiosk on site for public education and outreach relative to water quality and watershed management issues.

To review the site plan or find out additional information regarding the 319 Glen Lake Project contact Jeff Marcoux, NH DES Watershed Assistance Specialist by email at [Jeffrey.Marcoux@des.nh.gov](mailto:Jeffrey.Marcoux@des.nh.gov) or by phone at (603) 271-8862.







Map 8

PISCATAQUOG RIVER  
MANAGEMENT PLAN

OPEN SPACE

Watershed Boundary

Lakes

Streams

Town Boundaries

Conservation Lands

Privately Held Conservation Lands

Publicly Held Conservation Lands

Name	Conservation Land (Acres)	Area in Watershed	% of Conservation Land
Bedford	107	492	22
Bennington	12	221	5
Deering	3,554	12,813	28
Dunbarton	3,306	10,024	33
Francestown	4,171	19,315	22
Goffstown	2,325	19,003	12
Greenfield	893	3,842	23
Henniker	333	3,300	10
Hopkinton	42	45	92
Lyndeborough	1,269	4,610	28
Manchester	116	1,124	10
Mont Vernon	277	1,581	18
New Boston	5,258	25,458	21
Weare	6,040	37,357	16
Totals	27,702	139,186	20

01234 Miles

Data Sources:  
NH GRANIT Digital Data (1:24,000)  
Conservation Lands Updated June 2008 by GRANIT  
The Nature Conservancy  
NH Department of Transportation  
NH Department of Environmental Services

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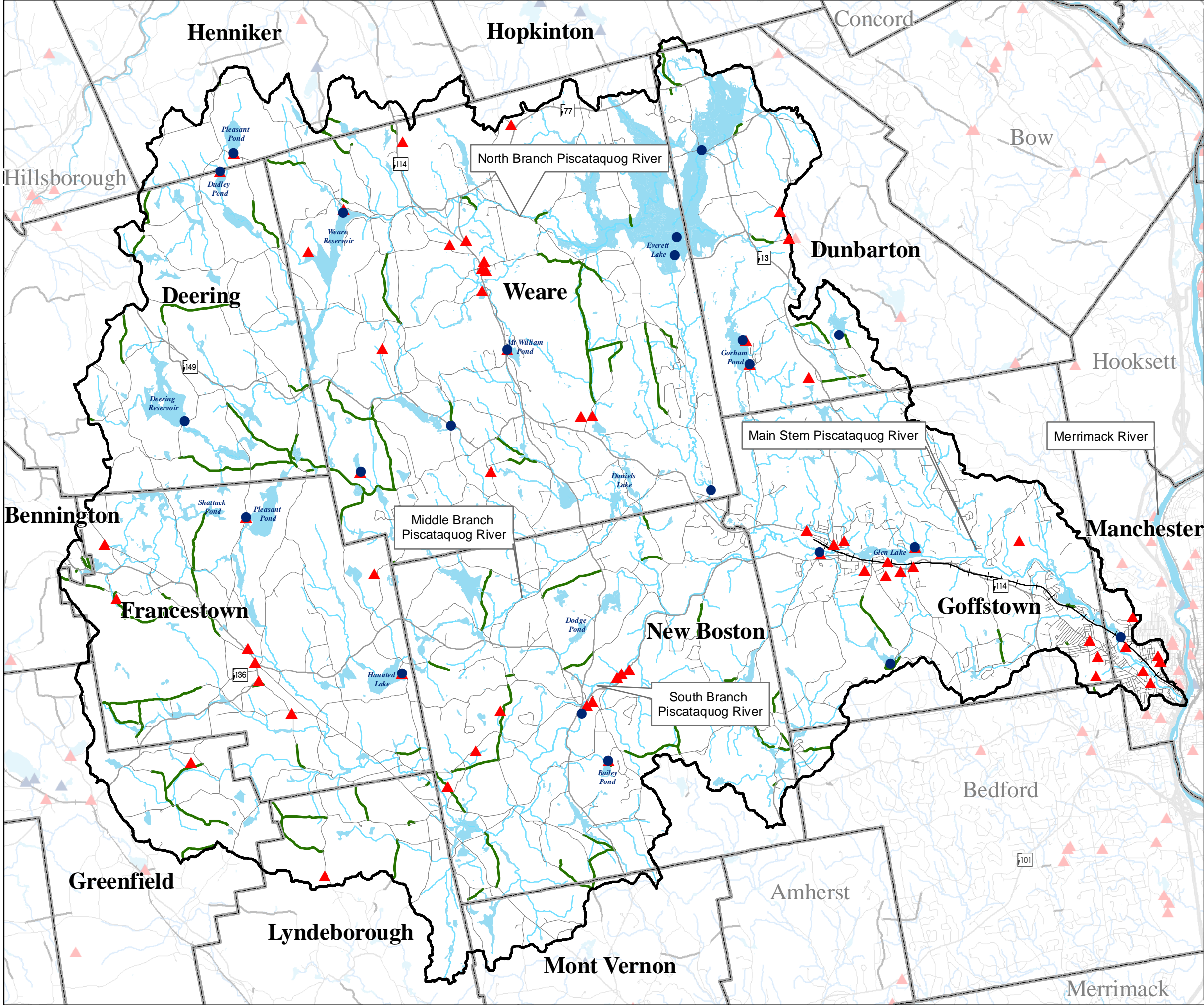
E

S

New Hampshire  
Location  
Map

Piscataquog River  
Watershed





Map 9

# PISCATAQUOG RIVER MANAGEMENT PLAN

## RECREATION POINTS

- Railroad
- Class VI Roads
- Public Water Access Points
- OEP Recreation Points
- Watershed Boundary
- Lakes
- Streams
- Town Boundaries

0 1 2 3 4 Miles

Data Sources:  
NH GRANIT Digital Data (1:24,000)  
Conservation Lands Updated June 2008 by GRANIT  
The Nature Conservancy  
NH Department of Transportation  
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## 7. Natural Resources

### 7.1 Goals

- To preserve and maintain the natural resources of the Piscataquog River Watershed for present and future generations of both humans and wildlife.
- To protect the threatened and endangered species within the watershed.
- To encourage the natural flow of the river for fish and wildlife habitats and public water uses.
- To support educational initiatives and encourage public awareness for the natural resources of the watershed.

### 7.2 Key Actions to Achieve these Goals

Table 7: Natural Resources	
Key Action	Implementation
Identify, protect, and enhance important spawning and rearing habitat within the corridor.	PRLAC to work with local conservation commissions, colleges and schools, environmental organizations, and federal and state agencies to identify important natural resources within the river corridor.
Identify and prioritize riparian and aquatic habitat areas impacted by past or ongoing disturbance, and explore opportunities for restoration.	PRLAC to encourage communities to seek grants from federal, state and private organizations to provide funding for restoration efforts.
Protect threatened, endangered, sensitive and native species.	Local officials (conservation commissions and planning boards) can use their authority to protect these areas through the review of wetland permits and intent to cut permits and through other public planning processes (such as the development of zoning ordinances).
Promote stewardship of the natural resources within the river corridor.	PRLAC to work with local conservation commissions, colleges and schools, environmental organizations and federal and state agencies to identify important natural resources within the river corridor.



<b>Table 7: Natural Resources</b>	
<b>Key Action</b>	<b>Implementation</b>
<p>Maintain adequate flow conditions to support and enhance current resident fish and aquatic resources, and anadromous fish habitat.</p> <p>This includes avoiding and preventing illegal stream and river crossings which impact wetlands and aquatic habitat.</p>	<p>PRLAC and PLC to participate in the Instream Flow Rules to be developed by NHDES for the Piscataquog River.</p> <p>NH DES to enforce the protected flow once it is established.</p> <p>Work with municipalities in seeking funding and solutions to prevent, mitigate and remove illegal stream and river crossings as appropriate.</p>
Sponsor and promote workshops to educate the public on federal, state and local regulations as they impact the river corridor.	PRLAC, PLC, and local conservation commissions to work together on public support.
Promote land conservation within the watershed to enhance the natural resources of the river.	PRLAC to work with the PLC and Community conservation commissions to identify and help protect properties that are vital to the quality of the watershed
Support efforts of the Eastern Brook Trout Joint Venture (EBTJV) and the Eastern Brook Trout Coalition	SNHPC and PRLAC to work with the collation and NHFG to expand program among all eleven watershed communities as practical.

## 7.3 Background

The Piscataquog River and surrounding watershed support diverse habitats for a wide variety of wildlife and plant species thanks to the extensive natural and protected lands along the river. A number of these species of plants and animals are significant and have been identified as threatened, endangered, or sensitive, and require special protection. An inventory of existing species located within the corridor has been assembled from information provided by The New Hampshire Fish and Game Department, The Audubon Society of New Hampshire, The New Hampshire Natural Heritage Program, and the Piscataquog Land Conservancy (PLC). This information is included in Appendices 9.1.1 through 9.1.5 of this document. Every effort should be made to protect and enhance the habitat for these species as well as the existing native species located in the watershed.

In the early days of European settlement in the region, mature stands of large white pine and red oak growing in the Piscataquog River watershed drew attention to the area. Settlers arrived to harvest the massive trees, some of which were reserved by the King of England for British Navy

ship masts. Today, this virgin forest is non-existent and the river corridor sustains second and third growth vegetation.

The Piscataquog River is a relatively steep gradient stream with a predominantly cobble and gravel substrate, dominated by riffle/pool habitat. The three branches of the river, together with its tributaries and lakes, provide both novice and knowledgeable anglers with fine and rewarding fishing. It is a favored fishery of the Merrimack Valley Chapter of Trout Unlimited, which has selected the river for its “Adopt-A-River Program.” The Piscataquog River is considered to be one of the two most important salmon nursery tributaries in southern New Hampshire. The river yields higher production levels of juvenile par, on average, than any other site. In addition, with many diversified river bottoms and several impoundments, the river supports a large warm water fishery as well as a notable trout fishery.

## **7.4 Fish**

The Piscataquog River and its tributaries are home to at least 24 different species of fish (see appendix 9.1.1 for a list of fish species and 9.2.1 for the NHFG Fish Stocking Report 2008 and 2009). Although the river is managed as a cold-water fishery, it also supports a healthy population of warm water species. The slower moving impounded sections of the river are home to mostly warm water species while coldwater species inhabit those areas having steeper gradients.

As noted, the Piscataquog River is considered to be one of the most important nursery grounds for anadromous Atlantic salmon, which are stocked as fry into South Branch. The Atlantic salmon lives as an adult at sea but returns to freshwater rivers and small streams to spawn. The young Atlantic salmon remain in fresh water for one or more years, then descend to the sea to feed and grow. After spending a year or more at sea they return to fresh water to spawn.

Once the anadromous fish return to the Merrimack River in sufficient numbers, it will be necessary for the owners of several dams to begin construction of fish ladders and downstream by-passes along the Piscataquog River. According to the Strategic Plan for the Restoration of Atlantic Salmon to the Merrimack River prepared by U.S. Fish & Wildlife Service, an upstream passage will need to be constructed at Kelly Falls Dam in Manchester, and downstream by-passes are called for at the Gregg and Hadley Falls dams in Goffstown. These projects will help to encourage the restoration of the anadromous fish to the watershed.

Additional protection recommendations are discussed in the 2008 Merrimack River Basin Anadromous Fish Land Conservation Plan. The purpose of this project was to identify locations within four sub-watersheds of the Merrimack River Basin (including the South Branch of the Piscataquog River) where land conservation projects would be most effective in protecting Atlantic salmon fisheries. Land conservation plays a key role in maintaining and improving water quality that provides specific living conditions Atlantic salmon require for survival. This 2008 Plan has identified the following protection factors to consider and recommendations to help ensure future protection of anadromous fish:

- Survey for the presence or absence of brook trout (are closely related to Atlantic Salmon & have similar water quality needs) throughout the watershed.
- Conservation priority may be further narrowed by evaluating land protection status across the four tributaries of the Merrimack Basin (South Piscataquog, Baker, Smith and Souhegan Rivers).
- Land conservation easements and the creation of forest reservations are recommended to ensure further protection of anadromous fish.
- Monitor for specific Atlantic salmon water quality needs (cold water, suitable pH levels, normal nutrient loading & low sedimentation/siltation loading).
- Encourage further streambank stabilization efforts to prevent human-caused erosion levels causing excessive sedimentation downstream that can exceed the suitability of anadromous fish.
- Discourage development and poor forestry practices near the river to prevent slope erosion along river banks.
- Stream restoration, sound land-use practices and environmental regulations should be taken into consideration and used wisely when managing and protecting coldwater fisheries.
- Catchments defined by the top three classes (Low, Moderately Low and Moderate on Map 7) should all be considered eligible for priority protection within the four sub-watersheds, however, extra consideration should be given to land area with clusters of higher-ranked catchments.

Refer to Map 11 to view the protection priority plans for the South Branch of the Piscataquog Watershed. The land protection prioritization of this map is based on the Merrimack River Basin Anadromous Fish Land Conservation Plan developed by the Society for the Protection of NH Forests (SPNHF). Within the catchment protection priority area (South Branch), the level of protection was based on the amount of stocked salmon and land area within the watershed. The Piscataquog Watershed was studied and ranked alongside another three New Hampshire sub-watersheds (the Baker River, Smith River, and Souhegan River). The priority is relative based on these comparisons but highlights areas that are the most sensitive and have the most to lose from future development pressures. These catchment areas are also a critical habitat for anadromous fish.

Wild brook trout are another valuable resource of the Piscataquog River Watershed currently still threatened by habitat degradation due to historic (and possibly current) timber logging, poorly constructed stream crossings, acid deposition, non-point source pollution and changes in water quality and hydrology due to increased impervious surfaces (and thus stormwater runoff) in the watershed. As mentioned previously, brook trout and Atlantic salmon require similar water quality to sustain their wellbeing. Due to the similarities, recommended strategies suggested for the protection of Atlantic salmon may be applicable to ensuring the health of brook trout. For more information visit: <http://www.easternbrooktrout.org/conservationstrategy.aspx>.

To halt the widespread decline of wild brook trout, a diverse group of non-governmental organizations, academicians and state and federal agencies formed the Eastern Brook Trout Joint Venture (EBTJV). The objective of the EBTJV is to conserve wild brook trout and their habitats in the eastern United States, from Georgia to Maine, with the long-term goal “to implement a

comprehensive conservation strategy to improve aquatic habitat, raise public awareness, and prioritize the use of federal, state and local funds for brook trout conservation”. The first step to protecting brook trout in the Piscataquog River Watershed is to identify those waterbodies which *historically* contained and those which *currently* contain brook trout; this work was conducted by the New Hampshire Fish and Game Department in recent years, and several tributaries to the River were identified as having apparently healthy populations of wild brook trout.

The second step is for the EBJTV and all eleven watershed communities to identify specific threats to brook trout in the watershed, and then implement strategies to protect and restore their habitat. For example, it is well documented that impervious surfaces in a watershed have a negative impact on water quality and aquatic habitat, and communities are encouraged to revise zoning ordinances to reflect this science. Stream crossings that preclude the passage of fish and areas of streambank erosion caused by human activities should all be identified and restored. There are many financial and scientific resources available for restoration work – NH DES and New Hampshire Fish & Game Department (NHFG) should be contacted for assistance.

Recently, a partnership was formed with Trout Unlimited, NH Fish & Game, the New Boston Conservation Commission, Saint Anselm College Biology Department, Southern NH Planning Commission, and the Russell Piscataquog River Watershed Foundation for the specific purpose of protecting, restoring and securing habitat for the Eastern Brook Trout in the Piscataquog Watershed. In 2010, the focus of the Piscataquog Watershed Eastern Brook Trout Coalition will be on research and restoration of eastern brook trout within the South Branch and the watersheds of priority tributaries: Rand, Cold, and Scataquog Brooks. In the future, the work of the coalition will be expanded to include other areas of the watershed, including the Middle Branch and other important tributaries. In addition, the coalition may consider land protection actions as deemed to be important to the focus area of the coalition.

Currently, funding for this effort is being provided through Trout Unlimited and the New Boston Conservation Commission within the focus areas of the town to conduct volunteer training and culvert assessment; engage interns to assist with compilation and collection of existing data; identify point and non-point sources of pollution and habitat degradation, and to sample selected streams and movement into spawning areas. Some of the anticipated outcomes of this work include a report on the status of stream crossings and their impact on aquatic organism passage with focus on Eastern Brook Trout; collaboration with NH DOT to develop and implement a schedule of plantings and bank stabilization along Route 13, also known as the state designated John Stark Scenic Byway; and the presentation of scientific data on the biological importance of the South Branch of Piscataquog River and priority tributaries.

Historically, the NH Fish & Game has conducted surveys of the fish communities in the Piscataquog River Watershed since 1938. Surveys conducted by the NH Fish & Game in the last several years have documented that the Watershed is dominated by native fish species. Non-native fish species, such as largemouth bass) are primarily found in the Watershed’s lakes and ponds, while the vast majority of the streams and rivers have only one species of non-native fish, the margined madtom, which has formed sustainable populations. Even so, the margined madtom appears to comprise only a very small proportion of the fish community and is not known to impact native fish species. Common carp inhabits portions of the Main Stem of the



Piscataquog River in Manchester and Goffstown, and is likely restricted to those areas of the river because the habitat in upstream portions of the river is not suitable to carp. Additionally, smallmouth bass are found in the main stem and portions of the North Branch.

## **7.5 Mammals**

The Piscataquog River and its corridor provide a diverse array of habitat for a large variety of mammals, including several endangered, threatened and sensitive species. Recently added to the state endangered list was the New England cottontail. Areas of particular interest in future management are shrublands large enough to support the living and breeding habits of this species. Another species found on the state endangered list, the small-footed bat, was documented in New Boston. Appendices 9.1.1 through 9.1.4 provide lists of all mammal species known and expected to occur within the river corridor.

## **7.6 Birds**

Because of the extensive natural and protected lands along the river, the Piscataquog River Watershed supports a series of diverse habitats for a wide variety of birds. Birds of conservational interest include the pied-billed grebe, bald eagle, peregrine falcon, and the common nighthawk. With the exception of the common nighthawk, which moved from a threatened species to an endangered one, recent successes in conservation efforts, in addition to state programs, are responsible for downlisting several species. The bald eagle, pied-billed grebe, and the peregrine falcon were moved from the endangered list to the threatened list, while the Cooper's hawk was removed from the threatened list. A list of bird species found within the watershed is provided in Appendix 9.1.3.

## **7.7 Reptiles and Amphibians**

Several species of reptiles of special concern have been observed inhabiting the watershed. They are the endangered species of the eastern hognose snake, the racer, and the Blanding's turtle as well as the threatened spotted turtle. A list of reptiles and amphibians found within the watershed is provided in Appendix 9.1.4.

## **7.8 Vegetation and Forest Communities**

Wildflowers deserving special protection that are now surviving within the Piscataquog River Watershed include the small spike-thrush (*Sagittaria rigida*), gall-of-the-earth (*Nabalus serpentarius*), one-sided rush (*Juncus secundus*), piled-up sedge (*Carex cumulata*), and slender crabgrass (*Digitaria filiformis*). A particularly attractive plant species found in the watershed is the small whorled pogonia (*Isotria medeoloides*). The largest-known population of this perennial wildflower is found in central New Hampshire and Maine. It was given federal listing as endangered in 1982, but habitat protection efforts have allowed the species to be reclassified as threatened. Biologists hope that with continued landowner awareness and concern the plant will survive. Other rare plant species that have been documented within the river watershed include

the sessile-fruited arrowhead (*Sagittaria rigida*), american cancerroot (*Conopholis americana*), sweet coltsfoot (*Petasites frigidus* var. *palmatus*), farwell's water milfoil (*Myriophyllum farwellii*), and fern-leaved false foxglove (*Aureolaria Pedicularia* var. *intercendens*). See Appendix 9.1.5, for a full list of the wildflowers of the watershed.

Also of note is a large ironwood (*Carpinus caroliniana*) community found along the banks of Peacock Brook and at its confluence with the Middle Branch of the Piscataquog River. This tree community is unusual in that this species does not normally cluster in such a massive group. Numerous wildlife species including turkey and ruffed grouse are attracted to the area for the nuts that these trees produce.

The flows of the Piscataquog create a variety of hydrologic conditions that support unique and relatively rare and high quality natural communities. The watershed exhibits areas that are periodically flooded. Forested portions that benefit from this flux of nutrients feature communities only found in higher nutrient sites. A common example is a silver maple-false nettle-sensitive fern floodplain forest which may be found on some portions along the Piscataquog River. Floodplain forests provide many natural benefits including water quality, river stability, and provide excellent habitat for many birds including the rare red-shouldered hawk. A map depicting the floodplain forest distribution along the Piscataquog can be found on Map 12. Other forested areas influenced by water are swamps found within the watershed. A community of interest is the blackgum - red maple basin swamp featuring co-dominance of blackgum. Blackgum reaches its northernmost distribution throughout southern and central New Hampshire and high quality sites are considered rare. This is one of the oldest tree species to grow in Northern America and common older age examples in NH can be found at approximately 200 years in age while some even older trees vary in age from 300 to 600 years. Wetland areas that feature low land vegetation are emergent marshes and fens, examples of high quality sites that are found within the watershed include the medium level fen and the emergent marsh - shrub swamp system. Lastly, natural communities can be fed by groundwater and are known as forested seeps, an example of this can be found in Weare with the circumneutral hardwood forest seep community type.

## 7.9 Related Organizations

The NHFG's Nongame and Endangered Wildlife Program was established in 1988. The program works to protect over 400 different species of the state's nongame wildlife using wildlife monitoring and management with the addition of public outreach and education. This program, with the aid of other NH wildlife groups, has effectively managed the come back of many rare and endangered species. The NHFG website and more information can be found at <http://www.wildlife.state.nh.us/>

The Natural Heritage Bureau (NHB) finds and reports rare plants and exemplary natural communities under the Native Plant Protection Act (1987) RSA 217-A. Their main goal is to protect the natural heritage of NH, to investigate the condition and distribution of rare plants and exemplary natural communities, and educate land owners about future management of this resource. NHB works in concert with NH Fish & Game to keep up-to-date documentation on rare wildlife for the NH Fish & Game's Nongame and Endangered Wildlife Program. The NHB

website and more information can be found at: <http://www.nhdfi.org/about-forests-and-lands/bureaus/natural-heritage-bureau/>

## **7.10 NH Wildlife Action Plan**

In spring 2006, the NH Wildlife Action Plan (WAP) was adopted, to provide New Hampshire decision-makers with the appropriate planning tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern (for more information see: <http://www.wildnh.com/Wildlife/wildlifeplan.htm>).

This plan is a pro-active effort to define and implement a strategy that will help keep species off the rare species list. The WAP addresses where the most vulnerable species and habitats are in relation to rapid land use changes to the natural landscape. These rapid changes impacting wildlife habitats include the impacts of the 19<sup>th</sup> century conversion of forests to fields, and today's land conversion to roads, housing, and businesses, which permanently alters natural habitats, degrading their value to native wildlife.

The Wildlife Action Plan demonstrates conservation planning tools and resources that can be applied to local conservation efforts of communities within the Piscataquog River Watershed, including conducting a Natural Resource Inventory (NRI), Wildlife Habitat Audit, addressing Wildlife Risk Assessments, conservation strategies, and how the WAP can be implemented. When conducting an NRI the first step is to create a map of natural resources describing their distribution across the local landscape. The WAP includes Geographic Information Systems mapping data of New Hampshire wildlife habitat and species and their level of need for protection which can be incorporated into an NRI. Currently the towns of Francestown and Weare are in the process of updating their NRI, and the Town of Lyndeborough recently completed an updated NRI in February 2009. Additionally the watershed communities of Bedford (2000), Bennington (2005), Deering (2004), Greenfield (2003), Henniker (2002) and Mont Vernon (2002) have conducted a Natural Resource Inventory within the past decade. For more detailed steps on how to incorporate the WAP mapping data into an NRI visit contact the NH Fish & Game Department staff for assistance.

NH Fish and Game has developed a Wildlife Habitat and Natural Resource Protection Audit as a counterpart to the WAP. This audit provides an assessment of the current level of protection for wildlife habitat and natural resources by reviewing a town's Master Plan, Zoning Ordinances, Subdivision and Site Plan Review Regulations with respect to 25 topics pertaining to wildlife habitat and natural resources (for a full list of topics visit NHFG at [www.wildnh.com](http://www.wildnh.com) under the WAP). Currently no towns within the Piscataquog River Watershed have conducted a Wildlife Habitat Audit; however, within the SNHPC Region, the Town of Deerfield has recently completed an assessment and review of land use regulations with respect to wildlife habitat and natural resource protection (NH Audubon Society, December 2009).

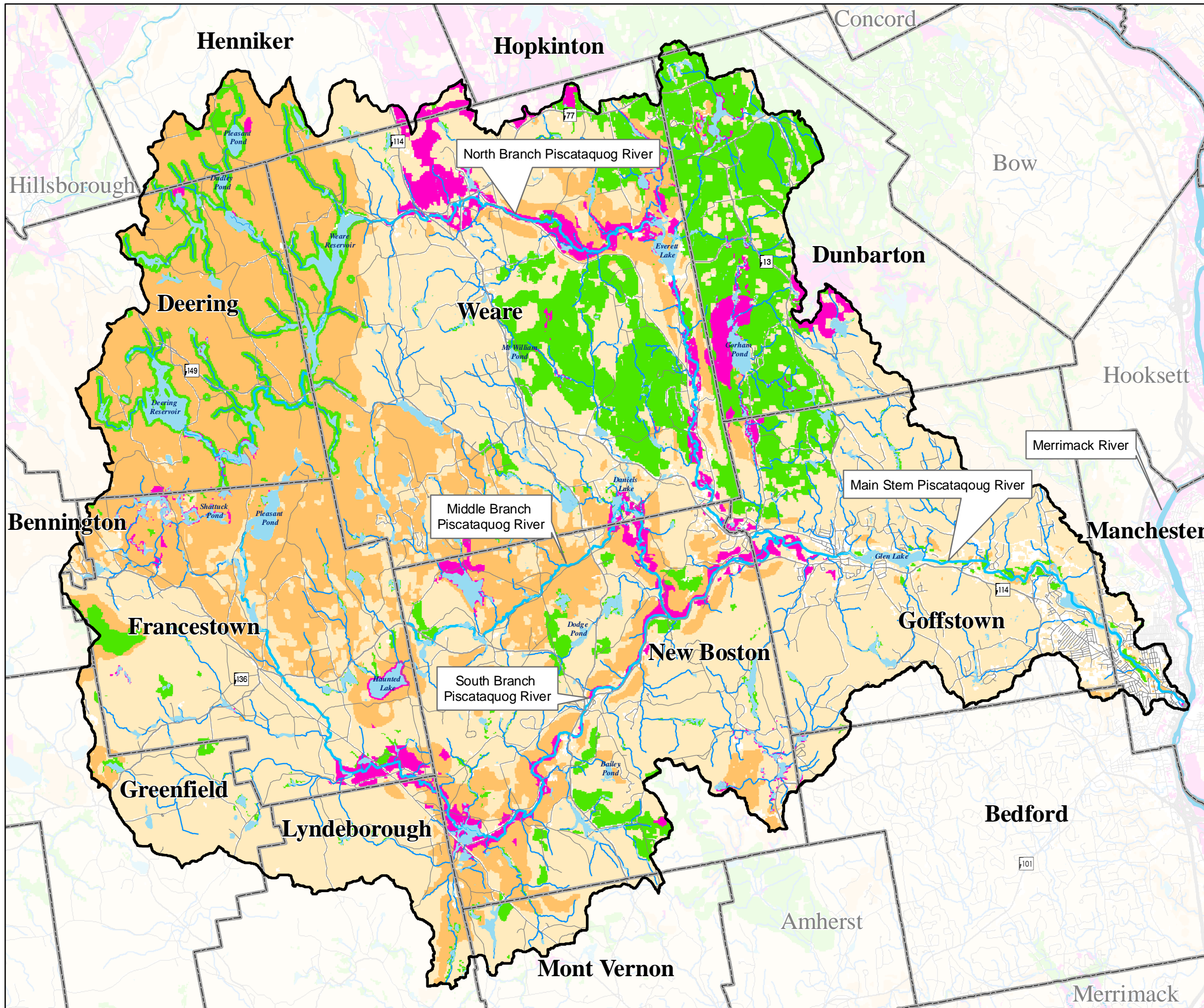
Conservation management programs depend on an assessment of the degree of risks posed to species and habitats that are of the greatest concern. The Wildlife Action Plan provides qualitative risk assessments of factors that influence New Hampshire wildlife and their habitats. The evaluation of risk factors were based on a ranking process which provided a consistent basis

for comparing risk factors across all species and habitats, these factors were placed into categories of appropriate conservation action.

Communities within the Piscataquog Watershed are encouraged to take advantage of these innovative planning tools to assist in the implementation of conserving natural resources and retaining connected natural expanses for increased wildlife habitat. In addition to incorporating protection strategies within local Master Plans, ordinances, and land use regulations, Conservation Commissions and Open Space Committees need to be further informed about conservation science in an effort to preserve natural land networks. Local conservation strategies and objectives should be aided by the wildlife habitat risk assessments developed as part of the WAP. Technical assistance in educational outreach, implementation of conservation strategies and developing measurable monitoring plans of conservation efforts are available through NH Fish & Game.

To view current habitat protection ranking of lands within the Piscataquog River Watershed based on the NH Wildlife Action Plan see Map 10. Habitat protection ranking based on the condition of wildlife habitats was analyzed by ranking the biological, landscape and human impact factors that most affect each habitat type (for a description of habitat types visit NH Fish & Game under the WAP at [http://www.wildnh.com/Wildlife/wildlife\\_plan.htm](http://www.wildnh.com/Wildlife/wildlife_plan.htm)). Biological factors address overall biodiversity including rare plant and animal species. Landscape factors include size of habitat and its proximity to other patches of similar types of habitat. Human impact factors include density of roads around the habitat, dams, recreational use, and pollution. These three main ecological condition factors were individually scored per habitat type in the watershed and pulled together to generate an overall ranking score.





Map 10

**PISCATAQUOG RIVER  
MANAGEMENT PLAN**

WILDLIFE ACTION PLAN  
HABITAT RANKING

Watershed Boundary

Lakes

Streams

Town Boundaries

**Wildlife Action Plan Habitat Ranking**

Tier 1 - Highest Ranked Habitat by Ecological Condition in NH

Tier 2 - Highest Ranked Habitat by Ecological Condition in Biological Region

Tier 3 - Supporting Landscapes

Tier 4 - Habitat Not Top Ranked

01234 Miles

Data Sources:  
NH GRANIT Digital Data (1:24,000)  
NH Department of Transportation  
NH Department of Environmental Services  
NH Fish and Game, Wildlife Action Plan,  
December 2006

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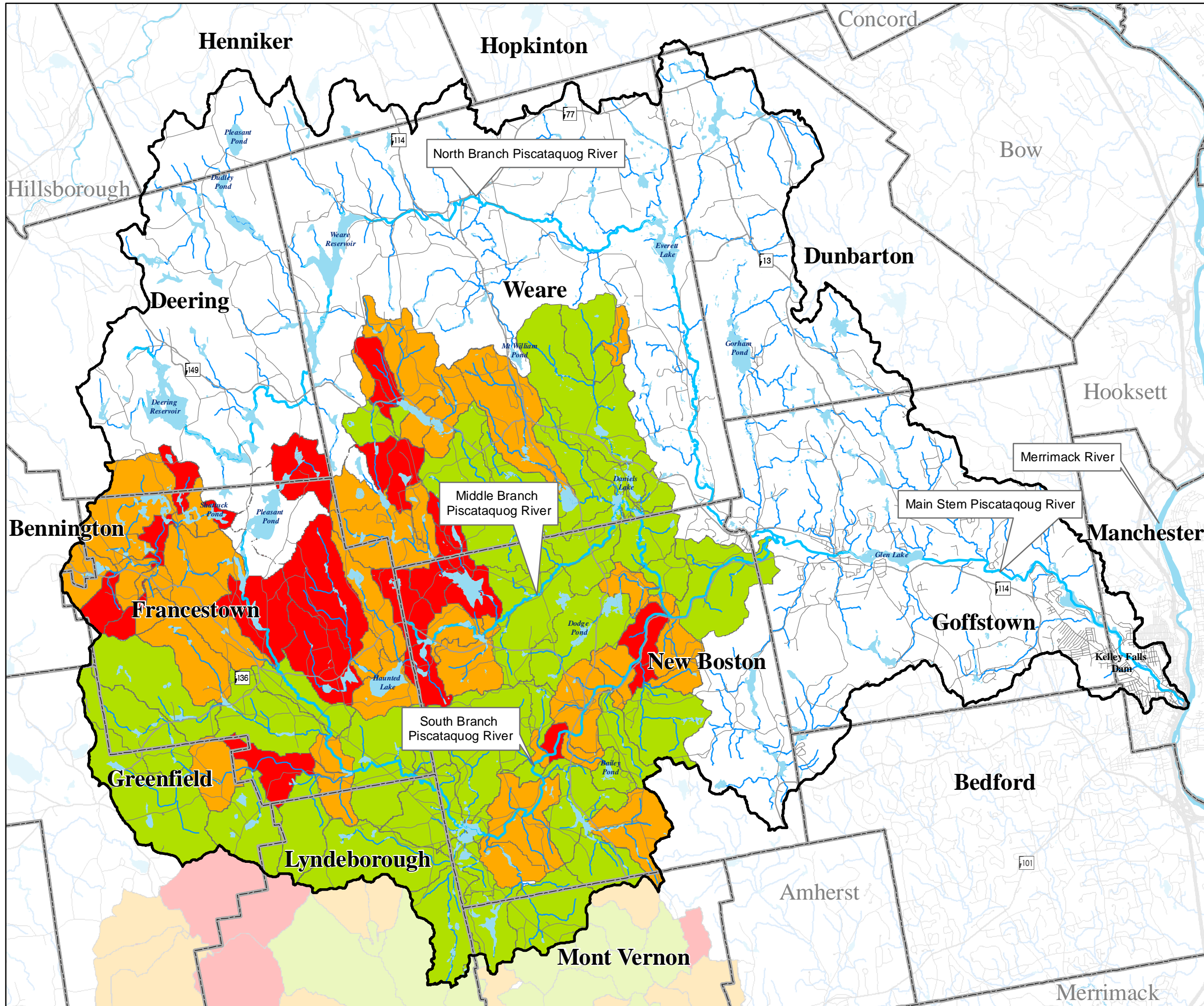
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SNHPC

New  
Hampshire  
Location  
Map





Map 11

# PISCATAQUOG RIVER MANAGEMENT PLAN

"MERRIMACK RIVER BASIN  
ANADROMOUS FISH  
LAND CONSERVATION PLAN"

PREPARED BY: SOCIETY  
FOR THE PROTECTION OF  
NEW HAMPSHIRE FORESTS

Watershed Boundary

Lakes

Streams

Town Boundaries

South Branch Piscataquog River  
Catchment Protection Priority

**Moderate**

**Moderately Low**

**Low**

0 1 2 3 4 Miles

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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New  
Hampshire  
Location  
Map

## 7.11 Wetlands Protection

Currently 10 percent of New Hampshire's landscape is made up of wetlands. The protection of existing wetlands is critical to the health of the environment and its inhabitants. Wetlands perform multiple vital functions in ensuring the health of both wildlife and the increasing human population, these include filtering surface waters, recycling energy and nutrients, providing breeding and nesting grounds for wildlife, reducing storm flooding, and they are home to many rare plant species that only live in wetland communities. The Piscataquog River corridor is home to several high quality headwater wetlands, including the large wetland communities along Route 136 in New Boston, Frankestown, and Greenfield, wetlands along River Road in Mont Vernon and the smaller wetland communities within Lyndeborough. Refer to Map 12 for a general display of the wetland areas found in the Piscataquog watershed.



Greenfield wetlands along Route 136  
(Source: SNHPC)

Protecting these headwaters will ensure further protection of river communities downstream and is vital to the overall health of the watershed. The New Hampshire Department of Environmental Services Wetlands Bureau provides municipalities in the Piscataquog Watershed with assistance with wetlands protection practices and guidelines to ensuring their health into the future. Piscataquog Watershed municipalities are encouraged to review wetlands protection planning documents and related funding programs, available on the NH DES Wetlands Bureau webpage at: <http://des.nh.gov/organization/divisions/water/wetlands/index.htm>.

A recent development that is promising in assisting wetland protection was the establishment of the Aquatic Resource Mitigation Fund in 2006. In order to assess the proper appropriation of this fund a committee was commissioned for the Merrimack Watershed Area. The Site Selection Committee prioritizes and votes on funding for mitigation projects. This committee and and DES employed the environmental consulting firm Vanasse Hangen Brustlin, Inc. (VHB) to develop a critical tool for prioritizing potential wetland restoration sites. Using spatial data VHB was able

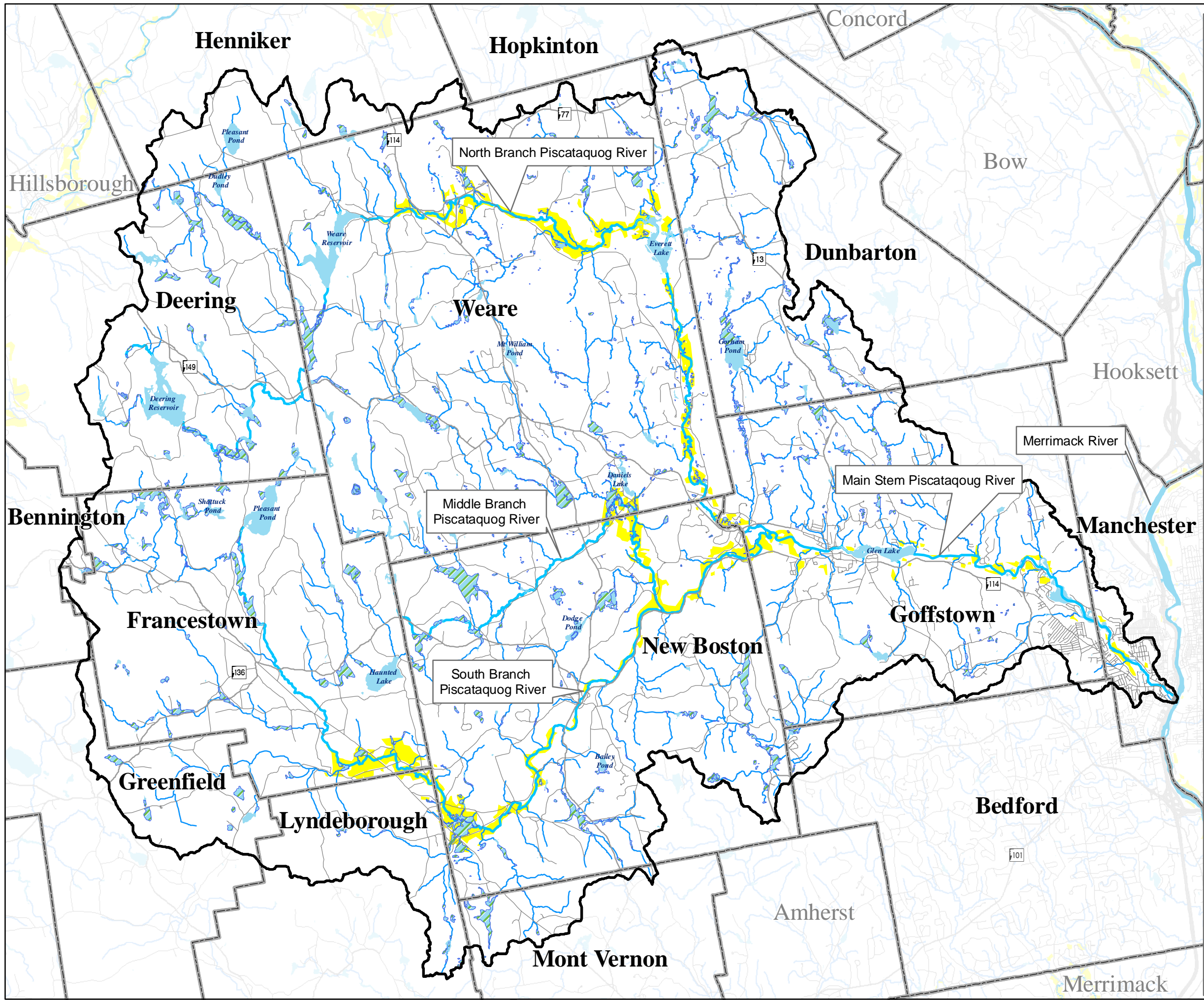


to highlight wetland areas that were disturbed, yielding potential restoration candidate sites. VHB then weighed the sites priority for restoration on its position within the landscape, the overall benefit from restoration, and the ability for the restoration to remain intact over time. Committee members used this information in addition to site visits and weighed other criteria, such as the possibility of future development pressures, to decide which sites will receive the overall best benefit from the Aquatic Resource Mitigation Fund.

Of particular note was the grant awarded in 2009 to the Stewart Property in Francestown that will help to restore a 55-acre site, protecting 5,000 feet along the Rand Brook and the South Branch of the Piscataquog River. The plan will focus on restoration of active cow pasture to natural riparian vegetation. It will include the removal of invasive species and enhance the exemplary natural communities of the forested floodplains and floodplain vernal pools found on the property, enhancing and ensuring future quality in both water and wildlife habitat. To view these potential sites within the Piscataquog Watershed use VHB's interactive GIS tool that can be found at [www.restorehwetlands.com](http://www.restorehwetlands.com).







Map 12

# PISCATAQUOG RIVER MANAGEMENT PLAN

## FOREST FLOODPLAINS AND WETLANDS

- Forested Floodplain
- Watershed Boundary
- Town Boundaries
- Lakes/Reservoirs
- Wetlands
- Streams

0 1 2 3 4 Miles

Data Sources:  
NH GRANIT Digital Data (1:24,000)  
NH Department of Transportation  
NH Department of Environmental Services  
NH Fish and Game, Wildlife Action Plan,  
December 2006

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SNHPC

New  
Hampshire  
Location  
Map



## 8. Scenic Resources

### 8.1 Goals

- To preserve existing features and areas within the watershed recognized as scenic.
- To identify and protect additional scenic features in the watershed.

### 8.2 Key Actions to Achieve these Goals

Table 8: Scenic Resource	
Key Action	Implementation
Document existing scenic features in each community.	PRLAC to work with each community to develop an inventory of existing features to be protected. Those listed in the nomination papers prepared by the PLC shall be included at the outset.
Identify new scenic features in each community.	PRLAC to work with each community to develop an inventory of new features to be protected.  PRLAC to encourage communities and Regional Planning Commissions to research the status of abandoned roads and rail rights-of-way along the river for public acquisition.
Develop regulations that would help to preserve scenic features.	PRLAC to work with each community to adopt and enforce the provisions of the Comprehensive Shoreland Protection Act, particularly as they relate to setbacks and buffers.  PRLAC to work with each community to adopt local ordinances in each town restricting the placement of signs along the river corridor.

### 8.3 Background

The predominantly rural nature of the landscape through which the Piscataquog River flows provides a wealth of natural scenic features that include open fields, farm expanses and views of the river. Further adding to this beauty are the forested roadsides that greet the traveler as well as views of the Uncanoonuc Mountains to the east and Crotched Mountain and Mount Monadnock to the west. Preservation of these sites and identification of additional sites are the priority goals here. A particular focus should be the acquisition of abandoned railroad rights-of-way along the river. The PLC has already secured some of these areas in New Boston, Goffstown, and Manchester. Each recently acquired the railroad corridors along the Piscataquog in their respective communities, and have turned these areas into pedestrian and bike friendly paths.



## 9. Cultural Resources

### 9.1 Goals

- To protect the cultural value of the Piscataquog River and adjacent corridor by identifying key resources.
- To protect and preserve the cultural resources located along the Piscataquog River.

### 9.2 Key Actions to Achieve these Goals

Table 9: Cultural Resources	
Key Action	Implementation
Encourage communities to inventory known sites of historic and cultural significance.	Communities to use local commissions and organizations to help identify sites.
Encourage written agreements with landowners to protect known sites on a voluntary basis.	Local historical societies to work with the New Hampshire Division of Historic Resources to identify and contact interested landowners. Sites on public land should be protected through the appropriate agency.
PRLAC review all permit applications and comment on any possible impacts on cultural resources.	NH Rivers Coordinator should ensure that all local wetland, shoreland and other similar permit applications reach the PRLAC in a timely fashion.

### 9.3 Background

The Piscataquog River Valley was one of the first areas to be developed when this region of New Hampshire was settled. For decades, saw and power mills and other mills for varied uses relied upon the river for their operations. The river valley also supported other factories, farming and forestry.

The Piscataquog River provided essential resources for early inhabitants. In the late 1700s and into the 1800s, its primary use was as a source of power for the numerous mills and shops. A site along the Piscataquog River was once home to the first shoe factory in the nation, which produced nearly 23,000 pairs of boots in its first year.

Fracesttown, Deering, Weare, and New Boston still contain many reminders of their early history in the ruins of the water-powered mills along the river's banks. The lower segment of the Piscataquog River was an important link in the transportation of cargo around Manchester. Dam locks were built at the river's mouth in 1818 to facilitate the passage of boats to and from the Merrimack River.

Records of these river-centered activities are abundant and can be found in locally printed and verbal histories. (Written historic resources include: *A Timetable of History* by Terry Knowles, Weare Historical Society; *New Boston's Mills and Factories* by Charles and Rena Davis, New Boston Historical Society; and *History of Manchester, Derryfield 1751-1810*, by Chandler E. Potter.)

Many structures that have survived and represent a significant piece of New Hampshire's heritage have been given a historical designation. These designations are recognized on a state and national level and the Piscataquog watershed region has many fine examples.

Schoolhouses include the Clinton Grove Academy and the North Schoolhouse in Weare; and the Goffstown High School, Grasmere Schoolhouse, and Aiken Academy in Goffstown. Of particular significance is Page's Schoolhouse, a one-room schoolhouse that served the area where Caleb Page lived, father to Molly Stark. Molly Stark was the wife of Captain John Stark who is known for his leadership role in the Battle of Bunker Hill during the Revolutionary War and is attributed for coining New Hampshire's motto, "Live Free or Die". During his time away, Molly resided in her father's house.

Page's Corner School House, Dunbarton, NH



(Source: SNHPC)



Many historic houses and farms include the Richards house in Goffstown, the Gregg Montgomery house in Francestown and the Chase Amos house in Weare. The Chase Amos house was owned by Chase Amos in the mid to late 1800's and was used to manufacture carriages for several years. Chase Amos was the owner of the only surviving mill site featured along the Piscataquog River; the Chase Amos mill is part of the National Historic Registry.

Other notable structures include town churches, public libraries, cemeteries, town meeting halls, and important buildings that served different functions over time such as Simon's Store and the Stone Memorial Building in Weare. To view designated historical sites within the Piscataquog Watershed, see Map 13. This map displays the level of historical designation of sites within the region. The different levels of historical designation assist in the effort to preserve historic value of historical sites in the Piscataquog region. The clustered regions within Francestown represent two significant historic districts. One ten-building district is dedicated to the construction of several buildings erected for the soapstone mill that was Francestown's leading industry at the time. The other district is featured in Francestown's Main Street area, and includes a total of 44 different properties.

To further recognize the connection of historic, cultural, and recreational features, the state designated the circular route of NH 13, NH 77, and NH 114 travelling through Goffstown, Weare, Dunbarton, and New Boston as the General John Stark Scenic Byway. This route comprises elements of historic significance to the area and the United States while also providing small town downtown areas, state parks, and scenic vistas. This route was designated by the state in 2008 following the guidelines of the National Scenic Byway program overseen by the Federal Highway Administration. Adoption of the route as a National Scenic Byway is still pending. For more information regarding this resource, a Corridor Management Plan developed by the General John Stark Byway Council and is available on the Southern New Hampshire Planning Commission website ([www.snhpc.org](http://www.snhpc.org)). Refer to Map 13 for a display of mill sites, National and State Registered Historic Sites, and the routes designated as part of the General John Stark Scenic Byway.

