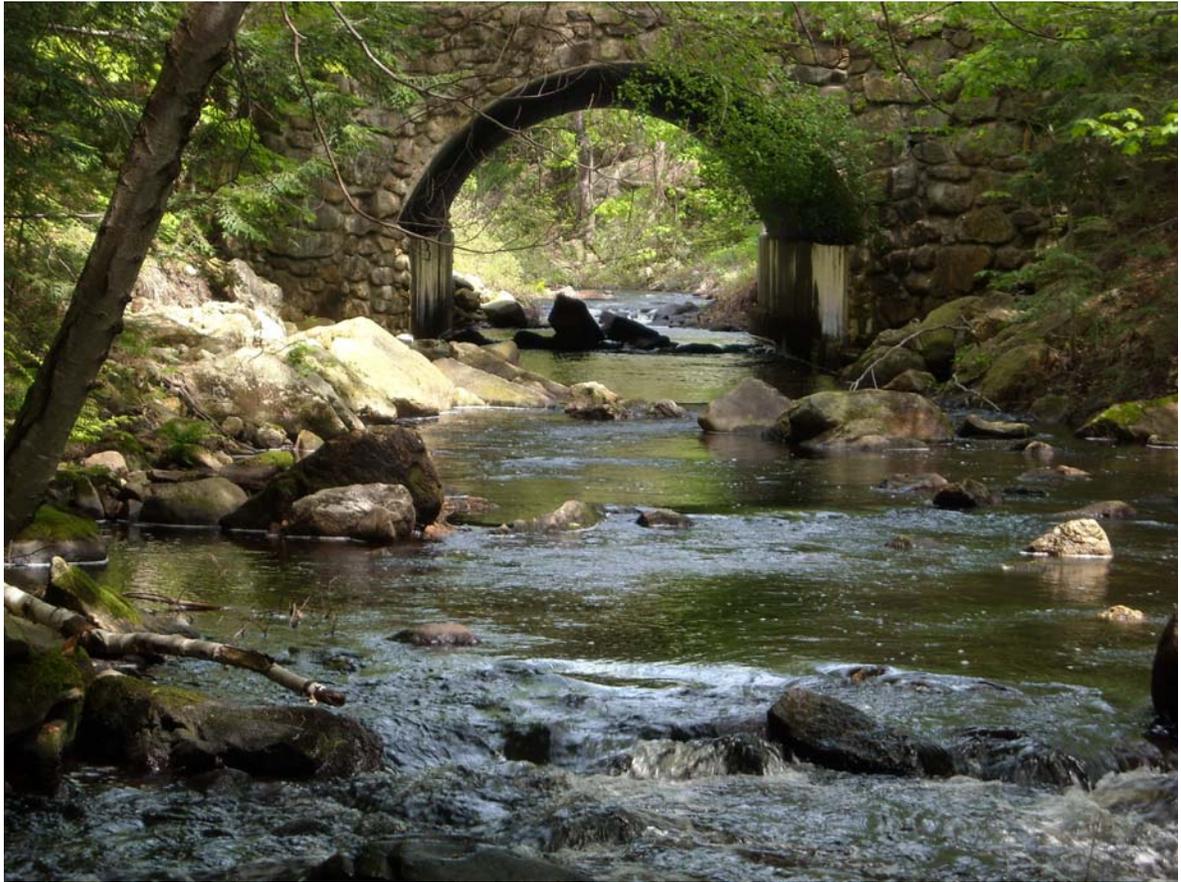


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Lamprey River, North Branch River, Pawtuckaway River, North River, Little River and Piscassic River

Nomination for Designation to the New Hampshire Rivers Management and Protection Program



Submitted to the NH Department of Environmental Services

By the
Lamprey River Nomination Committee
Lamprey River Watershed Association
Lamprey River Advisory Committee

Submitted June 1, 2010
Revised June 24, 2010

ACKNOWLEDGEMENTS

Lamprey River Nomination Committee

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Cheryl Killam, Vice-chair	Raymond
June Dickerson, Secretary	Raymond
Dawn Genes	Lamprey River Watershed Association
Karen Alexander	Raymond
Jack Barnes	Raymond
Barbara Edgar	Raymond
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Carolyn Matthews	Raymond
Jim Ryan	Northwood
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Funding Sources:

Lamprey River Advisory Committee

Piscataqua Region Estuaries Project

New England Grassroots Environmental Fund

With Technical Assistance from:

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Supported by:

Lamprey River Watershed Association

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New Hampshire Rivers Management and Protection Program

River Nomination Form

Instructions: Before beginning any work on a river nomination, sponsors should contact the State Rivers Coordinator at the NH Department of Environmental Services. The rivers coordinator can provide initial guidance by identifying local and regional contacts and other sources of information and can give advice throughout the preparation of a river nomination. Refer to the publication, "A Guide to River Nominations," for a step-by-step explanation of the nomination process and a directory of federal, state, regional, and private sources of information and technical assistance. The River Coordinator's address and telephone number are: PO Box 95, 29 Hazen Drive, Concord, NH 03302-0095; (603) 271-8801.

SECTION I. NOMINATION INFORMATION

1. Name of River:

Lamprey River, including tidal sections (except the already state designated river segment in Lee and Durham), North Branch River, Pawtuckaway River, North River, Little River, and the Piscassic River.

2. River/River Segments , Locations (and start/end points) and Length (miles):

The Lamprey River from immediately downstream of the dam at Meadow Lake in Northwood to the Epping / Lee town line, a distance of 35 miles; from the Durham/Newmarket town line to the tidal portion of the Lamprey River in Newmarket 1.8 miles downstream of the Macallen Dam, a distance of 2.6 miles;

The North Branch River in Deerfield, Candia and Raymond from immediately downstream of the Beaver Pond Dam to the confluence with the Lamprey River in Raymond, a distance of 8.2 miles;

The Pawtuckaway River from immediately downstream of the Pawtuckaway Lake Dam in Nottingham to the confluence with the Lamprey River in Epping, a distance of 3.6 miles;

The North River from immediately downstream of the North River Pond Dam in Nottingham through Lee to the confluence with the Lamprey River in Epping, a distance of 15.1 miles;

The Little River from immediately downstream of the of Mendum's Pond Dam in Nottingham to the confluence with the Lamprey River in Lee, a distance of 7.6 miles.

The Piscassic River from the headwaters 0.5 miles upstream of the Fremont/Brentwood town line to the confluence with the Lamprey River in Newmarket, a distance of 15.6 miles.

In total, 87.7 miles are being nominated.

3. (a) Sponsoring Organization: Lamprey River Watershed Association

(b) Contact Person: Dawn Genes, Executive Director

(c) Address: 43 North River Road, Lee, NH 03861

(d) Daytime Telephone Number: 603-659-9363

SECTION II SUMMARY: RESOURCES OF STATEWIDE OR LOCAL SIGNIFICANCE

Explanation: In order to be eligible for designation to the Rivers Management and Protection Program, a river must contain or represent either a significant statewide or local example of a natural, managed, cultural, or recreational resource.

Instructions:

1. By checking the appropriate boxes below, indicate the resource values that you believe are present in the nominated river and its corridor and whether you believe these values are present at a level of significance that is statewide or local. If the value is not present, leave the box blank. *L* = local significance *S* = statewide significance

Natural Resources	Upper Lam- prey	North Branch River	Paw- tuck- away	North River	Little River	Pis- cassic River	Tidal Lam- prey
Geologic/Hydrologic Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Wildlife Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Vegetation/Natural Communities	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Fish Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Rare Species or Habitat	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Water Quality	L	L	L	L	L	L	L,S
Open Space	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Natural Flow Characteristics	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Managed Resources							
Impoundments	L		L,S	L	L	L	L,S
Water Withdrawals/Discharges	L,S	L	L,S	L,S	L,S	L,S	L,S
Hydroelectric Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Cultural Resources							
Historical/Arch. Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Community River Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Recreational Resources							
Fishery Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Boating Resources	L,S		L	L	L	L	L,S
Other Recreational Resources	L,S	L	L,S	L	L	L	L,S
Public Access	L,S	L	L,S	L	L	L	L,S
Other Resources							
Scenic Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Land Use	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Land Use Controls	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Water Quantity	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Riparian/Flowage Rights	L,S	L,S	L,S	L,S	L,S	L,S	L,S
Scientific Resources	L,S	L,S	L,S	L,S	L,S	L,S	L,S

2. Briefly describe the most important resource values that are present in the nominated river and why you believe these values are significant from either a statewide or local perspective.

For example, if the river contains a segment of whitewater that attracts kayakers from throughout the state and is identified in a regional boaters' guide as a premier whitewater boating segment, you should identify recreational boating as a significant statewide resource and include one or two sentences in support of this statement. In addition, if you feel that a resource value is threatened, explain why.

The Lamprey River and its tributaries, the North Branch River, the Pawtuckaway River, the North River, the Little River and the Piscassic River, support a variety of resource values along as they travel and collect water from fourteen communities. These resources include drinking water, wildlife habitat, fish and aquatic habitat, recreation opportunities, and historic values. Each river makes significant contributions to the total river system and their protection is critical to the health of the entire watershed and to the quality of water delivered to Great Bay.

Prior Designation of Sections of the Lamprey in Lee, Durham, Newmarket and Epping

Because of its ecological, historical and cultural values, eleven miles of the Lamprey River in the towns of Lee and Durham were designated for special protection in 1990 by the State of New Hampshire, through the NH Rivers Management and Protection Program.

In 1996, the Lamprey River through Lee, Durham and Newmarket (to the confluence with the Piscassic River) was federally designated by the US Congress through the National Wild and Scenic Rivers Act. In 2000, the river segment in Epping, from the West Epping Dam to Lee, was added. In total, twenty-three and a half miles of the Lamprey River are designated as a Wild and Scenic River, from the West Epping Dam in Epping to the confluence with the Piscassic River in Newmarket. The lower Lamprey is one of only thirteen other rivers in the US recognized as "Wild and Scenic" by the US Park Service. In the case of the Lamprey, this designation was granted based on "unique attributes of historical and ecological significance".

As pieces of a larger river system whose worth and integrity are, for the most part, substantially intact, the entire Lamprey River, the North Branch River, the Pawtuckaway River, the North River, the Little River and the Piscassic River should be considered for designation through the RMPP.

Significant Resource Values in the Lamprey River and the Major Tributaries:

1. Water Quality

The Lamprey River links Betty Meadows Lake in Northwood to the Great Bay Estuary at Newmarket and is the largest contributor of fresh water to Great Bay. Great Bay Estuary has been classified as "impaired" under the Clean Water Act for several years and there is a trend of decline on several key indicators. It is imperative that the Lamprey's water and watershed retain the highest possible degree of ecological integrity if Great Bay is to improve and become compliant with the Clean Water Act. The link between the Lamprey River and Great Bay's ecological health is not merely the amount of water being delivered, but also the quality of the water. Unfortunately, a few indicators show that the Lamprey itself is impaired. Occasional high levels of dissolved nitrogen and low levels of dissolved oxygen, at a few locations along the lower reaches of the river signal a decrease in water quality. Impaired water quality is not only a negative mark on an area, but it also brings federal sanctions. Communities that contribute or potentially contribute to the problems are required to address the impairments meaningfully and appropriately. (The State of the Estuaries Report 2009 prepared by the Piscataqua Regional Estuaries Partnership.)

The Lamprey River is the largest tributary that flows into the Great Bay. The PREP evaluates the “State of NH’s Estuaries” every three years. In 2006, seven of the twelve water quality indicators were showing negative or cautionary trends representing a decline in the health of Great Bay. Elevated nitrogen concentrations are largely responsible for the loss of eel-grass (which is necessary for fish habitat) and low dissolved oxygen levels in the Great Bay.

The costs of declining water quality are many. Impaired natural resources such as reduced fish habitat, fines for municipalities, and sullied public perception could translate into serious economic losses: \$2.6 million in lost sales, \$930,000 in lost income, 43 lost jobs. (A. Nordstrom, *What’s Our Water Worth?* 2007)

Southern New Hampshire has experienced 10% growth per decade in population in the past few decades. This has resulted in an increased demand to draw more water from the river and the aquifers that supply it. The Lamprey River, North Branch River, North River and Piscassic River each has several registered water users for purposes of water supply, agriculture, commercial, bottled water, industrial or sewage treatment.

Concurrently, the incidence of extreme rain events has increased flooding along the river. These floods underscore the need for improved land-use planning in the towns along the river and its tributaries, especially where human safety and public infrastructure are concerned. To address this need, the Lamprey’s flood maps are scheduled to be revised in 2010 to incorporate updated land-use patterns and the resultant likelihood of flooding.

Water quantity has long been a management issue for municipalities and the state due to ongoing concern about flooding, adequate public water supply, and controlled flow for water power. Most of the dams that formerly dotted the Lamprey are gone or breached, but the Macallen Dam in Newmarket, the Wiswall Dam in Durham, and the Bunker Dam in Epping still present significant obstacles to free flow and passage for anadromous fish. Macallen has a fish ladder, a fish ladder has been proposed for Wiswall, and Bunker is slated for removal. Ecologically, a free-flowing river is a healthier river. However, the historical significance of dams can draw a passionate response from local residents.

2. Wildlife

The Lamprey River and its tributaries support a number of wildlife species that have been listed as rare, endangered, threatened, or are species of special concern in the state. The 2006 Land Conservation Plan for New Hampshire’s Coastal Watersheds (The Nature Conservancy and others), and New Hampshire’s state Wildlife Action Plan (NH Fish & Game and others 2005, 2010) have identified conservation focus areas and critical wildlife habitats in all eleven towns in the Lamprey River Watershed. These include several areas of highest ranked habitats in the state (identified by the NH Wildlife Action Plan maps, 2010). Highest ranked habitats are those that are in the best ecological condition in the state and in the ecological region. Conservation Focus Areas (Coastal Conservation Plan) include large unfragmented forest blocks, intact floodplains and riparian corridors, significant fish and wildlife habitats, critical habitat supporting rare species and exemplary natural communities, and important connectivity areas.

The Lamprey’s wildlife has been well studied in the past and several key habitats and populations have been identified in the watershed. The river channel, floodplain, and adjacent wetland communities are particularly intact compared with other rivers in the region. As a result, the Lamprey River system has “landscape-level significance” that extends beyond its individual components. (D. SPerduto and G. Crow, “A Vegetation Assessment of the Lamprey River Corridor in Epping, Lee, Durham, and Newmarket, New Hampshire, (1994))

The Lamprey watershed provides suitable habitat for six of the nine species of mussels found in New Hampshire. Among these, the brook floater (*Alasmidonta varicose*) is listed by the state as endangered and is a candidate for federal listing. According to Susi von Oettingen, US Fish and Wildlife Endangered Species Specialist, the presence of six species of mussels is an outstanding indicator of high diversity and good water quality, few dams, and little sedimentation.

The Lamprey watershed also provides suitable habitat for all six of New Hampshire's native turtles and all have been found along the river. Among these, Blanding's turtles are endangered in New Hampshire, spotted turtles are threatened, and wood turtles are listed as vulnerable to extirpation and extinction. All three of these turtles need extensive and varied habitats for different processes in their life histories, a fact often at odds with increasing human population.

Mammals that are common and/or abundant in the watershed include: beaver, black bear, coyote, eastern chipmunk, fisher, flying squirrels, gray fox, gray squirrel, longtail weasel, mink, moose, muskrat, porcupine, raccoon, red fox, red squirrel, river otter, shorttail weasel, skunk, whitetail deer, and woodchuck. Mammals occasionally encountered are bobcat, eastern cottontail rabbit, and snowshoe hare. Birds represent 159 species, including four state endangered species (pied-billed grebe, bald eagle, sedge wren, and peregrine falcon) and three state threatened species (northern harrier, osprey, and common nighthawk).

3. Significant Recreational and Aesthetic Attributes

The Lamprey provides a variety of recreational opportunities, including Class III rapids for whitewater rafting, and quieter waters for canoeing and kayaking, all popular pastimes in the Lamprey River Watershed towns. According to C.F. Jackson in A Biological Survey of Great Bay, New Hampshire (1944), the Lamprey "furnishes every possible type of stream environment." With careful planning and several portages, it is possible to run the full length of the river. One of the most popular events along the river is the annual canoe race in Epping. From the boat launch in Newmarket, one can access Great Bay and the ocean beyond. The river and its tributaries offer a number of fishing opportunities, swimming and tubing. There are many public walking trails along the river. No road parallels the river, but the river can be enjoyed by motorists and bicyclists as they cross the river. There are several scenic vistas along the way as the river makes its journey to the sea. The Lamprey River Advisory Committee has produced a popular map and brochure that indicates routes, points of interest, and helpful information for those who wish to explore and enjoy the Lamprey. Most public access points also have kiosks to inform visitors.

The North River also offers some exciting canoe and kayak runs in the lower reaches. Just beyond the town line, at the bridge, is the best white water spot on the North River, a favorite of kayakers, fisherman, and photographers alike. This is also the site of an old grist mill.

All of the rivers offer excellent fishing.

4. Rare Plants

Rare plants of the Lamprey River corridor include one federally listed threatened species, small whorled pogonia (*Iisotria medeoloides*), which is also on the state threatened species list. There are 18 state endangered plant species and three state threatened species within the Lamprey corridor. See Section VII 1. (c) for a complete list.

The North Branch River has no federally listed plant species and one state listed endangered plant species, Tubular Thoroughwort (*Eutrochium fistulosum*), within the river corridor.

The Pawtuckaway River has no federally listed plant species and one state listed endangered plant species, Lowland Toothcup (*Rotala ramosior*), within the river corridor.

The North River has no federally listed plant species and one state listed endangered plant species, Slender Blue Flag (*Iris prismatica*), within the river corridor.

The Little River has no federally listed plant species and two state listed endangered species, Ovoid Spike-rush (*Eleocharis ovata*) and Spherical Panic Grass (*Dichanthelium spaen*), two state listed threatened species, Knotty Pondweed (*Potamogeton nodosus*) and River birch (*Betula nigra*), within the river corridor.

Within the Piscassic River corridor there are no federally listed plant species and four state listed endangered species; blunt sphenopholis (*sphenopholis obtusata*), climbing hempweed (*mikania scandens*), downy false foxglove (*aureolaria virginica*), and umbrella sedge (*cyperus erythrozoides*). The large bur-reed (*sparganium eurycarpum*) is a state listed threatened plant species.

5. History

The Lamprey River, North Branch River, Pawtuckaway River, North River, Little River and Piscassic River are significant assets to the people living in its watershed and to the people of New Hampshire. Their rich history helps to evoke a strong sense of place and belonging. Human history along the Lamprey River dates back 8,000 years. Abenaki Native Americans paddled the river and camped on the shores. Mills dotted the rivers in the 18th century to harness the power of the water and to provide transportation for goods.

There are numerous historic structures in the river corridors; schools, houses, churches, mills, taverns, barns, libraries and more are living legacies to this rich history. Work is underway to map and research several significant mill complexes and the technology used. A committee in Epping has recently formed to create a lasting legacy of the remnant of Folsom Mills, which will be effected by the removal of the adjacent Bunker Dam.

Table 1. Count of Historic Structures in the Nominated River Corridors

River	Town	Number of Historic Structures	Number of Historic Structures on National Register
Lamprey	Northwood	6	1
	Deerfield	6	4
	Raymond	6	1
	Epping	21	1
	Newmarket	15	2
North Branch	Candia	5	3
Little River	Barrington	1	1
	Nottingham	7	2
Piscassic	Fremont	32	1
	Epping	1	0
	Newfields	2	0

No other river system in the coastal watershed delivers as much water or represents as much land area as the Lamprey River watershed. The Lamprey River, North Branch River, Pawtuckaway River, North River, Little River and Piscassic River must be protected and through a watershed approach, provide the habitat, water supply, scenery and recreation that the human and wildlife population needs to thrive in a healthy environment.

III. COMMUNITY AND PUBLIC SUPPORT

Explanation: The level of community and other public support which is demonstrated for a river nomination will be an important factor in determining whether that river will be recommended for legislative designation.

Such support may be shown by the adoption of a town resolution, a letter from selectmen, master plan excerpts, or documented support from other groups, either public or private (if private, explain the group's purpose and who is represented).

Instructions: Describe the type of community and other public support that exists for the river nomination and attach appropriate documentation. Include copies of any letters of support from local elected and appointed officials. Include documentation of notification of the nomination to elected public officials of all municipalities through which each nominated river or segment flows.

Eleven miles of the Lamprey River in the towns of Lee and Durham were accepted into the New Hampshire River Management and Protection Program (RMPP) in 1990. Candia sought designated status for the North Branch River with a Town Warrant article in 2000 and several applications but was turned back for lack of a regional effort. Neighboring towns were not ready at that time but have since requested to also be part of this program with strong support at this time from Raymond and Deerfield to create a critical mass of river miles that collectively support a larger ecosystem. Evidence of Candia's long-time interest in the RMPP can be seen in Appendix A.

In March 2009, residents in the town of Raymond voted to support the establishment of a Lamprey River committee to work with neighboring communities to prepare and submit a nomination for the Lamprey River to the RMPP through Warrant Article 29, with 549 "Yes" votes (58%) to 394 "No" votes.

As towns struggle with resource issues they have recognized that working together makes sense and that a watershed approach is necessary. The need to work together was made perfectly clear by the twelve communities not yet included in the RMPP who attended a conference held on June 13, 2009 in Nottingham. The conference was entitled, "Your Water, Your Wallet, Your Watershed – Why Working Across Town Boundaries Makes \$ence". This watershed outreach conference was sponsored by a collaboration of organizations which included the Lamprey River Watershed Association (LRWA), Lamprey River Advisory Committee (LRAC), NH Water Resources Research Center at UNH and the Piscataqua Region Estuaries Partnership (PREP). Seventy three people registered for the conference and it was attended by town officials, residents and non-profit organizations from all fourteen communities of the watershed.

By all accounts, this conference was a great success and there was a call to action to focus on opportunities for improving water quality management methods throughout the watershed. A DVD of the four conference speakers was made available on the LRWA website and shown on several local community public access TV channels in Northwood, Deerfield, Newmarket and Raymond. The break-out session summaries were also widely distributed.

The research presented at the conference clearly showed that the Lamprey River is experiencing a decline in water quality and at the same time a greater demand for this resource. For example, data from the Lamprey River show a long-term increase in nitrate and chloride concentrations which both are drinking water contaminants. According to 2006 analysis, seven of the twelve water

quality indicators were showing negative or cautionary trends representing a decline in the health of Great Bay. Elevated nitrogen concentrations are largely responsible for the loss of eel-grass (which is necessary for fish habitat) and low dissolved oxygen levels in the Great Bay. Protecting only 12 miles of the mainstem of the Lamprey River and not the many miles of major tributaries that feed into the Lamprey will not achieve the improvements to water quality that are necessary to reduce and reverse these negative trends.

Both during and following the “Your Water, Your Wallet, Your Watershed” conference State Representative L. Mike Kappler from Raymond was instrumental in recruiting members from a majority of the watershed communities to form a committee to begin the RMPP nomination process. The Lamprey River Nomination Committee (LRNC) held its first organizational meeting on July 17, 2009 with membership from the watershed towns. The LRNC prepared outreach materials and prepared a strategy for widespread notification of watershed towns and residents of the interest in seeking designated status for the remaining Lamprey River sections (including tidal portions) and its key tributaries. These main tributaries include the North Branch River in Deerfield and Candia; the Pawtuckaway River in Nottingham Raymond and Epping, the North River and Little River in Nottingham and Lee; and the Piscassic River which flows from Fremont to Newmarket.

The announcement of the formation of the Lamprey River Nomination Committee in July of 2009 and the nomination process underway was printed in the Lamprey River Watershed Association's fall 2009 newsletter to 861 watershed residents, predominately riverfront landowners. Representative Kappler also provided updates to news organizations including the Carriage Towne News.

Notification of Corridor Communities

Letters of notification, brochures explaining the nomination process and maps of the watershed were mailed to 12 of the 14 municipalities within the Lamprey River watershed on November 5, 2009 (Appendix A). They were addressed to the Chairman of each of the Select Boards, Planning Boards and Conservation Commissions. The towns included Northwood, Nottingham, Deerfield, Candia, Raymond, Epping, Newmarket, Barrington, Fremont, Brentwood, Exeter and Newfields. Lee and Durham were not part of this mass mailing as these towns are already in the River Management and Protection Program.

Table 2. Towns Contacted by the Lamprey River Nominating Committee

Town/Organization	Local Government	Conservation Commission	Planning Board
Barrington Town Office	Mike Morrison	John Wallace	John Huckins
Brentwood Town Office	Jeffrey Bryan	Rob Wofchuck	Bruce Stevens
Candia Town Office	Frederick Kelley	Susan Wilderman	Mary Girard
Deerfield Town Office	Stephen R. Barry	Serita Frey	Frederick J. McGarry
Epping Town Office	Tom Gauthier	Greg Tillman	Greg Tillman
Exeter Town Office	William Campbell	Peter Richardson	Langdon Plumer
Fremont Town Office	Donald Gates	Jack Karcz	Roger Barham
Raymond Town Office	Frank Bourque	Cheryl Killam	Jonathan Wood
Newfields Town Office	Wes Moore	Alison Watts	John Hayden
Newmarket Town Office	Michael LaBranche	Bruce Fecteau	John Badger
Northwood Town Office	Alden Dill	Stephen Roy	Peter Jones
Nottingham Town Office	Mary L. Bonser	Samuel Demeritt	Scott Canney

Notification to State Senators and State Representatives

Notification letters, brochures explaining the nomination process, and maps of the watershed were sent to state Senators and Representatives of the communities within the Lamprey River Watershed on November 19, 2009 (Appendix A).

Outreach to Watershed Stakeholders

Letters were sent on or around March 24, 2010 to the individual landowners along the Lamprey River in Deerfield, Raymond, Epping and Newmarket, in addition to landowners along the North Branch River in Candia, the Pawtuckaway River in Raymond, the North River and Little River in Nottingham, and the Little River and North River in the town of Lee. In total, approximately 600 pieces of first class mail went to river abutters. Notification was also sent to all Lamprey River Watershed Association volunteers via electronic mail. (Appendix A).

The letters and emails discussed what was proposed and why, notice of three public information sessions and addresses to send letters of support.

News articles about the nomination efforts appeared in the Carriage Towne News on January 7, 2010 and the Manchester Union Leader on April 14, 2010. The Forum, an online newspaper serving the towns of Deerfield, Northwood, Candia and Nottingham printed the article “Lamprey River Group to File for River Protection” submitted by Dawn Genes on April 10. (Appendix A)

Notices about the public informational sessions were placed on the local community public access TV channels in Deerfield, Newmarket and Raymond.

Organizations Contacted by the LRNC:

The Natural Resources Outreach Coalition (NROC) has provided valuable technical assistance to the LRNC through facilitation and strategic planning at LRNC meetings, assistance with public presentation preparations for the public meetings, and with development of informational materials such as “Frequently Asked Questions and Answers” which was included in the landowner mailings. NROC also facilitated at the public information sessions and captured notes.

The Lamprey River Advisory Committee provided the initial seed money to get nomination efforts underway. LRAC was formed in 1990 when Congress enacted legislation authorizing a study to

determine whether the Lamprey River should be designated a National Wild and Scenic River. The river was indeed found eligible, and designation occurred in 1996. LRAC also serves as the local management advisory committee under the RMPP, under which segments of the Lamprey in Lee and Durham were designated in 1990.

Northwood Area Land Management Collaborative (NALMC) is a unique, voluntary and strategic public/private partnership working together across property boundaries to maintain and enhance the ecological, social, recreational, and economic resources. The NALMC neighborhood currently encompasses over 3,000 acres and includes land owned by NH Fish and Game Department, NH Department of Resources and Economic Development, the Town of Northwood, Coe-Brown Northwood Academy, the University of NH, Harmony Hill farm and several other private landowners.

Bear-Paw Regional Greenways is a land trust with a mission to permanently conserve a network of lands that protects our region's water, wildlife habitat, forests and farmland. It works to conserve open space through outreach, education and land protection project assistance in towns within the Lamprey River watershed, including Candia, Deerfield, Northwood, Nottingham, and Raymond. Bear-Paw printed a notice of the April 13 public information session in Deerfield in their spring newsletter.

The National Park Service's Rivers and Trails Program works with local citizens groups to preserve valuable open space, assistance in river conservation, and develop trail and greenway networks. It often acts as a catalyst to help assemble the necessary pieces to achieve on-the-ground conservation success, helping identify resources, navigate the planning process, and convert ideas into action. Lelia Mellen, NPS, provided technical assistance in conceptual planning, organizational development, and historical and cultural resource documentation.

Without direct support from a Regional Planning Commission the technical assistance from the NPS was instrumental in getting several components of this application completed. Also, since half of the Lamprey (the 24 miles flowing through Epping, Lee, Durham and Newmarket) is already designated as 'wild and scenic' by the NPS, their knowledge of the river was second to none.

The Southeast Land Trust of New Hampshire's mission is to conserve the significant land and natural resources of southeastern New Hampshire, including water, working farms and forests, wildlife habitat and natural areas, and community landscapes. As a regional land trust, the organization serves 39 communities of greater Rockingham County.

The Lamprey River Watershed Association (LRWA) was formed in 1983 to promote the restoration, conservation, and sustainable use of the natural resources of the Lamprey River Watershed. It supports the natural resource education and research on the Lamprey ecosystem. Moreover, it works in partnership to increase the understanding among citizens about the importance of conservation in the watershed. LRWA had identified the need for expanded designation in their strategic plan.

The AL Wood Drive Road Association was formed in 1987 and has been an active participant in protecting the water quality in Mendums Pond where the outflow represents the headwaters to Little River. The Little River has been determined to be one of the most important tributaries feeding into the Lamprey to maintain low flow (Tom Ballestero 2004). For the past few years this Association has received state and federal funding to study the nutrient pollution problems associated with Mendums which impacts downstream river water quality.

Letters of Support Received

Based on the notification letters sent out, followed by an education and outreach initiative, a substantial number of support letters were received from a wide range of stakeholders, including municipalities, public and private groups, state senators and representatives, and many individuals that are riverfront land owners or residents that enjoy the use of the river in their community (Appendix A).

In addition, a strong joint letter of support was received from U.S. Senator Jeanne Shaheen and U.S. Congresswoman Carol Shea-Porter. This is more fully explained as a footnote in the Letters of Support Received Table.

Public Meetings

Three public meetings: April 7 in Raymond, April 8 in Newmarket, and April 13 in Deerfield, were held to give riverfront landowners an opportunity to learn more about the nomination of the Lamprey River and what it might mean to them.

Individual first class letters were mailed to riverfront landowners in Newmarket, Newfields, Exeter, Brentwood, Fremont, Epping, Raymond, Candia, Deerfield, Northwood, Nottingham and Barrington notifying them of all three meetings so they could choose the most convenient one.

The public information meeting on April 7 in Raymond was held during a scheduled Conservation Commission meeting and was shown on RCTV Channel 22 for two weeks.

The public information meeting on April 8 in Newmarket was held during a scheduled Planning board meeting with the Conservation Commission attending.

Presentations to Groups

The LRNC attended a NALMC meeting on August 26, 2009 to discuss what nomination of the upper Lamprey River might mean to this group and landowners in the NALMC region.

LRNC attended the Bear-Paw Regional Greenways Board meeting on December 12, 2009 to explain the nomination process.

On January 19, 2010 LRNC attended the Newmarket Planning board meeting to explain the nomination process and answer questions.

During a river clean up by the Great Bay Chapter of Trout Unlimited, the nomination was explained and participants were eager to sign the petition to show support.

Results Summary As of June 17, 2010

600	pieces of first class mail to riverfront landowners
18	letters of support from town boards and commissions
72	letters of support from individuals and partner organizations
43	petition signatures of individuals in support of the nomination
48	attendees at public meetings

6/24/10

**Letters of Support Received
for the Lamprey River and Tributaries Nomination to NH RMPP**

	Conservation Commissions	Planning Boards	Select Boards	Individuals and Organizations	Legislators – listed by town of residence. Most represent more than one town.
Barrington	6/21/10		11/18/09	Al Wood Drive Association Thomas and Loretta Chase	Larry Brown 5/4/2010
Brentwood	8/27/09	11/16/09			Don Petterson 5/4/2010 Donna Schlachman 5/4/2010
Candia	5/20/10		3/18/00 Warrant Article at Town Meeting		David Boutin 5/4/2010 Frank Case 5/17/10
Deerfield	5/20/10	5/13/10		Bear-Paw 4/22/2010 Residents: Kate Harnett (Pbd Member), John and Sarah Miller, Wendy Schorr, Herbert G. McKinney, Melissa Zych, Don Williams, Peter Devlin, Lisa Wolford, Barbara Matthews, Robert Matthews, Howard & Sylvia Maley, Erick Berglund Jr. (Cons. Comm. Mbr.)	Susi Nord 5/4/2010 Jim Ryan 5/4/2010
Durham	Already in RMPP	Already in RMPP	Already in RMPP	Great Bay Trout Unlimited Carl Spang (LRWA President)	Judith Spang 5/4/2010
Epping	1/10/10	12/11/09		Phil Primack	Penn Brown 12/23/2009 Amanda Merrill 3/5/10
Exeter	10/20/09			SE Land Trust 2/3/10	Maggie Hassan 5/4/2010 John Henson 1/11/2010 Frank Russell 5/4/2010
Fremont	4/6/10 6/7/10			Patricia deBeer	Tim Comerford 5/4/2010 Daniel Itse 5/4/2010
Lee	Already in RMPP	Already in RMPP	Already in RMPP	Lamprey River Advisory Committee Lamprey River Watershed Assoc. National Park Service Rivers & Trails Residents: Jud Porter, Arthur & Susan Bradbury, Sharon Meeker & Family, Bill McDowell (also UNH), Ben Genes	Jim Cyr 5/4/2010 Naida Kaen 5/4/2010 Bob Perry 5/4/2010

6/24/10

**Letters of Support Received
for the Lamprey River and Tributaries Nomination to NH RMPP**

Newfields	9/23/09				Marcia Moody 5/4/2010
Newmarket	5/13/10	5/24/10		Aryaloka, Residents: Albert Shattuck Jr, Peter Witham, Michelle Daly (also UNH)	Dennis Abbott 5/4/2010 Doreen Howard 5/4/2010
Northwood		12/10/09	11/25/09	NALMC, Resident: Victoria Parmele	Dennis Vachon 5/4/2010
Nottingham	03/10/10			Bonnie Winona, Gail and Chris Mills, John Terninko, Salandrea Patrizi, Therese Thompson, Pamela Greene, Michelle Hart, Kathleen Hicks, Timothy Bedell, Joliet Hoffman, Sarah Chapman, Mark & Joan Carpenter, Karen Batchelder, Ted & Alexandra Neff, Sinan Taigat, Seyhan Mukal, Janet & Phil D'Eon, Jean Eichhorn, Mike Principato, Chris Reagan, Katherine Howell, Robert & Jane Cooke, Pat Newhall, Jill Sunde, Douglas Simmons, PhD, Denise Murphy- Simmons, Susan & Joe Medeiros, Debra Nelson & Robert Wells, Carrie Pascoe, Nancy Smart, Gerry Lalonde	Maureen Mann 5/4/2010 James Sullivan 5/4/2010
Raymond	12/21/09	5/21/10		Residents: Kathy Mayo, Carolyn Matthews, John Matthews, Kimberlee Tyndall	Mike Kappler 2/12/10
Other				Cynthia Copeland, Strafford Regional Planning Commission 6/16/10	David Borden 5/4/2010 Pamela Hubbard 5/4/2010 Terie Norelli 5/4/2010 Stella Scamman 5/4/2010 Doug Scamman 5/4/2010 Senator Shaheen Congresswoman Shea-Porter
Totals	10	6	2	72	32

One letter was received by a Nottingham resident concerned that any abutters to rivers that are not currently 4th order will become subject to CSPA rules after designation. He finds the CSPA process to be “expensive, time-consuming, and frustrating.”

6/24/10

**Letters of Support Received
for the Lamprey River and Tributaries Nomination to NH RMPP**

A strong joint letter of support (included in the Appendix A) came from U.S. Senator Jeanne Shaheen and U.S. Congresswoman Carol Shea-Porter for our successful Application for Assistance submitted to the National Park Service (NPS) requesting technical assistance from their NH State Director for Rivers, Trails and Conservation Assistance Program. Since we received no direct support from the three Regional Planning Commissions located within the Lamprey River watershed, the NPS's assistance was instrumental in assisting us to complete the Nomination. Moreover, the NPS has been involved with those portions of the Lamprey River which has been designated as 'wild and scenic'.

IV. Other Supporting Information

1. State of the Estuaries 2009. Piscataqua Region Estuaries Partnership
Every three years, the Piscataqua Region Estuaries Partnership (PREP) publishes a State of the Estuaries report that communicates the status and trends of key environmental indicators for the Great Bay and Hampton-Seabrook estuaries and the Piscataqua Region watersheds.
www.prep.unh.edu
2. Final Lamprey River Protected Instream Flow Report. July 13, 2009. New Hampshire Department of Environmental Services. This report describes the scientific methods used to study and develop protected instream flows for the Lamprey Designated River. The findings of this report will be used to formally establish protected instream flows for the Lamprey Designated River and will provide the basis for the development of a Water Management Plan to be completed during the second phase of this project.
http://www.unh.edu/erg/lamprey/final_ipuocr_report_revised.pdf
3. Lamprey River Hydrologic Observatory
Formed in 1999 to address the effects of suburbanization on water quality through long-term study of the Lamprey River basin (479 km²) in SE New Hampshire. The entire Lamprey River basin is referred to as the Lamprey River Hydrologic Observatory (LRHO) and serves as a platform to study the hydrology and biogeochemistry of a suburban basin. The LRHO is used as a focal point for student and faculty research, teaching and outreach in the Departments of Natural Resources & the Environment, Earth Science, Civil Engineering and the Climate Change Research Center. www.wrrc.unh.edu/lrho/
4. Piscataqua Region Environmental Planning Assessment, Derek Sowers, Project Manager. The Piscataqua Region Environmental Planning Assessment documents the current status of environmental planning efforts and land use regulations for each of the 52 communities in the Piscataqua Region watershed. A summary of 80 questions associated with municipal regulatory and non-regulatory approaches to resource management is included as well as recommended actions to improve natural resource protection across the watershed.
www.prep.unh.edu/resources/pdf/piscataqua_region_environmental-prep-10.pdf
5. The Land Conservation Plan for New Hampshire's Coastal Watersheds, August 2006. Prioritized coastal watershed areas and regional strategies for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and outstanding recreational opportunities.
<http://www.nature.org/wherewework/northamerica/states/newhampshire/projects/art19061.html>
6. New Hampshire Volunteer River Assessment Program 2009 Lamprey River Watershed Water Quality Report (January 2010) by the New Hampshire Department of Environmental Services, Volunteer River Assessment Program.
www.des.state.nh.us/wmb/VRAP/lamprey.html
7. Soil Survey of Rockingham County, New Hampshire. October 1994
8. Comments and Recommendations on the Water Resources Issues Involved with the Application by USA Springs, Inc. for a Large Ground Water Withdrawal. Thomas P. Ballesterio, PhD, PE, PH, CGWP, PG 23 May 2004

9. Strafford Regional Planning Commission, Cynthia Copeland, Director
Strafford Regional Planning has leadership among the three regional planning commissions that serve the Lamprey River watershed. Support information regarding aquifers, land use, impervious surfaces and more was generously supplied by SRP. www.strafford.org
10. Lamprey River Watershed Association, Streamwalk 2008 and Streamwalk 2009.
The entire 47 miles of the Lamprey River was walked by volunteers on each bank to determine the health and condition of the riparian area. Completed with a grant from the NH Department of Environmental Services. www.lrwa-nh.org
11. Southeast Land Trust, Brian Hart, Executive Director
The Southeast Land Trust of New Hampshire's mission is to conserve the significant land and natural resources of southeastern New Hampshire, including water, working farms and forests, wildlife habitat, natural areas, and community landscapes. As a regional land trust, we serve the 39 communities of southeastern New Hampshire. Established in 1980, the Land Trust has helped conserve more than 6,000 acres of land. www.seltnh.org
12. Bear Paw Regional Greenways, Dan Kern, Executive Director
Bear Paw Regional Greenways is a land trust established by community volunteers concerned with protecting open space lands. www.bear-paw.org
13. Lamprey River Watershed Association: Brochure - information about the organization and the watershed
14. Your Water, Your Wallet, Your Watershed – Why Working Across Town Boundaries Makes Sen\$. DVD of speakers from partnership hosted conference, June 13, 2009 Nottingham Town Hall. Additional copies are available from volunteer@lrwa-nh.org
15. Explore the Lamprey River” Map and tour guide of hiking trails, paddling access and historic sites, Lamprey River Advisory Committee (LRAC) www.lamprey.org
16. “Hidden Treasures on the Back Country Roads of the Lamprey River”, LRAC
17. “The Lamprey River – A Special Place” Watershed map and information about the Lamprey River Advisory Committee
18. “Living On The Lamprey-A Landowner’s Guide to Protecting, Preserving and Nurturing Your River”
19. “River Story – The Lamprey Through History” Video of historic locations on the Lamprey River. LRAC
20. Lamprey River Floodplain, trail guide for walk along Lamprey at the Rt. 87 bridge. LRAC

V. RIVER CLASSIFICATIONS

1) River Segment Criteria

a) General Description	
X	The river or segment is free flowing and characterized by high quality natural and scenic resources. The river shoreline is in primarily natural vegetation and the river corridor is generally undeveloped and development, if any, is limited to forest management and scattered housing. (Natural Rivers)
X	The river or segment is adjacent to lands which are partially or predominantly used for agriculture, forest management, and dispersed or clustered residential development. Some instream structures may exist, including low dams, diversion works and other minor modifications. (Rural Rivers)
X	The river or segment which flows through developed or populated areas of the state and which possesses existing or potential community resource values such as those defined in official municipal plans or land use controls. Such a river has mixed land uses in the corridor reflecting some combination of open space, agricultural, residential, commercial and industrial land uses. It is readily accessible by road or railroad and may include impoundments or diversions. (Rural-Community Rivers)
X	The river or segment flows through populated areas of the state and possesses actual or potential resource values, with some residential or other building development near the shoreline. The river or river segment is readily accessible by road or railroad, and may include some impoundments or diversions. (Community Rivers)
b) Length	
X	The river or segment is at least 5 miles long. (Natural Rivers)
X	The river or segment is at least 3 miles long. (Rural and Rural-Community Rivers)
X	The river or segment is at least 1 mile long. (Community Rivers)
c) Water Quality	
A and B	The actual water quality of the river or segment meets Class A standards under the state's water quality standards. (Natural Rivers)
A and B	The actual water quality of the river or segment meets Class B standards under the state's water quality standards. (Rural, Rural-Community and Community Rivers)
d) Distance to Roads	
<i>See next page</i>	The minimum distance from the river shoreline to a paved road open to the public for motor vehicle use is at least 250 feet, except where a vegetative or other natural barrier exists which effectively screens the sight and sound of motor vehicles for a majority of the length of the river. (Natural Rivers)
X	There is no minimum distance from the river shoreline to an existing road. Roads may parallel the river shoreline with regular bridge crossings and public access sites. (Rural, Rural-Community and Community Rivers)

Distance to Roads for proposed Natural River Segments:

North Branch River

The proposed Natural River segment for the North Branch River runs the entire length of the river (8.2 miles), beginning at the river's headwaters below the Beaver Pond Dam in Candia and ending at its confluence with the Lamprey River in Raymond. From upstream to downstream the North Branch River passes under three roads: New Boston Road in Candia, Deerfield Road (NH Route 43) in Candia, and Raymond Road (NH Route 27) in Raymond. Adjacent to the Raymond Road crossing, and within 250 feet of the river, is Island Road in Raymond; this local road contains scattered residential lots. Raymond Road is located within 250 feet of the river for approximately 0.3 miles near the crossing. These are the only crossings and roads within 250 feet along the entire length of the river.

- The New Boston Road crossing in Candia is adjacent to a town-owned conservation parcel to the south and is buffered by natural forest cover and wetlands to the north.
- The Deerfield Road crossing in Candia is adjacent to a few residential lots and the area is dominated by natural forest cover.
- The area of Raymond Road and Island Road in Raymond contains some residential lots, a commercial area, and quarry buffered by forest.

Piscassic River

The proposed Natural River segment for the Piscassic River begins at the river's headwaters 0.5 miles east of the Freemont/Brentwood town line to the NH Route 87 crossing in Newfields for a distance of 9.4 miles. From upstream to downstream the Piscassic River passes under six state roads and local roads; NH Route 125 in Brentwood, NH Route 101 in Epping, NH Route 27 in Epping, Birch Road in Epping, Cuba Road in Newfields and NH Route 87 in Newfields. No other state or local roads are within 250 feet of the river segment.

- The Route 125 crossing in Brentwood is adjacent to conservation land on the east side of the crossing and the area is dominated by forest cover and wetland.
- The Route 101 crossing in Epping is surrounded by forest cover and wetlands on all sides. The crossing is surrounded by conservation land.
- The Route 27 crossing in Epping is surrounded predominately by agricultural fields and wetland.
- The Birch Road crossing in Epping is surrounded by forested conservation land on all but the southwest side. The southwest side is also dominated by forest with no development within the river corridor. This road is a Class 6, unmaintained town road.
- The Cuba Road crossing in Newfields is surrounded entirely by conservation land on all sides.
- The downstream extent of the segment at the Route 87 crossing in Newfields is dominated by the Piscassic Ice Pond and it is surrounded by wetlands and agricultural fields.

2) River Segments

All classifications are listed from upstream to downstream.

Lamprey River

- Lamprey River – Segment 1, Length: 13.5 miles **RURAL**

Description: From immediately downstream of Meadow Lake Dam in Northwood to the confluence with the North Branch River in Raymond.

- Lamprey River – Segment 2, Length: 3.0 miles **RURAL-COMMUNITY**

Description: From the confluence with the North Branch River in Raymond to 0.9 miles downstream of the Langford Road crossing.

- Lamprey River -Segment 3, Length: 2.0 miles **COMMUNITY**

Description: From 0.9 miles downstream of the Langford Road crossing in Raymond to 0.3 miles downstream of the Epping Street Crossing.

- Lamprey River – Segment 4, Length: 5.1 miles **RURAL-COMMUNITY**

Description: From 0.3 miles downstream of the Epping Street Crossing in Raymond to the confluence with the Pawtuckaway River in Epping.

- Lamprey River – Segment 5, Length: 4.0 miles **COMMUNITY**

Description: From the confluence with the Pawtuckaway River in Epping to the downstream side of the Route 125 Bridge.

- Lamprey River – Segment 6, Length: 7.3 miles **RURAL**

Description: From the downstream side of the NH Route 125 Bridge in Epping to the Epping/Lee town line.

Note: The Lamprey River is currently designated as RURAL from the Epping/Lee town line to the Durham/Newmarket town line.

- Lamprey River Segment 7, Length: 2.6 miles **COMMUNITY**

Description: – From the Durham/Newmarket town line to 1.8 miles downstream of the MacCallen Dam in Newmarket.

North Branch River

- North Branch River – Segment 1, Length: 8.2 miles **NATURAL**

Description: From immediately downstream of the Beaver Pond Dam in Candia the confluence with the Lamprey River in Raymond.

See previous section for distance to road information.

Pawtuckaway River

- Pawtuckaway River – Segment 1, Length: 3.6 miles **RURAL**

Description: From immediately downstream of the Pawtuckaway Lake Dam in Nottingham to the confluence with the Lamprey River in Epping.

North River

- North River – Segment 1, Length: 15.1 miles **RURAL**

Description: From immediately downstream of the North River Pond Dam in Nottingham to the confluence with the Lamprey River in Epping.

Little River

- Little River – Segment 1, Length: 7.8 miles **RURAL**

Description: From immediately downstream of the Mendum's Pond Dam in Nottingham to the confluence with the Lamprey River in Lee.

Piscassic River

- Piscassic River – Segment 1, Length: 9.4 miles **NATURAL**

Description: From the headwaters 0.5 miles upstream of the Fremont/Brentwood town line to the downstream side of the Route 87 crossing in Newfields.

See previous section for distance to road information.

- Piscassic River – Segment 2, Length: 3.3 miles **RURAL-COMMUNITY**

Description: From the downstream side of the Route 87 crossing in Newfields to the downstream side of the Grant Road crossing in Newmarket.

- Piscassic River- Segment 3, Length: 2.9 miles **COMMUNITY**

Description: From the downstream side of the Grant Road crossing in Newmarket to the confluence with the Lamprey River.

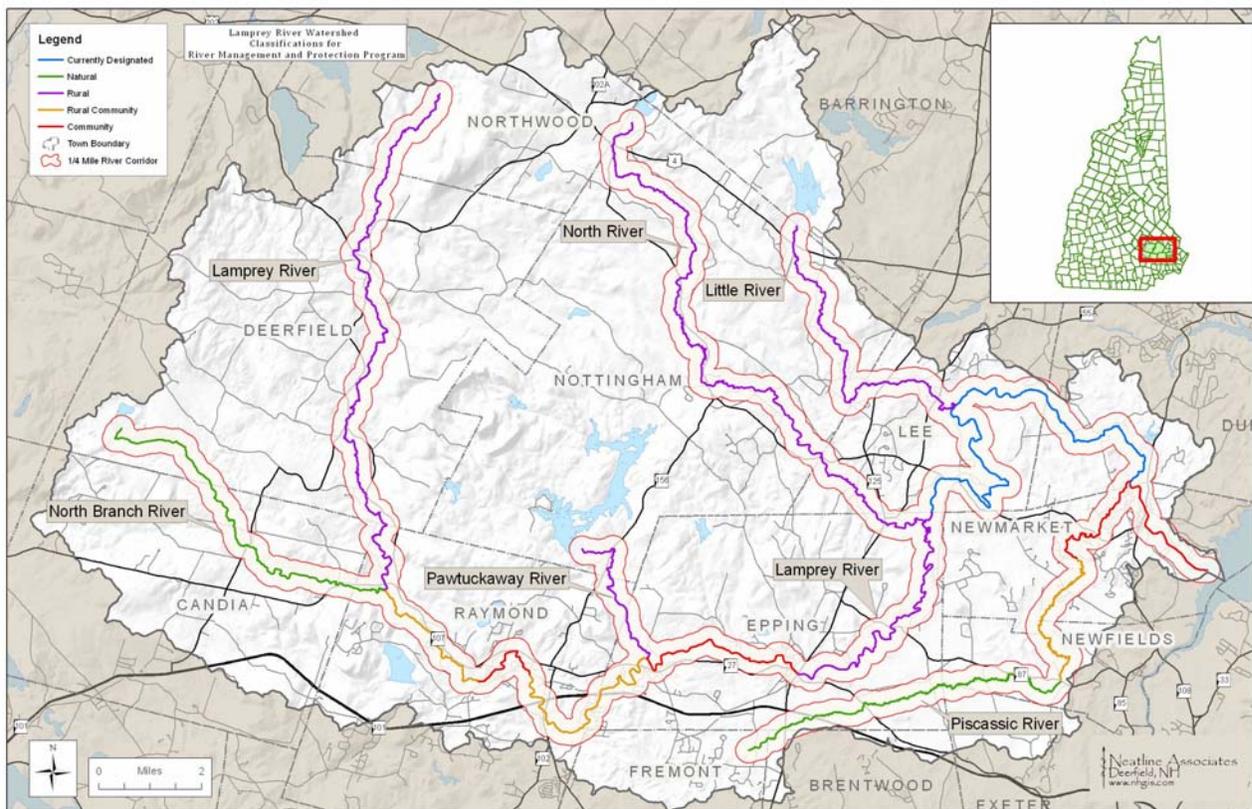
A map of the proposed classifications is on the next page.

VI. Maps

A map of the river must be appended to this resource assessment. This map should be taken from a U.S. Geological Survey quadrangle (scale 1:24,000) or equivalent in accuracy and detail. GIS maps produced to show river-related resources can serve this purpose. Include an inset or locator map showing the location of the river or segment within the state.

This nomination is for the Lamprey River from its headwaters in Northwood to Great Bay Estuary except for the already designated section in the towns of Lee and Durham. The North Branch River, the Pawtuckaway River, the North Branch River, the Little River and the Piscassic River are also nominated. Protection of all of these major rivers in the watershed is critical to the Lamprey watershed delivering the highest water quality to the estuary.

Map 1. Proposed Classification for the Nominated Rivers



The relationship of the Lamprey watershed with the other coastal watersheds is pictured on the next page.

Map 2 The Lamprey River Watershed as Part of the Coastal Watershed



VII. Resource Assessment

1. Natural Resources

Geographic and Physical Setting

The Lamprey River watershed encompasses approximately 137,000 acres or 214 square miles. The Lamprey Watershed is part of the Piscataqua River Watershed and is the largest tributary to Great Bay Estuary. Great Bay Estuary is a nationally recognized estuary and one of only 28 estuaries of national significance.

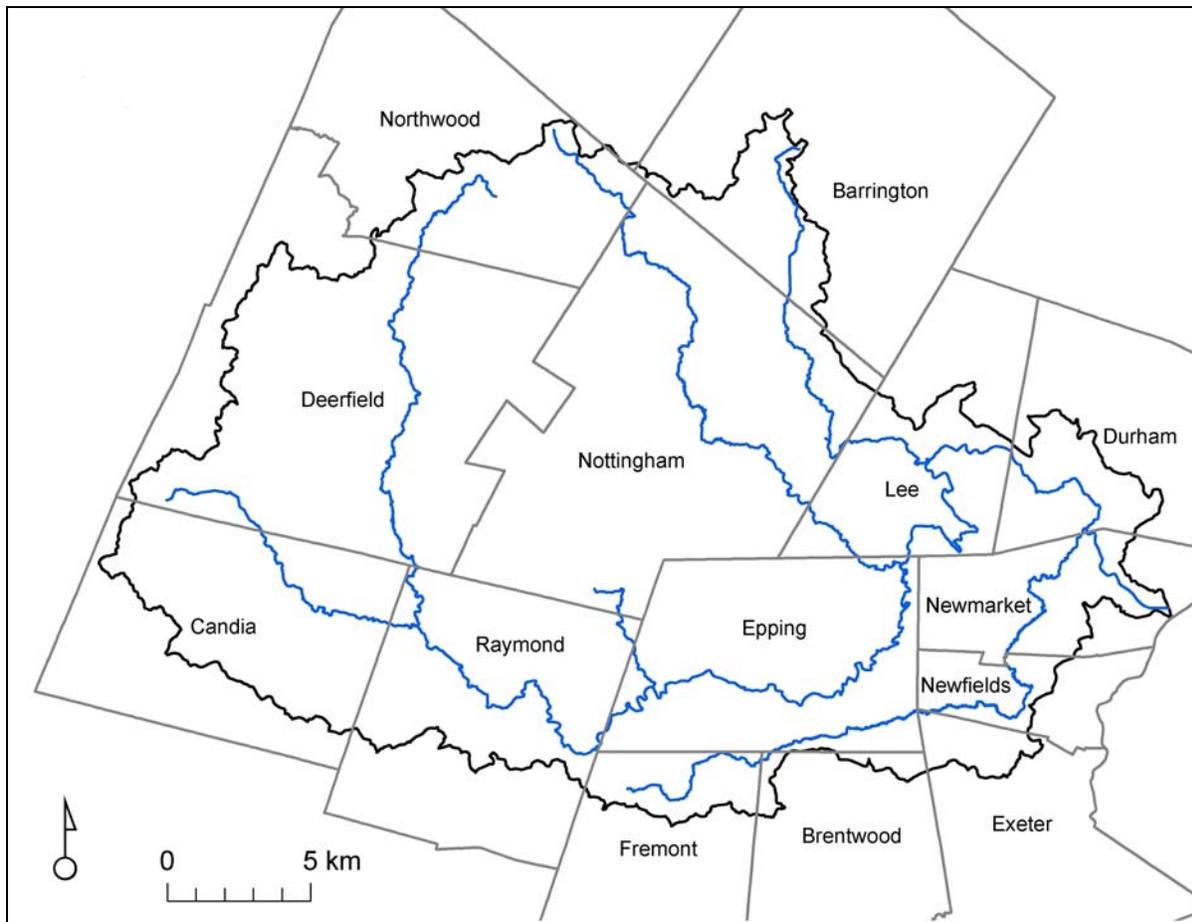
The main branch of the Lamprey River is 47 miles long from its headwaters in Northwood to where it becomes tidal in Newmarket. The North Branch River, Pawtuckaway River, North River, Little River and Piscassic River contribute significant land area and flow to the Lamprey River and their management and protection are important for achieving watershed goals.

Table 3. Facts and Figures About the Lamprey River Watershed

Area of the Lamprey River Watershed	214 Square miles
Number of Designated (HUC Code) Subwatersheds	9
Elevation Change Along Lamprey River - Mainstem	600 feet
Median Daily Discharge [^] (at Packers Falls Gage)	278cfs.
Maximum Recorded Discharge [^] (at Packers Falls Gage)	8,970 cfs. (5/16/2006)
Lowest Daily Mean Discharge [^] (at Packers Falls Gage)	0.66 cfs (7/27/1994)
Towns sharing the Lamprey River Watershed	14
Regional Planning Commissions Serving Towns of the Watershed	3
Population of Watershed – 2005*	40,838
Projected Population of Watershed* - 2020	49,632
Projected Population Change from 2005 to 2020	21.5% increase
Change in Impervious Surface Area from 1990 to 2000#	56%
Subwatershed with Highest % Imperviousness – Middle Lamprey#	6.6% - 8.0%
Mean annual temperature	47 F
Highest monthly average temperature in July	70 F
Lowest monthly average temperature in January	22 F
Total mean annual precipitation	42 inches
Highest precipitation month – November	4.7 inches
Average seasonal snowfall	69 inches
Miles of Lamprey River currently in RMPP	12
Miles of Lamprey River in National Wild & Scenic Rivers System	24

Reference material: [^]USGS Stream Gage, ^{*}US Census Data, [#]per Strafford Regional Planning
Temperature and precipitation data was reported by the National Climatic Data Center for Epping, New Hampshire.

The Lamprey River and its tributaries drain parts of 14 towns. The watershed is composed of nine sub-watersheds, with some contributing a significant amount of the total land area of the watershed.



Map 3 The Nominated Rivers and Town Boundaries

The mainstem of the Lamprey begins in the upland areas of Northwood, travels 47 miles to where it becomes tidal, and can be characterized as having a low gradient for most of its length. The Lamprey flows 1.83 miles from Macallen Dam to Great Bay and is subject to tidal influences in this section.

The North Branch River begins in Bear Brook State Park and travels through Deerfield and Candia to meet up with the Lamprey River at mile 13. The North Branch River has a low gradient, often undefined channel and passes through dense underbrush until about the New Boston Road area.

The Pawtuckaway River begins at the dam of Pawtuckaway Lake and flows southeast through bits of Nottingham, Raymond and Epping where it meets the Lamprey at mile 23. The Pawtuckaway has the nickname of the “Stingy River”. The nickname is from folktales of a stingy farmer near the river.

The North River begins at North River Pond in the Northwest corner of Nottingham near the line with Barrington and Northwood. The North River meanders through Nottingham like a small mountain stream and joins the Lamprey at mile 34.

The Little River begins above Mendums Pond in Barrington and flows out of Barrington through Nottingham to Lee and joins the Lamprey at mile 40.

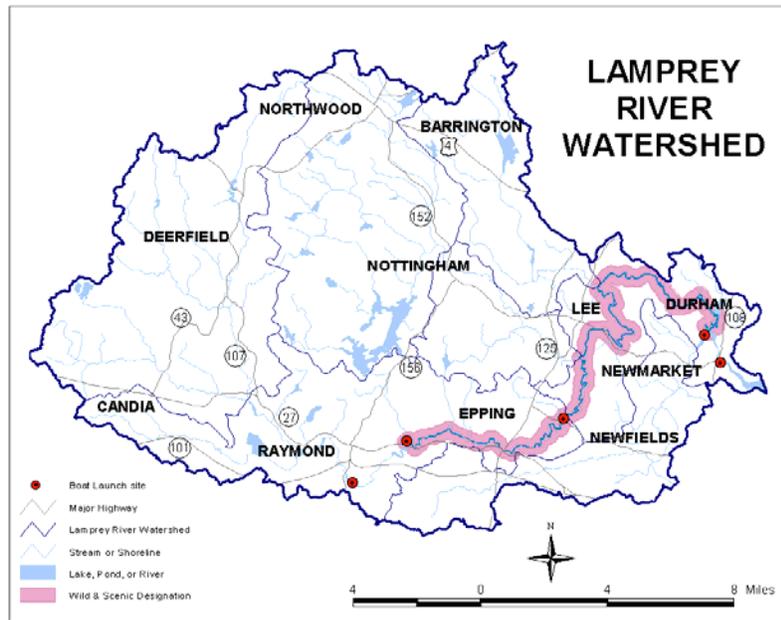
The Piscassic River begins in the Northern part of Fremont, travels through a corner of Brentwood, some of Epping, a tiny corner of Exeter, through conservation lands of Newfields to Newmarket where it joins the Lamprey River in the backwater area of Macallen Dam.

Table 4 The Towns of the Lamprey River Watershed by Percent of Watershed

TOWN	% of town in watershed	% of total watershed
Nottingham	99.6%	23%
Deerfield	80.2%	20%
Epping	99.9%	12%
Raymond	64.8%	9%
Candia	60.9%	9%
Lee	61.3%	6%
Northwood	39.0%	6%
Newmarket	72.2%	5%
Durham	25.8%	3%
Barrington	13.9%	3%
Newfields	56.2%	2%
Fremont	26.9%	2%
Exeter	12.1%	1%
Brentwood	7.5%	1%

Map 4

The Lamprey River is listed as “Wild and Scenic” in the lower portion of the river. Wild and Scenic status was achieved by an act of the US Congress in 1996.



(a) Geologic Resources

Briefly describe the significant geologic resources of the river and its corridor, including any unique or visually interesting features such as waterfalls, unusual rock formations, and areas of rapids. If you are unable to include such features, then simply describe the bedrock geology map. Consider geologic resources on the basis of natural history, visual, and economic interest. Indicate if the state geologist or a national or state resource assessment has identified these geologic resources as significant at a national, regional (New England), state, or local level.

The rivers of the Lamprey watershed are low-gradient, coastal streams punctuated with step-like gradient changes caused by the underlying bedrock geology. These geologic underpinnings result in changes in valley width and river gradient. The geology is expressed in the substrate of the relatively dynamic, short sections of river where coarse grained sediment (cobble sized material and larger with sand and gravel) is dominant and bedrock outcrops are abundant. In the sections impounded by bedrock outcrops or dams, the substrate of the channel bed is more fine grained (fine to coarse grained sand and gravel sized sediment) reflecting these low velocity environments.

The underlying bedrock consists of a Massabesic Gneiss Complex from the late Proterozoic period, Concord Granite from the late Devonian, and metasedimentary and metavolcanic rocks of the Merrimack Trough formed during the Silurian to Ordovician periods.

The Lamprey basin rivers (the Lamprey, North Branch, Pawtuckaway, North, Little, and Piscassic) have low elevations that flow over acidic bedrock and have extensive areas of deep and coarse sediment. The rivers in the lowest portion of the watershed occur in areas of deep and extensive fine marine clay, which provides buffering capacity. Finer streambed substrates and connected wetland and floodplain communities are common in these areas of deep, fine surficial geological deposits.

The watershed is characterized by hills, low mountains, and broad valleys. Many of the hills are either drumlins or bedrock ridges. Low mountains, such as Saddleback and Pawtuckaway, generally have a thin mantle of soil material over bedrock, especially on the upper slopes. Glacial outwash consisting of sand and gravel is in some of the major stream valleys. The watershed has many ponds and lakes, which are fed by numerous small streams.

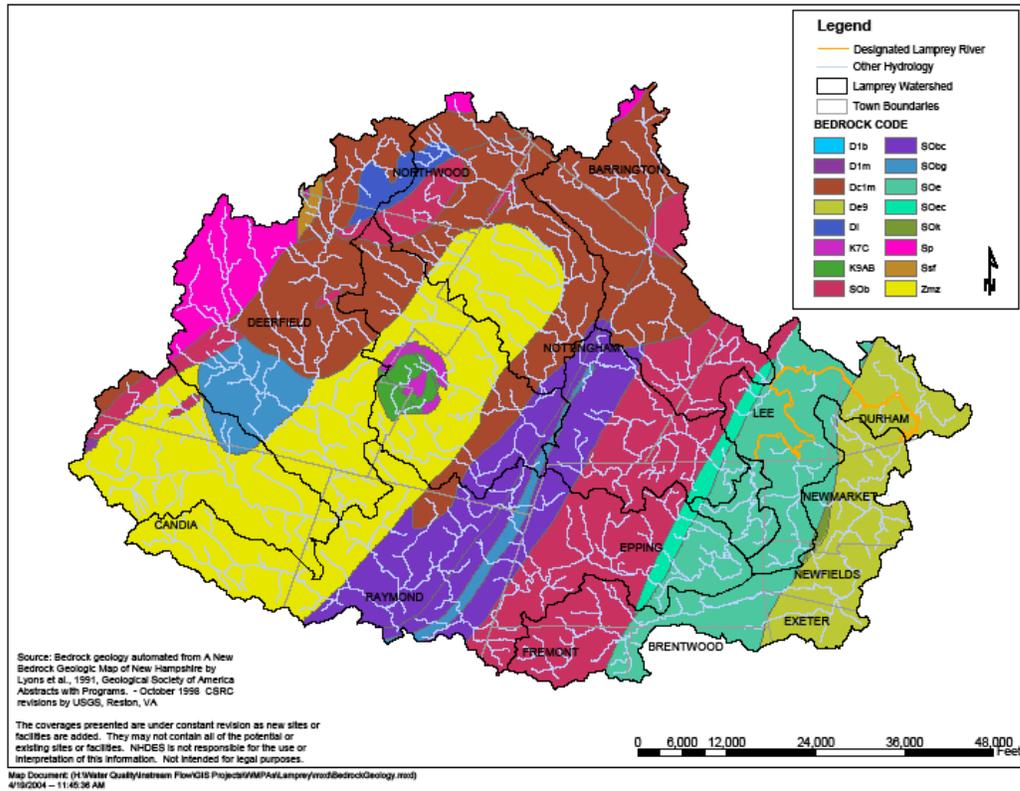
The Pawtuckaway State Park area is significant because of its designation as a state park, as well as the fact that it contains the ring dike. This dike is clearly visible on aerial photography.

Soils are generally Inceptisols with some Entisols in the southeastern portion of the watershed. Soil texture is dominated by sandy loams with some loamy sands and sands that are predominately well drained.

The groundwater reservoir is interpreted to be comprised of three distinct but interconnected reservoirs that either serve as shallow reservoirs, near-surface reservoirs fed by them and serving as the primary source of baseflow in the stream network and deep groundwater reservoirs. Aquifers composed of coarse sand and gravel materials, with large, interconnected pore spaces, are generally the most transmissive aquifers and yield the most water. These high-yielding aquifers were deposited as eskers, kame terraces, outwash plains, and deltas by meltwater during glacial retreat. Under natural or near-natural conditions, water quality from stratified-drift aquifers is generally good, although threats from natural and human derived sources of contamination have been identified.

Map 5 Geology of the Lamprey River Watershed

Bedrock Geology - Lamprey River WMPA



SYMBOL	ROCK GROUP	NAME DESCRIPTION
D1b	Granite, other	Pink equigranular biotite granite
D1m	Peraluminous Granite	Two-mica granite of northern and southeastern NH
Dc1m	Peraluminous Granite	Concord Granite
De9	Mafic Rocks	Exeter Diorite
DI	Pelitic Rocks	Littleton Fm
K7C	Alkali Granite	Augite-hornblende-biotite monzonite
K9AB	Mafic Rocks	Augite hornblende diorite and gabbro
SOB	Calcgranofels	Berwick Fm
SObc	Calcpelite	Berwick Fm
SOBg	Pelitic Rocks	Berwick Fm
SOec	Sulfidic Schists	Eliot Fm
SOk	Calcgranofels	Kittery Fm
Sp	Pelitic Rocks	Perry Mtn Fm
Ssf	Sulfidic Schists	Smalls Falls Fm
Zmz	Granite, other	Massabesic Gneiss Complex

Geology map source: <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/lamprey/documents/bedrock.pdf>

(b) Wildlife Resources

This largely forested and relatively undeveloped river corridor system supports important floodplain forests, extensive shrub and emergent marsh wetlands, and scattered openings and fields among the forested uplands. The floodplains, backwaters, vernal pools, fields, and forests are home to a great diversity of wildlife including significant populations of Blanding's, spotted, and wood turtles, species of conservation concern in New Hampshire.

Compared to other rivers in the region, the Lamprey River, North Branch River, Pawtuckaway River, North River, Little River and Piscassic River channels, floodplains and adjacent wetlands are still relatively intact, making possible the wide range of plants, fish, and other wildlife that live here. Their persistence depends on maintaining water quality, flow patterns, riparian vegetation, and unfragmented uplands. Intact riparian areas (buffers) and associated wetlands help protect the river from soil erosion and sediments, excessive nutrients, pollutants, and over-heating in summer sun, as well as slowing the flow of seasonal or storm flood waters. Several key management challenges affect the ecological integrity of the river corridor. These include increasing development, invasive species, fish restoration and passage upriver, habitat fragmentation, water withdrawals, and stormwater, sediment, and nutrient runoff into the river.

The ecology of the watershed, as summarized above, was found by the National Park Service to represent an "outstandingly remarkable" resource value worthy of recognition and protection through the Wild and Scenic Rivers System (1995 *Draft Report to Congress*).

(1) List the species of mammals, birds, reptiles and amphibians commonly found in the river and river corridor.

Table 5 Mammals Likely to be Found in the Lamprey, North Branch, Pawtuckaway, North, Little, or Piscassic Rivers or Corridors

Mammals		
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	floodplain forest
Eastern Chipmunk	<i>Tamias striatus</i>	riparian edge
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	riparian edge
Gray Squirrel	<i>Sciurus carolinensis</i>	floodplain forest
River Otter	<i>Lontra Canadensis</i>	riverbank and channel
Moose	<i>Alces alces</i>	Floodplain forest
Muskrat	<i>Ondatra zibethicus</i>	channel, oxbow
Raccoon	<i>Procyon lotor</i>	oxbow, bank
Snowshoe Hare	<i>Lepus americanus</i>	Floodplain thicket
Black Bear	<i>Ursus americanus</i>	Floodplain forest
Beaver	<i>Castor Canadensis</i>	channel, bank
Red Fox	<i>Vulpes</i>	floodplain thicket
Coyote	<i>Canis latrans</i>	floodplain forest
White-tailed Deer	<i>Odocoileus virginianus</i>	oxbow, floodplain

Table 6 Reptiles and Amphibians Likely to be Found in the Lamprey, North Branch, Pawtuckaway, North, Little, or Piscassic Rivers or Corridors

Reptiles and Amphibians		
Green Frog	<i>Rana clamitans melanota</i>	Back Swamps
Pickerel Frog	<i>Rana palustris</i>	floodplain
Wood Frog	<i>Rana sylvatica</i>	Floodplain pools
Spring Peeper	<i>Hyla crucifer</i>	Back Swamps, pools
Gray Tree Frog	<i>Hyla vericolor</i>	Floodplain pools
Bull Frog	<i>Rana catesbeiana</i>	channel
Spotted Salamander	<i>Ambystoma maculatum</i>	Floodplain pools
Red-spotted Newt	<i>Notophthalmus v. viridescens</i>	Backwater marsh
Snapping Turtle	<i>Chelydra s. serpentine</i>	Backwater swamp
Eastern Painted Turtle	<i>Chrysemys p. picta</i>	channel, oxbow, pools
Common Musk Turtle	<i>Sternotherus odoratus</i>	Back swamps
Wood Turtle (SC)	<i>Clemmys insculpta</i>	tributary channel
Common Garter Snake	<i>Thamnophis sirtalis</i>	riparian forest

SC – NH Special Concern (NHF&G 2005)

SGCN – Species of Greatest Conservation Need (NHF&G 2005)

Table 7 Birds Likely to be Found in the Lamprey, North Branch, Pawtuckaway, North, Little, or Piscassic Rivers or Corridors

Birds		
American Bittern (RC, SGCN)	<i>Botaurus lentiginosus</i>	Channel marsh
American Black Duck (SGCN)	<i>Anas rubripes</i>	Channel
American Crow	<i>Corvus brachyrhynchos</i>	Floodplain
American Goldfinch	<i>Carduelis tristis</i>	Floodplain
American Robin	<i>Turdus migratorius</i>	Floodplain
Bald Eagle*	<i>Haliaeetus leucocephalus</i>	varied
Baltimore Oriole	<i>Icterus galbula</i>	Floodplain
Barn Swallow	<i>Hirundo rustica</i>	Channel
Belted Kingfisher	<i>Ceryle alcyon</i>	Channel
Black-capped Chickadee	<i>Poecile atricapilla</i>	Wooded eastern edge
Blue Jay	<i>Cyanocitta cristata</i>	Floodplain forest
Blue-headed Vireo	<i>Vireo solitaries</i>	Floodplain
Broad-winged Hawk	<i>Buteo platypterus</i>	Floodplain forest
Brown Creeper	<i>Certhia Americana</i>	Floodplain forest
Brown-headed Cowbird	<i>Molothrus ater</i>	Riparian edge
Canada Goose	<i>Branta Canadensis</i>	Channel
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Channel, riparian edge
Cerulean Warbler	<i>Dendroica cerulea</i>	Floodplain forest
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Floodplain
Chipping Sparrow	<i>Spizella passerine</i>	Floodplain field
Common Grackle	<i>Quiscalus quiscula</i>	Channel

Common Yellowthroat	<i>Geothlypis trichas</i>	Riparian edge
Dark-eyed Junco	<i>Junco hyemalis</i>	Floodplain forest
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Channel
Eastern Bluebird	<i>Sialia sialis</i>	Floodplain forest
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Riparian edge
Eastern Wood Pewee	<i>Contopus virens</i>	Floodplain Forest
Gray Catbird	<i>Dumetella carolinensis</i>	Riparian edge
Great Blue Heron (SGCN)	<i>Ardea Herodias</i>	Channel, bank
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Floodplain
Green Heron	<i>Butorides virescens</i>	Bank
Hermit Thrush	<i>Catharus guttatus</i>	Forest
Indigo Bunting	<i>Passerina cyanea</i>	Floodplain meadow
Mallard	<i>Anas platyrhynchos</i>	Channel
Mockingbird	<i>Mimus polyglottos</i>	Riparian edge
Mourning Dove	<i>Zenaida macroura</i>	Floodplain
Northern Cardinal	<i>Cardinalis cardinalis</i>	Floodplain
Northern Flicker	<i>Colaptes auratus</i>	Floodplain forest
Osprey	<i>Pandion haliaetus</i>	Channel, floodplain
Ovenbird	<i>Seiurus aurocapillus</i>	Forest
Pine Warbler	<i>Dendroica pinus</i>	Forest
Red-eyed Vireo	<i>Vireo olivaceus</i>	Floodplain
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Channel, floodplain
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Oxbow, back swamp
Rock Dove	<i>Columba livia</i>	Bridges
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Channel island
Ruffed Grouse (SGCN)	<i>Bonasa umbellus</i>	Floodplain old-field
Scarlet Tanager	<i>Piranga olivacea</i>	Floodplain
Sharp-shinned Hawk	<i>cf. Accipiter striatus</i>	Floodplain
Song Sparrow	<i>Melospiza melodia</i>	Floodplain field
Spotted Sandpiper	<i>Actitis macularia</i>	Gravel bars
Tufted titmouse	<i>Baeolophus bicolor</i>	Floodplain forest
Turkey Vulture	<i>Cathartes aura</i>	Floodplain forest
Veery (SGCN)	<i>Catharus fuscescens</i>	Forest
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Floodplain forest
Wild Turkey	<i>Meleagris gallopavo</i>	Forest
woodcock	<i>Scolopax minor</i>	Young forests
Wood Duck	<i>Aix sponsa</i>	Floodplain pool
Wood thrush (SGCN)	<i>Hylocichla mustelina</i>	Forest
Yellow Warbler	<i>Dendroica petechia</i>	Riparian edge

SGCN – Species of Greatest Conservation Need (NHF&G 2005)

*The bald eagle is federally listed as “monitored”. NH Natural Heritage Bureau lists the bald eagle as present in Northwood. Citizens have occasionally observed bald eagles in the lower Lamprey River area.

(2) List any endangered or threatened animals that are supported by the river and river corridor environment. Include location, if known. Check whether these animals are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level. Animal Species Location E or T, N or S

Lamprey River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	LastObs
<u>Invertebrate Species</u>							
Brook Floater (<i>Alasmidonta varicosa</i>)	Raymond	3	***	M	E	-	1952
Brook Floater (<i>Alasmidonta varicosa</i>)	Epping	12	B/C	S	E	-	1996
<u>Vertebrate species</u>							
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Northwood	31	**		T	M	
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Epping	42	B/C	S	E	-	2008
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Epping	43	A/B	S	E	-	1997
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Epping	45	B	S	E	-	1998
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Newmarket	60	C	S	E	-	2007
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Newmarket	64	A	S	E	-	2008
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Epping	199	B/C	S	E	-	1993
Great Blue Heron (Rookery) (<i>Ardea herodias</i>)	Deerfield	17	H	M	-	-	1986
Peat Moss (<i>Sphagnum flavicomans</i>)	Northwood	01	NR	S	E	-	1998
Spotted Turtle (<i>Clemmys guttata</i>)	Epping	28	C	S	T	-	1993
Swamp Darter (<i>Etheostoma fusiforme</i>)	Raymond	01	NR	S	SC	-	1984
Wood Turtle (<i>Glyptemys insculpta</i>)	Epping	08	A	S	SC	-	1999
Wood Turtle (<i>Glyptemys insculpta</i>)	Epping	09	**	S	SC	-	1999
Wood Turtle (<i>Glyptemys insculpta</i>)	Epping	15	B/C	S	SC	-	2006

Does not include species found in the already designated portions of the Lamprey River in Lee and Durham.

Rank: A-D = Excellent (A) to poor (D), H = Historical (not observed within the last 20 years), X = Extirpated, NR = Not ranked
****=highest importance, ***=extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T=Threatened, E=Endangered

Occurrence: An occurrence is a specific example of a natural community type, or a population of a species. For species the NHB goal is to consider populations to be separate (= different occurrences) if there is limited gene flow between them. Sightings within a certain distance of each other are all considered to be one occurrence. The default distance for plants is 1 km. For animals it depends on mobility and whether there is unsuitable habitat between two sightings (restricting any gene flow between the populations.)

North Branch River Corridor

Name - Occurrence # (unique identifier)	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Invertebrate Species</u>							
Brook Floater (<i>Alasmidonta varicosa</i>)	Deerfield	003	NR	M	E	-	1952
Brook Floater (<i>Alasmidonta varicosa</i>)	Raymond	003	NR				
<u>Vertebrate species</u>							
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	Candia	011	**	S	T	-	1992
Northern Black Racer (<i>Coluber constrictor constrictor</i>) -	Deerfield	013	**	S	T	-	1993
Spotted Turtle (<i>Clemmys guttata</i>) - 089	Candia	089	C	S	T	-	2008
Swamp Darter (<i>Etheostoma fusiforme</i>)	Raymond	001	NR	S	SC	-	1984

See notes above

Pawtuckaway River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	LastObs
<u>Vertebrate species</u>							
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Nottingham	024	A	S	E	--	2008
Wood Turtle (<i>Glyptemys insculpta</i>)	Epping	015	B/C	S	SC	--	2006

Rank: A-D = Excellent (A) to poor (D), H = Historical (not observed within the last 20 years), X = Extirpated, NR = Not ranked
 ****=highest importance, ***=extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T=Threatened, E=Endangered

Occurrence: An occurrence is a specific example of a natural community type, or a population of a species. For species the NHB goal is to consider populations to be separate (= different occurrences) if there is limited gene flow between them. Sightings within a certain distance of each other are all considered to be one occurrence. The default distance for plants is 1 km. For animals it depends on mobility and whether there is unsuitable habitat between two sightings (restricting any gene flow between the populations.)

North River Corridor

Name - Occurrence # (unique identifier)	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	LastObs
<u>Vertebrate species</u>							
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	Lee	005	**	S	T	-	2007
Spotted Turtle (<i>Clemmys guttata</i>) - 110	Nottingham	110	C	S	T	-	2004
Wood Turtle (<i>Glyptemys insculpta</i>) - 009	Epping	009	**	S	SC	-	1999
Wood Turtle (<i>Glyptemys insculpta</i>) - 010	Epping	010	**	S	SC	-	1994

See notes above

Little River Corridor

Name - Occurrence # (unique identifier)	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	LastObs
<u>Vertebrate species</u>							
Blanding's Turtle (<i>Emydoidea blandingii</i>) - 098	Nottingham	098	**	S	E	-	2006
Blanding's Turtle (<i>Emydoidea blandingii</i>) - 110	Nottingham	110	A	S	E	-	2008
Northern Black Racer (<i>Coluber constrictor constrictor</i>) -	Nottingham	020	**	S	T	-	1991
Wood Turtle (<i>Glyptemys insculpta</i>) - 011			B	S	SC	-	2000

See notes above

Piscassic River Corridor

Name - Occurrence # (unique identifier)	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	LastObs
<u>Vertebrate species</u>							
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Newmarket	060	C	S	E	--	2007
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Newfields	064	A	S	E	-	2008
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Newmarket	064	A	S	E	-	2008
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Newmarket	001	**	S	SC	--	2002
Spotted Turtle (<i>Clemmys guttata</i>)	Newfields	087	B	S	T	--	2008

See notes above

The bald eagle is the only federally listed wildlife species found in the Lamprey watershed.

(3) List significant wildlife habitat which is supported by the river or to which the river is integral, for game and non-game wildlife populations. Identify if the habitat has been determined to be exceptionally diverse, very diverse, or moderately diverse by the NH Fish and Game Department or the U.S. Fish and Wildlife Service.

Significant Habitat Diversity Rating

According to the New Hampshire Wildlife Action Plan, a significant portion of the Lamprey River watershed is considered to be the highest ranked habitat in New Hampshire and also the highest ranked habitat in the biological region with additional lands as supporting landscapes.

Table 8 NH Wildlife Action Plan in the Lamprey River Watershed

Highest Quality Habitat in NH Wildlife Action Plan

- Lamprey River Corridor – upper (from headwaters to confluence with North Branch River)
- Lamprey River Corridor – mid (scattered areas of highest ranked from confluence with North Branch River to downstream of Rt. 125 bridge in Epping)
- Lamprey River Corridor - tidal
- Lamprey River Watershed – upper
- Lamprey River Watershed - mid
- North Branch River Corridor – from Beaver Pond in Deerfield to upstream of Old Boston Road in Candia
- Pawtuckaway River Corridor
- North River Corridor – the entire reach from headwaters to confluence with Lamprey River
- North River Watershed – extensive areas in the upper and mid reaches
- Little River Corridor – the entire reach from headwaters to confluence with Lamprey River
- Little River Watershed – extensive areas throughout
- Piscassic River Corridor – from Cuba Road in eastern end of Epping to Packers Falls Road in Newmarket
- Piscassic River Watershed – extensive areas from Cuba Road in eastern Epping to confluence with Lamprey River

Highest Quality Habitat in Biological Region Wildlife Action Plan

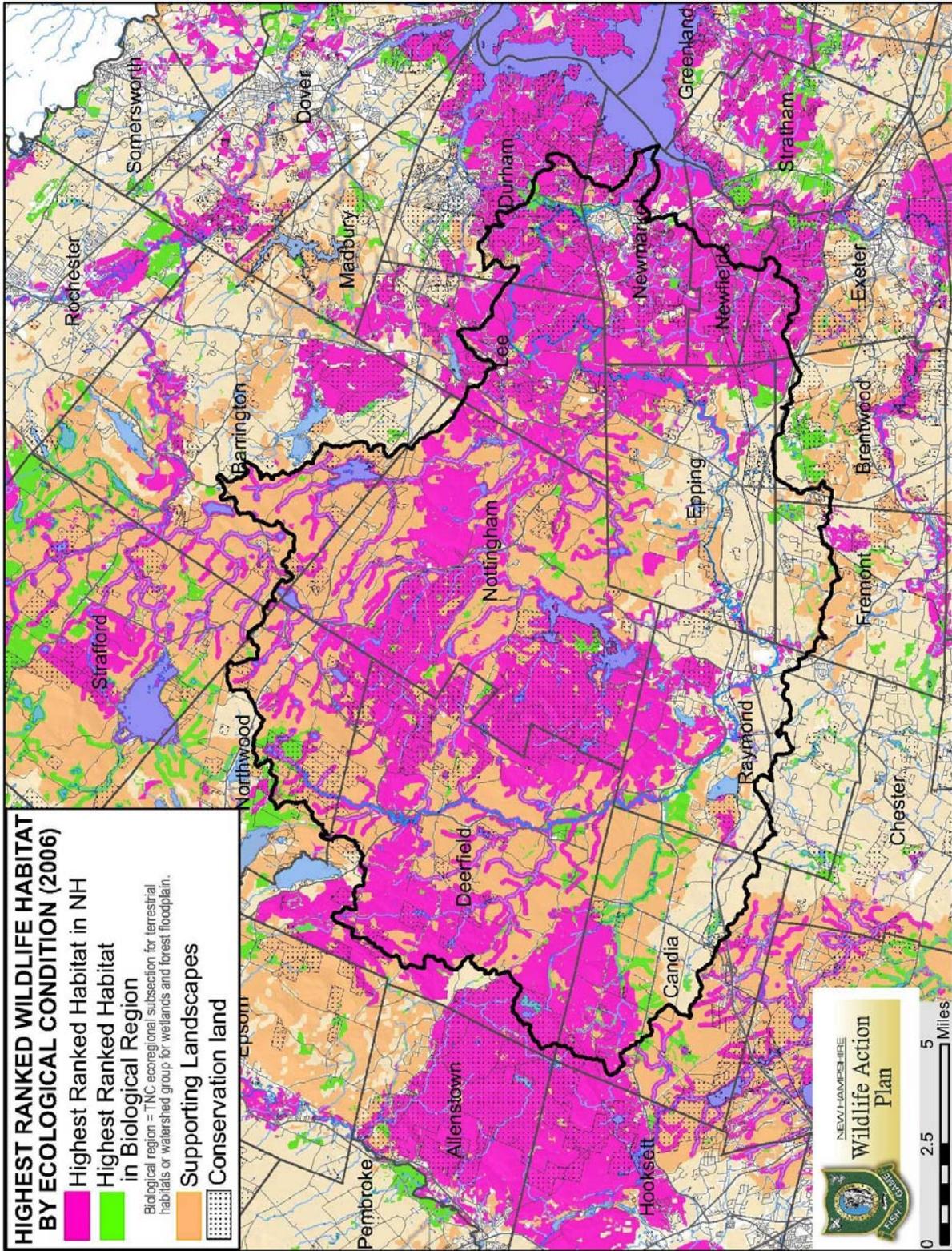
- Lamprey River Corridor – scattered areas from below junction with Hartford Brook to near downtown Raymond
- Lamprey River Corridor – from Durham town line to Macallen Dam
- Lamprey River Watershed – headwaters near Meadows Lake
- North Branch River Corridor – from upstream of Old Boston Road to confluence with Lamprey River in Raymond

Supporting Landscapes

- All of the Lamprey River headwaters watershed that is not highest ranked habitat
- All of the Lamprey mid-river watershed that is not highest ranked habitat to vicinity of downtown Raymond
- All of the North River watershed that is not highest ranked habitat

A map of the highest ranked habitat areas can be seen on the following page.

Map 6 Highest Ranked Wildlife Habitat by Ecological Condition



As a Tidal Coastal Watershed, the Lamprey River and its tributaries are considered to be exceptionally diverse as they provide a gradient between salt, brackish, and fresh water. The tidal aquatic ecosystem of the Lamprey river system offers unique habitats for New Hampshire's wildlife. This habitat is relatively uncommon in New Hampshire, and the rivers and estuaries at Great Bay are one of the best examples of an estuarine ecosystem in the Northeast.

The combination of marine, freshwater, and terrestrial habitats in the Tidal Coastal Watershed Group supports the greatest diversity of species in New Hampshire, from harbor porpoises to horseshoe crabs. The rivers support runs of diadromous fish, such as American shad, alewife, American eel, and blueback herring. Freshwater fish species of concern are also found in this watershed group, including the state endangered American brook lamprey and the state threatened bridge shiner. The coastal waters are also important habitat for commercially and recreationally important species like the American lobster and the striped bass. In addition to aquatic species, bird species such as the state threatened bald eagle, state threatened common tern, American black duck, osprey, saltmarsh species are just a few species that use the Great Bay and other coastal waters throughout their breeding and migratory seasons.

The effects of rapid development, including habitat conversion, non-point source pollution, and altered hydrology, are the most pressing threats to coastal watersheds. Fragmentation due to dams and stream crossings restricts the amount of habitat available to many species and could have a negative impact on their genetic viability. Climate change is predicted to alter sea level and thus the tidal flows that are such a key element of this watershed. Salt marsh and river restoration are two important conservation strategies for the tidal coastal watershed.

The Lamprey River has maintained most of the healthy, diverse habitat types that made it eligible for protection under both the State and National river programs over a decade ago.

In the lower four Lamprey towns alone, 159 species of birds have been sighted, including four state-endangered species: the pied-billed grebe, bald eagle, sedge wren, and the peregrine falcon. The river provides valuable habitat for birds to breed, feed and nest. In the spring and fall, the river corridor provides a critical resting place with plenty of shoreland food for migrating birds. The fact that there are so many bird species tells us that there is a wide variety of plants and habitats, including undeveloped upland areas adjacent to the river.

According to The Land Conservation Plan for New Hampshire's Coastal Watersheds, the Lamprey River and tributaries are of exceptional significance for living resources and water quality. Many of the Conservation Focus Areas are in the Lamprey River Watershed. The Land Conservation Plan for New Hampshire's Coastal Watersheds also identified significant forest ecosystems. The upper reaches of the Lamprey watershed is one of the largest high-quality forest ecosystem areas of all the seacoast watersheds. Concentrated in the Saddleback Mountain, Pawtuckaway State Park and Bear Brook State Park triangle, this area offers large unfragmented blocks of land for wide-ranging species of wildlife that they are unable to find elsewhere.

The cerulean warbler has been in decline over its entire range the last 40 years. The species is closely associated with floodplain forests. A stable but small population of cerulean warblers at Pawtuckaway State Park occupies a mixed red oak/red maple/white pine forest, and represents the northeastern-most known locality for this species in North America.



Map 7 Conservation Focus Areas in the Lamprey River Watershed

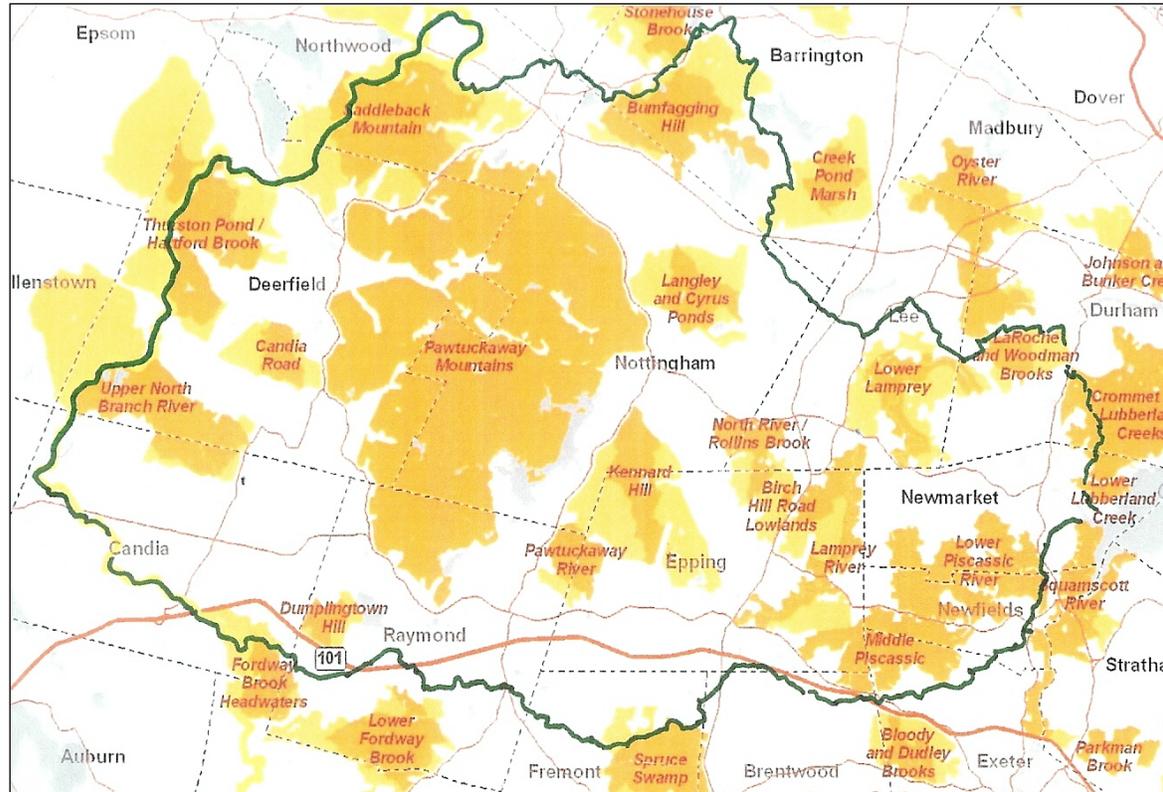
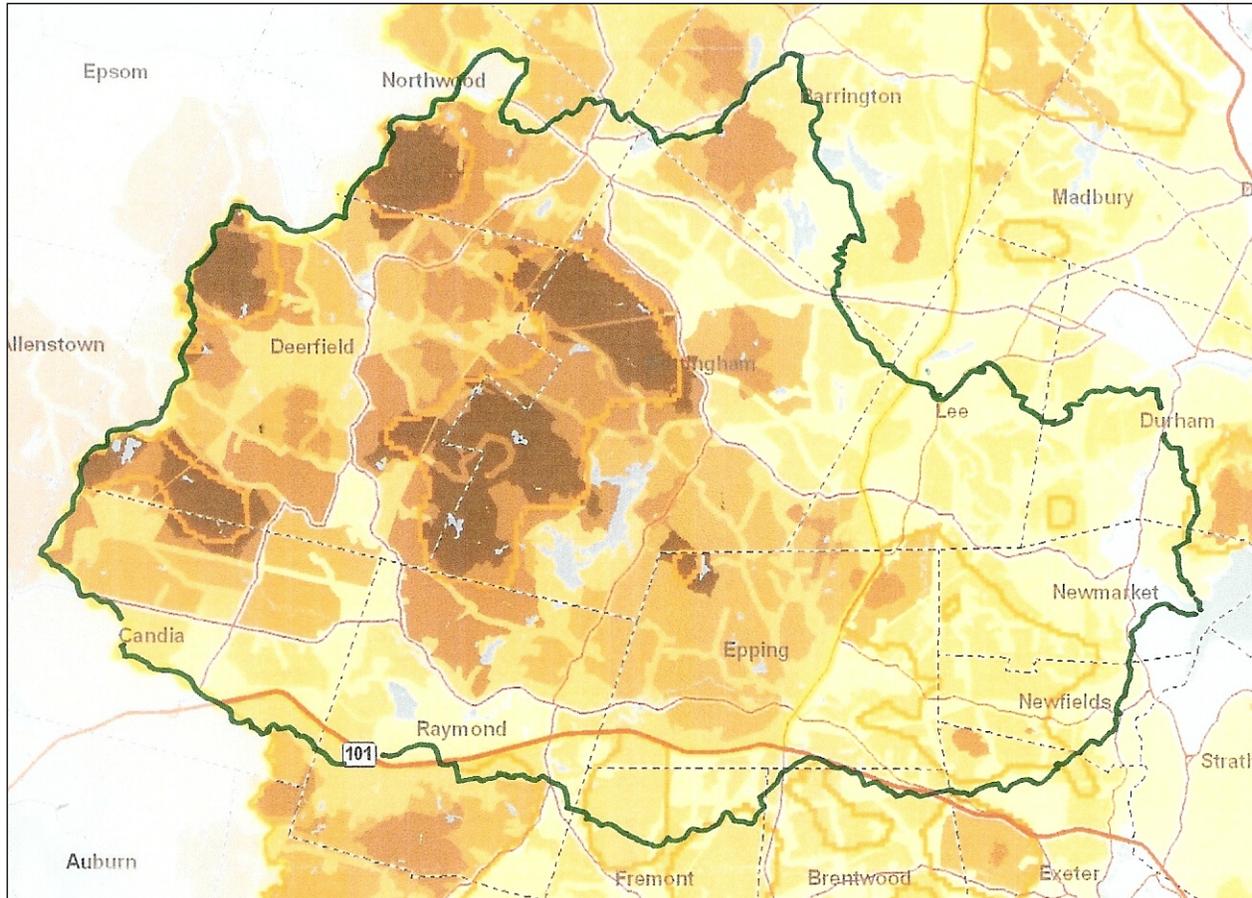


Table 9 Lamprey River Watershed Conservation Focus Areas

Nominated River Segment	Conservation Focus Area
Lamprey River - upper	Candia Road – 550 acres located within a 55,200 acre block. Includes 586 acres of Tier 4 high quality stream watershed. Significant wildlife habitats include grassland, marsh, and peatland.
Lamprey River – upper	Lamprey River – 1,720 acres, a portion of a 650 acre block and a portion of a 1,180 acre block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Includes over 7 miles of good diversity of fish in the Lamprey River, plants and animals of conservation concern, exemplary natural communities, and significant wildlife habitats of floodplain forest, grassland, marsh, and peatland.
Lamprey River – upper	Saddleback Mountain – 3,610 acres, a portion of a 6,230 acre block as a Tier 2 priority in the 2005 Wildlife Action Plan. Includes animals of conservation concern, exemplary natural communities, and significant wildlife habitat of grassland, marsh, peatland, and ridge/talus.
Lamprey River – upper	Thurston Pond/Hartford Brook – 6,870 acres, a portion of a 5,500 acre block identified as a Tier 1 priority in the 2005 Wildlife Action Plan. Park of a 55,200 acre block. Exemplary natural communities and significant wildlife habitat of marsh, peatland, and ridge/talus.
Lamprey River – upper	Dumplingtown Hill – 360 acres located within a 6,100 acre block. Home to plants and animals of conservation concern, and exemplary natural communities and systems. Significant wildlife habitats include marsh, peatland, and ridge/talus.
North Branch River	Upper North Branch River – 2,890 acres, a 1,890 acre block identified as a

	Tier 2 priority in the 2005 Wildlife Action Plan and a portion of a 15,440 acre block identified as a Tier 1 priority. Located within a 55,200 acre block. Includes animals of conservation concern and significant wildlife habitat of grassland, marsh and peatland.
Pawtuckaway River	Pawtuckaway Mountains – 23,140 acres, three blocks of 1,300, 2,200 and 1,880 acres all identified as Tier 2 priorities in the 2005 Wildlife Action Plan and one 8,950 acre block identified as a Tier 1 priority. Includes plants and animals of conservation concern, exemplary natural communities, and significant wildlife habitat of cliff, floodplain forest, grassland, peatland, and ridge/talus.
Pawtuckaway River	Pawtuckaway River – 750 acres, a portion of a 4,910 acre block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Part of 45,000 acres of aggregated forest block. Significant wildlife habitat of floodplain forest, grassland, marsh, and peatland.
North River	Birch Hill Road Lowlands – 60 acres, a small portion of a 1,250 acre block identified in the 2005 Wildlife Action Plan as a Tier 2 priority. Significant wildlife habitat – peatland.
North River	Kennard Hill – 1,290 acres, a portion of a 4,910 acre block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Significant wildlife habitat includes grassland, marsh, and peatland.
North River	Langley and Cyrus Ponds – 1,030 acres, a portion of a 2,250 acre block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Significant wildlife habitat includes grassland, marsh, and peatland.
North River	North River/Rollins Brook – 810 acres, a portion of a 1,260 acre block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Located within a 45,000 acre block. Includes animals of conservation concern and significant wildlife habitat of floodplain forest, grassland, marsh and peatland.
North River/Little River	Bumfagging Hill – 2,360 acres, a portion of a 4,360 acres block identified as a Tier 2 priority in the 2005 Wildlife Action Plan. Includes plant and animals of conservation concern. Significant wildlife habitats include marsh and peatland.
Piscassic River	Lower Piscassic River – 3,030 acres, located within a 18,800 acres block. A 1,720 acre block identified as Tier 2 priority in the 2005 Wildlife Action Plan. Includes plants and animals of conservation concern, exemplary natural communities and significant wildlife habitats of grassland, marsh and peatland.
Piscassic River	Middle Piscassic – 2,280 acres, a portion of a 18,800 acre block. Includes animals of conservation concern, exemplary natural communities and significant wildlife habitat of floodplain forest, marsh, and peatland.
Lamprey River – lower	LaRoche and Woodman Brooks – 440 acres within a 12,700 acre block. Includes plants and animals of conservation concern, exemplary natural communities and significant wildlife habitats of floodplain forest, grassland, marsh, and peatland.
Lamprey River – lower	Lower Lamprey – 1,230 acres, a portion of a 790 acre block and a 870 acre block. Includes over 7 miles of good diversity of fish, animals of conservation concern, and significant wildlife habitats of floodplain forests, grassland, marsh, and peatland.

Map 8 High Value Forest Ecosystems of the Lamprey River Watershed

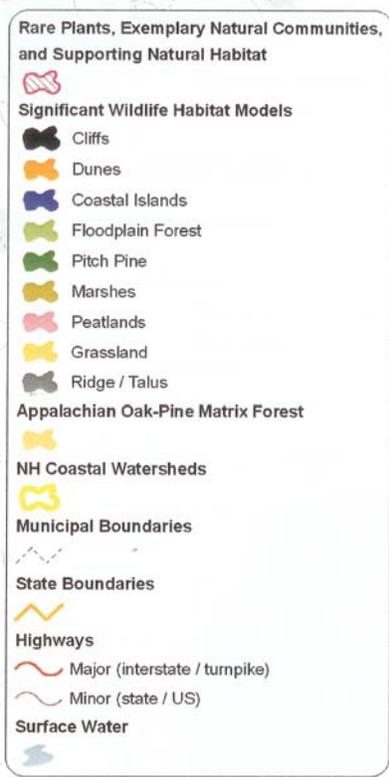
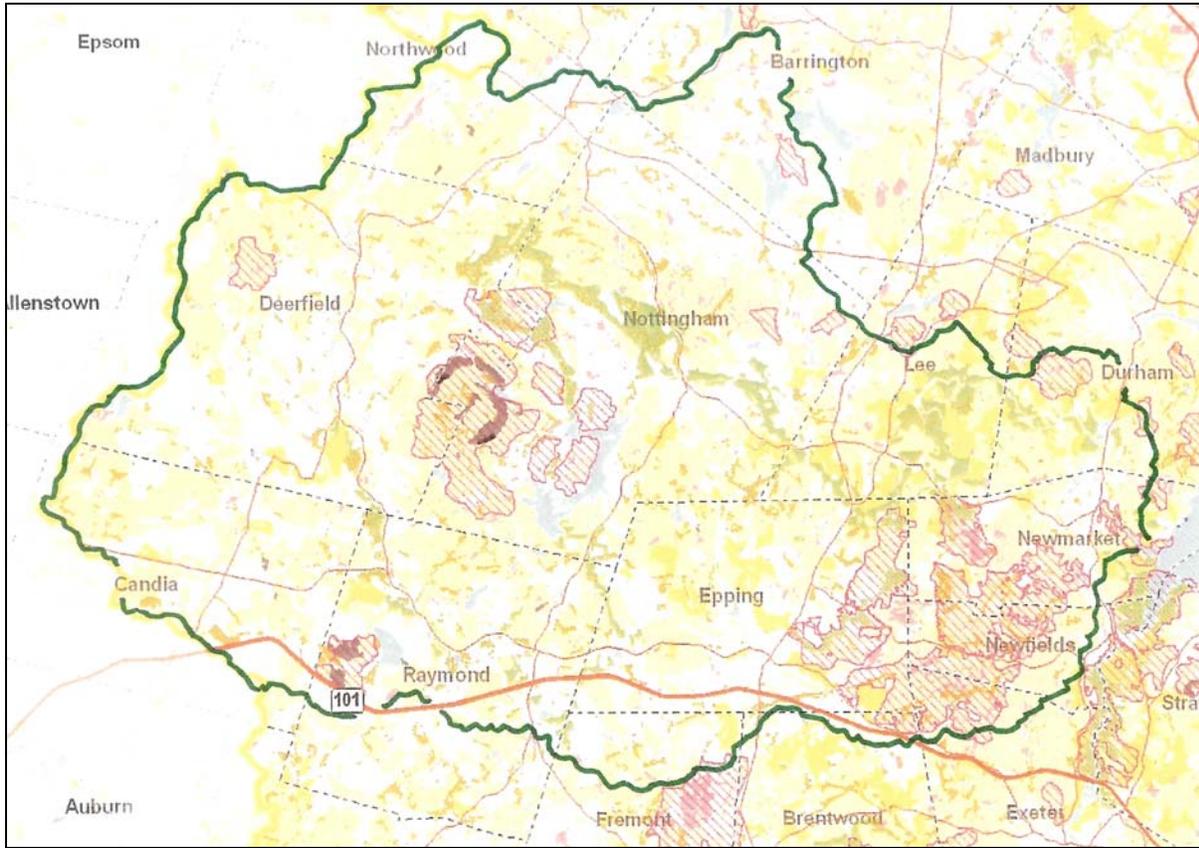


The darker the shading, the higher the quality.

(4) Determine if the river corridor is important for the movement of wildlife between large habitat areas. If it is, explain why.

The river corridor of the Lamprey River and the tributaries is extremely important for the movement of wildlife between some very significant large habitat areas. As the map above shows, more than half of the watershed has significant forest ecosystems. The Conservation Focus Areas described in the preceding pages are each part of larger blocks of land offering exceptional wildlife habitat, especially for Southeastern New Hampshire. The New Hampshire Wildlife Action Plan (2007) identifies the Lamprey River, the North Branch River, the Pawtuckaway River, the North River, the Little River and the Piscassic River as each having some area of significant high quality habitat. The Land Conservation Plan for New Hampshire's Coastal Watershed Critical Plant and Wildlife Habitat map is on the following page.

Map 9 Critical Plant and Wildlife Habitat of the Lamprey River Watershed



This map prepared for the Land Conservation Plan For New Hampshire's Coastal Watersheds shows the value of ecosystems in the Lamprey River watershed. Shading can be seen along the Lamprey River in the Deerfield and Raymond sections of the Lamprey, along the Pawtuckaway River, North River and Little River. The mid-Piscassic watershed is remarkable in its extent of rare plants, exemplary natural communities, and supporting natural habitat.

(c) Vegetation/Natural Communities

(1) List the plant species commonly found in the river and river corridor.

Forests cover 68.3% of the watershed with nearly 40% being mixed coniferous and deciduous forest. Deciduous species such as red maple and sugar maple (*Acer* spp.), oak (*Quercus* spp.) and American beech (*Fagus grandifolia*) cover 18.8% of the watershed. Coniferous species such as eastern white pine and red pine (*Pinus* spp.), eastern hemlock (*Tsuga Canadensis*) and white birch and black birch (*Betula* spp) cover 9.9% of the watershed.

Upland areas are predominately hemlock-beech-oak pine which sometimes occurs in pure stands. The four most common tree species in the overstory are white pine, red oak, hemlock and red maple with contiguous stands of white birch, American beech, red pine, yellow birch, black birch, sugar maple, white ash, black cherry, red spruce, and pitch pine. Much of the forest is in the mid-successional stage (50-100 years) with no forests classified as old growth forests. There are a few exceptions where basin swamps which support individual or small stands of black gum trees hundreds of years old.

Common herbaceous plants in the forest understory include starflower, wild sarsaparilla, wintergreen, Canada mayflower, white baneberry, roundleaved violet, and alternate leaved dogwood and a significant number of rare, threatened or endangered species. Understory shrub and non-shrub layers include predominantly woody plants such as witch hazel, black birch, black cherry, ironwood, maple-leaved viburnum, and black huckleberry (NHFG2006). Invasive species including Japanese knotweed, oriental bittersweet, black swallowwort are found in the river corridors, predominately at disturbed soil locations such as where bridges have been installed or repaired.

Table 10 Plant Species Common to the Lamprey River, North Branch River, Pawtuckaway River, North River, Little River or Piscassic River

Scientific name	Common Name
<i>Acer pensylvanicum</i>	Striped Maple
<i>Acer platanoides</i>	Norway Maple
<i>Acer rubrum</i>	Red Maple
<i>Acer saccharinum</i>	Silver Maple
<i>Acer saccharum</i>	Sugar Maple
<i>Agalinus purpurea</i>	Purple Gerardia
<i>Agrostis perennans</i>	Bentgrass
<i>Alliaria petiolata</i>	Garlic mustard
<i>Alisma subcordatum</i>	Water Plantain
<i>Alnus incana</i> spp. <i>Rugosa</i>	Speckled Alder
<i>Alnus serrulata</i>	Common Alder
<i>Amelanchier</i> sp.	Shadbush
<i>Amphicarpa bracteata</i>	Hog Peanut
<i>Anenome quinquefolia</i>	Wood Anenome
<i>Apios americana</i>	Ground Nut
<i>Aquilegia canadensis</i>	Canada Columbine
<i>Aralia nudicaulis</i>	Wild Sarsaparilla

<i>Arenaria lateriflora</i>	Grove Sandwort
<i>Arisaema triphyllum</i>	Jack-in the-pulpit
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Aster acuminatus</i>	Whorled Aster
<i>Aster cf. tardifolius</i>	Aster
<i>Aster cordifolius</i>	Heart-leaved aster
<i>Aster latifolius</i>	Flat-topped Aster
<i>Aster novi-belgii</i>	New York Aster
<i>Aster puniceus</i>	Purple Stemmed Aster
<i>Aster sp.</i>	Calico Aster
<i>Aster umbellatus</i>	Umbellated Aster
<i>Aster vimineus</i>	Small White Aster
<i>Athyrium filix-femina</i>	Lady Fern
<i>Berberis thunbergii</i>	Japanese Barberry
<i>Berberis vulgaris</i>	Common barberry
<i>Betula alleghaniensis</i>	Yellow Birch
<i>Betula lenta</i>	Black Birch
<i>Betula papyrifera</i>	Paper (white) Birch
<i>Betula populifolia</i>	Gray Birch
<i>Bidens cernua</i>	Nodding Bur-Marigold
<i>Bidens connata</i>	Swamp Beggars Tick
<i>Bidens discoidea</i>	Small Beggars Tick
<i>Bidens frondosa</i>	Common Bur-Marigold
<i>Boehmeria cylindrica</i>	False Nettle
<i>Brassenia shreberi</i>	Water-Shield
<i>Bulbostylis capillaris</i>	Hair-like-sedge
<i>Calamagrostis canadensis</i>	Blue-Joint
<i>Calla palustris</i>	Wild Calla
<i>Callitriche heterophylla</i>	Water Starwort
<i>Callitriche verna</i>	Starwort
<i>Caltha palustris</i>	Marsh Marigold
<i>Campanula aparinoides</i>	Marsh Bellflower
<i>Cardamine pennsylvanica</i>	Pennsylvania Bittercress
<i>Carex annectans</i>	Yellow -Fox Sedge
<i>Carex atlantica</i>	Atlantic Sedge
<i>Carex canescens</i>	Silvery Sedge
<i>Carex comosa</i>	a Sedge
<i>Carex crinita</i>	Drooping Sedge
<i>Carex debilis</i>	Stalking Sedge
<i>Carex flava</i>	Yellow Sedge
<i>Carex folliculata</i>	Follicled Sedge
<i>Carex gracillima</i>	Slender Sedge
<i>Carex gynandra</i>	Drooping Sedge

<i>Carex intumescens</i>	Bladder Sedge
<i>Carex lacustris</i>	Lake Sedge
<i>Carex lupulina</i>	Hop Sedge
<i>Carex lurida</i>	Sallow Sedge
<i>Carex prasina</i>	Drooping Sedge
<i>Carex scabrata</i>	Rough Sedge
<i>Carex serosa</i>	Separated Sedge
<i>Carex stipata</i>	Awl Sedge
<i>Carex stricta</i>	Tussock Sedge
<i>Carex tribuloides</i>	Blunt Broom Sedge
<i>Carex vesicaria</i>	Inflated Sedge
<i>Carex vulpinoidea</i>	a Sedge
<i>Carpinus caroliniana</i>	Musclewood
<i>Carya ovata</i>	Shagbark Hickory
<i>Castanea dentata</i>	American Chestnut
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Cephalanthus occidentalis</i>	Buttonbrush
<i>Cerastium</i> spp.	Chickweed
<i>Ceratophyllum demersum</i>	Coontail
<i>Chamaecyparis thyoides</i>	Atlantic White-Cedar
<i>Chelone glabra</i>	Turtlehead
<i>Chimaphila umbellata</i>	Pipsissewa
<i>Chrysosplenium americanum</i>	Golden Saxifrage
<i>Cicuta bulbifera</i>	Bulb Bearing Water Hemlock
<i>Cicuta maculata</i>	Water Hemlock
<i>Cinna arundinacea</i>	Wood Reed
<i>Circaea alpina</i>	Dwarf Enchanters Nights
<i>Circaea lutetiana</i>	Enchanter's Nightshade
<i>Clematis virginiana</i>	Virgins Bower
<i>Clethra alnifolia</i>	Sweet Pepperbrush
<i>Comptonia peregrina</i>	Sweetfern
<i>Convolvulus</i> spp.	Field Bindweed
<i>Coptis trifolia</i>	Goldthread
<i>Cornus alternifolia</i>	Alternate Leaved Dogwood
<i>Cornus amomum</i> spp. <i>amomum</i>	Silky Dogwood
<i>Cornus amomum</i> spp. <i>Obliqua</i>	Pale Dogwood
<i>Cornus canadensis</i>	Bunchberry
<i>Cornus racemosa</i>	Gray Dogwood
<i>Corylus cornuta</i>	Beaked Hazelnut
<i>Cynanchum nigrum</i>	Black Swallow-wort
<i>Cyperus strigosus</i>	Umbrella Sedge
<i>Cypripedium acaule</i>	Pink Lady's Slipper
<i>Decodon verticillatus</i>	Water Willow

<i>Dendrolycopodium hickeyi</i>	Tree Club Moss
<i>Dennstaedtia punctilobula</i>	Hayscented Fern
<i>Diervilla lonicera</i>	Bush Honeysuckle
<i>Diphasiastrum digitatum</i>	Groundcedar
<i>Dryopteris carthusiana</i>	Wood Fern
<i>Dryopteris cristata</i>	Crested Fern
<i>Dryopteris intermedia</i>	Intermediate Wood Fern
<i>Dryopteris marginalis</i>	Marginal Wood Fern
<i>Dryopteris novaboracensis</i>	New York Fern
<i>Dryopteris palustris</i>	Marsh Fern
<i>Dulichium arundinaceum</i>	Three-Way Fern
<i>Echinochloa crusgalli</i>	Barnyard Grass
<i>Elatine</i> spp.	Water Wort
<i>Eleocharis</i> cf. <i>acicularis</i>	Least Spike Rush
<i>Eleocharis obtusa</i>	Blunt Spike Rush
<i>Elocharis smallii</i>	Small's Spike Rush
<i>Elocharis tenuis</i>	Slender Spike Rush
<i>Epilobium coloratum</i>	Willow herb
<i>Epilobium leptonevria</i>	Narrow-leafed willow herb
<i>Equisetum arvense</i>	Common Horsetail
<i>Equisetum arvense</i>	Field Horsetail
<i>Equisetum fluviatile</i>	Water Horsetail
<i>Equisetum sylvaticum</i>	Woodland Horsetail
<i>Eupatorium dubium</i>	Eastern Joe-pye-weed
<i>Eupatorium perfoliatum</i>	Boneset
<i>Fagus grandifolia</i>	American Beech
<i>Fragaria virginiana</i>	Common Strawberry
<i>Frangula alnus</i>	Glossy Buckthorn
<i>Fraxinus americana</i>	White Ash
<i>Fraxinus nigra</i>	Black Ash
<i>Galium</i> sp.	Brdstraw
<i>Gaultheria procumbens</i>	Wintergreen
<i>Gaylussacia baccata</i>	Black Huckleberry
<i>Geum aleppicum</i>	Yellow Avens
<i>Geum laciniatum</i>	Rough Avens
<i>Glyceria melicaria</i>	Manna-grass
<i>Hamamelis virginiana</i>	Witch Hazel
<i>Hepatica acutiloba</i>	Round-leaved Hepatica
Honeysuckle <i>Lonicera canadensis</i>	Northern Fly
<i>Hydrocotyle americanum</i>	Water pennywort
<i>Hypericum boreale</i>	Boreal St. Johnswort
<i>Hypericum ellipticum</i>	Elliptical St, Johnswort
<i>Ilex verticellata</i>	Winterberry Holly

<i>Impatiens capensis</i>	Spotted Jewelweed
<i>Iris versicolor</i>	Blue Flag Iris
<i>Juncus canadensis</i>	Canada rush
<i>Juncus effusus</i>	Effuse rush
<i>Juniperus communis</i>	Common Juniper
<i>Kalmia angustifolium</i>	Sheep Laurel
<i>Laportia canadensis</i>	Wood nettle
<i>Lilium philadelphicum</i>	Wood lily
<i>Lindera benzoin</i>	Spicebush
Liverwort	Liverwort
<i>Lonicera</i> sp.	Honeysuckle
<i>Lycopodium obsuctum</i>	Princess pinr
<i>Lycopodium tristachyum</i>	Clubmoss
<i>Lycopus uniflorus</i>	Hore-hound
<i>Lyonia ligustrina</i>	Maleberry
<i>Lysimachia salicaria</i>	Purple loosetrife
<i>Maianthemum canadensis</i>	Canada Mayflower
<i>Medeola virginiana</i>	Indian Cucumber
<i>Melampyrum lineare</i>	Cow-Wheat
<i>Mentha arvensis</i>	Wild mint
<i>Mitchella repens</i>	Partridgeberry
<i>Monotropa uniflora</i>	Indian Pipe
<i>Monotrpa hypopites</i>	Pinesap
Moss spp.	Mosses
<i>Myosotis laxa</i>	Forget-me-not
<i>Nyphaea tuberosa</i>	White water-lily
<i>Nyssa sylvatica</i>	Black gum
<i>Onoclea sensibilis</i>	Sensitive Fern
<i>Osmunda cinamomea</i>	Cinnamon Fern
<i>Osmunda claytoniana</i>	Interrupted Fern
<i>Osmunda regalis</i>	Royal Fern
<i>Ostrya virginiana</i>	Ironwood
<i>Oxalis acetosella</i>	Wood sorrel
<i>Panax quiquefolius</i>	Dwarf Ginseng
<i>Panicum lanuginosum</i>	Panic grass
<i>Parthenocissus quinquefolia</i>	Virginia Creeper
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phragmites australis</i>	Common reed
<i>Pinus resinosa</i>	Red Pine
<i>Pinus rigida</i>	Pitch Pine
<i>Pinus strobus</i>	White Pine
<i>Podostemum ceratophyllum</i>	Riverweed
<i>Polygonum cusoidatum</i>	Japanese knotweed

<i>Polygonatum pubescens</i>	Hairy Solomon's seal
<i>Polygonum</i>	Tearthumb
<i>Populus grandidentata</i>	Big-toothed Aspen
<i>Populus tremuloides</i>	Quaking Aspen
<i>Potamogeton</i> spp.	Pondweed
<i>Prenanthes altissima</i>	Rattlesnake Root
<i>Prunus pensylvanica</i>	Pin Cherry
<i>Prunus serotina</i>	Black Cherry
<i>Prunus virginiana</i>	Choke Cherry
<i>Pteridium latiusculum</i> var.	Bracken Fern
<i>Pyrola eliptica</i>	Shinleaf
<i>Pyrola rotundifolia</i>	Round-leaved Wintergreen
<i>Quercus alba</i>	White Oak
<i>Quercus rubra</i>	Red Oak
<i>Quercus velutina</i>	Black Oak
<i>Ranunculs abortivus</i>	Small-flowered Crowfoot
<i>Ranunculs reptans</i>	Creeping spearwort
<i>Rhamnus cathartica</i>	Common Buckthorn
<i>Ribes</i> cf. <i>hirtetellum</i>	Gooseberry
<i>Rosa multiflora</i>	Multiflora Rose
<i>Rosa palustris</i>	Swamp Rose
<i>Rubus alleghaniensis</i>	Common Blackberry
<i>Rubus hispidus</i>	Dewberry
<i>Rubus ideaus</i>	Red Raspberry
<i>Rubus pubescens</i>	Dwarf Raspberry
<i>Sagittaria latifolia</i>	Arrowhead
<i>Salix discolor</i>	Large pussy willow
<i>Salix gracilis</i>	Slender willow
<i>Salix nigra</i>	Black willow
<i>Salix sericea</i>	Silky willow
<i>Sambucus canadensis</i>	Common Elderberry
<i>Scutellaria galericulata</i>	Marsh Skullcap
<i>Senecio aureus</i>	Golden Ragwort
<i>Smilax herbacea</i>	Carrion Flower
<i>Solanum dulcamara</i>	Deadly Nightshade
<i>Solidago canadensis</i>	Canada goldenrod
<i>Solidago rugosa</i>	Rough goldenrod
<i>Solidago</i> spp,	Goldenrod
<i>Sparganium</i> sp.	Bur-reed
<i>Sphagnum</i> spp.	Sphagnum moss
<i>Spiraea alba</i> var. <i>latifolium</i>	Meadowsweet
<i>Spirodela polyrhiza</i>	Water flaxseed
<i>Taxus canadensis</i>	Canada Yew

Tiarella cordifolia	Foamflower
Tilia americana	American Basswood
Toxicodendron radicans	Poison Ivy
Trientalis borealis	Starflower
Tsuga canadensis	Eastern Hemlock
Typha latifolia	Broad-leaved Cattail
Typha latifolia	Cattail
Ulmus americana	American Elm
Utricularia cornuta	Bladderwort
Uvularia sessilifolia	Wild Oats
Vaccinium angustifolium	Lowbush Blueberry
Vaccinium corymbosum	Highbush Blueberry
Vaccinium pallidum	Pale Blueberry
versicolor	Blue Flag Iris
Viburnum acerifolium	Mapleleaf Viburnum
Viburnum alnifolium	Hobblebush
Viburnum dendatum var. recognitum	Northern Arrowwood
Viburnum lentago	Nannyberry
Viburnum nudum var. cassinoides	Wild raisin

(2) List any endangered or threatened plant species that are supported by the river and river corridor environment. Include location, if known. Check whether these plants are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level.

Plant Species Location E or T, N or S

The following tables list the endangered or threatened plant species that according to the New Hampshire Natural Heritage Bureau, are supported by the river or river corridor. Presented by individual river segment. The tables use the following legend:

Town – location of species

Occurrence: An occurrence is a specific example of a natural community type, or a population of a species. For species the NHB goal is to consider populations to be separate (= different occurrences) if there is limited gene flow between them. Sightings within a certain distance of each other are all considered to be one occurrence. The default distance for plants is 1 km. For animals it depends on mobility and whether there is unsuitable habitat between two sightings (restricting any gene flow between the populations.)

QualityRank: A-D = Excellent (A) to poor (D), H = Historical (not observed within the last 20 years), X = Extirpated, NR = Not ranked, ****=Highest importance, ***=Extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T = Threatened, E = Endangered, SC = Special

Last Observed: Year

Lamprey River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Climbing Hempweed (<i>Mikania scandens</i>)	Raymond	002	**	S	E	-	2006
Eastern Lilaeopsis (<i>Lilaeopsis chinensis</i>)	Newmarket	003	A	S	E	-	1989
Eastern Lilaeopsis (<i>Lilaeopsis chinensis</i>)	Newmarket	006	A	S	E	-	1989
Engelmann's Quillwort (<i>Isoetes engelmannii</i>)	Epping	001	H	M	E	-	1947
False Water Pimpernel (<i>Samolus valerandi</i> ssp. <i>Parviflorus</i>)	Newmarket	003	A	S	E	-	1989
Georgia Bulrush (<i>Scirpus georgianus</i>)	Epping	002	NR	M	E	-	1972
Knotty Pondweed (<i>Potamogeton nodosus</i>)	Epping	014	**	S	T	-	1994
Mudwort (<i>Limosella australis</i>)	Newmarket	002	D	S	E	-	1996
Salt-loving Spike-rush (<i>Eleocharis uniglumis</i>)	Newmarket	005	A	S	T	-	1984
Separated Sedge (<i>Carex seorsa</i>)	Epping	002	**	S	E	-	1994
Slender Blue Flag (<i>Iris prismatica</i>)	Epping	003	H	M	E	-	1950
Small Whorled Pogonia (<i>Isotria medeoloides</i>)	Epping	045	D	S	T	-	1993
Tubular Thoroughwort (<i>Eutrochium fistulosum</i>)	Raymond	002	**	M	E	-	1959
Tubular Thoroughwort (<i>Eutrochium fistulosum</i>)	Raymond	007	**	S	E	-	2006

Does not include species found in the already designated portions of the Lamprey River in Lee and Durham.

Rank: A-D = Excellent (A) to poor (D), H = Historical (not observed within the last 20 years), X = Extirpated, NR = Not ranked
****=highest importance, ***=extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T=Threatened, E=Endangered

Occurrence: An occurrence is a specific example of a natural community type, or a population of a species. For species the NHB goal is to consider populations to be separate (= different occurrences) if there is limited gene flow between them. Sightings within a certain distance of each other are all considered to be one occurrence. The default distance for plants is 1 km. For animals it depends on mobility and whether there is unsuitable habitat between two sightings (restricting any gene flow between the populations.)

North Branch River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Tubular Thoroughwort (<i>Eutrochium fistulosum</i>)	Raymond	002	**	M	E	-	1959

See notes above

Pawtuckaway River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Lowland Toothcup (<i>Rotala ramosior</i>)	Nottingham	001	NR	M	E	--	1944

See notes above

North River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Slender Blue Flag (<i>Iris prismatica</i>)	Epping	003	H	M	E	-	1950

Rank: A-D = Excellent (A) to poor (D), H = Historical (not observed within the last 20 years), X = Extirpated, NR = Not ranked
 ****=highest importance, ***=extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T=Threatened, E=Endangered

Occurrence: An occurrence is a specific example of a natural community type, or a population of a species. For species the NHB goal is to consider populations to be separate (= different occurrences) if there is limited gene flow between them. Sightings within a certain distance of each other are all considered to be one occurrence. The default distance for plants is 1 km. For animals it depends on mobility and whether there is unsuitable habitat between two sightings (restricting any gene flow between the populations.)

Little River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Knotty Pondweed (<i>Potamogeton nodosus</i>)	Lee	016	**	S	T	-	1994
Ovoid Spike-rush (<i>Eleocharis ovata</i>)	Barrington	001	NR	M	E	-	1950
River Birch (<i>Betula nigra</i>)	Barrington	003	A	M	T	-	1986
Spherical Panic Grass (<i>Dichanthelium sphaerocarpon</i>)	Lee	001	NR	M	E	-	1939

See notes above

Piscassic River Corridor

Name	Town	Occurrence	Quality Rank	Precision	State Status	Federal Status	Last Obs
<u>Plant species</u>							
Climbing Hempweed (<i>Mikania scandens</i>)	Newmarket	010	B-	S	E	--	1996
Downy False Foxglove (<i>Aureolaria virginica</i>)	Newmarket	006	NR	M	E	--	1941
Large Bur-reed (<i>Sparganium eurycarpum</i>)	Newmarket	014	B-	S	T	--	1996
Large Bur-reed (<i>Sparganium eurycarpum</i>)	Newmarket	017	**	S	T	--	2001
Umbrella-sedge (<i>Cyperus erythrorhizos</i>)	Newmarket	002	NR	S	E	--	1998

See notes above

(3) List any vegetative communities supported by the river and the river corridor environment which have been identified as "exemplary natural ecological communities" by the New Hampshire Natural Heritage Inventory. Include location, if known.
Exemplary Natural Ecological Community Location

Known occurrences of exemplary natural communities mapped within 1,320 ft. of the main branch of the **Lamprey River**

Name	Town	Quality Rank	Precision	Last Observed
<u>Ecological System</u>				
Medium level fen system	Northwood	A-	S	1998
<u>Natural Community</u>				
Red maple floodplain forest	Epping	A	S	1994
Swamp white oak floodplain forest	Newmarket	B-	S	2006

Rank: A-D = Excellent (A) to poor (D)

Precision: S = location known to within ca. 300 feet, M = location known to within ca 1.5 mile

Known occurrences of exemplary natural communities mapped within the **North Branch River** watershed.

Name	Town	Quality Rank	Precision	Last Observed
<u>Natural Community</u>				
Appalachian oak – pine rocky ridge	Deerfield	A	S	2006
Black gum – red maple basin swamp	Deerfield	B+	S	1998
Chestnut oak forest/woodland	Candia	CD	S	2006

Rank: A-D = Excellent (A) to poor (D)

Precision: S = location known to within ca. 300 feet, M = location known to within ca 1.5 mile

Known occurrences of exemplary natural communities mapped within 1,320 ft. of the main branch of the **Pawtuckaway River**.

Name	Town	Quality Rank	Precision	Last Observed
<u>Natural Community</u>				
Alder-dogwood-arrowwood alluvial thicket	Raymond	B	S	2008

Rank: A-D = Excellent (A) to poor (D)

Precision: S = location known to within ca. 300 feet, M = location known to within ca 1.5 mile

Known occurrences of exemplary natural communities mapped within 1,320 ft. of the main branch of the **North River**.

Name	Town	Quality Rank	Precision	Last Observed
<u>Natural Community</u>				
Red maple floodplain forest	Epping	A	S	1994

Rank: A-D = Excellent (A) to poor (D)

Precision: S = location known to within ca. 300 feet, M = location known to within ca 1.5 mile

Known occurrences of rare species and exemplary natural communities mapped within 1,320 ft. of the main branch of the **Little River** watershed.

None known

Known occurrences of rare species and exemplary natural communities mapped within the **Piscassic River** corridor.

Name	Town	Quality Rank	Precision	Last Observed
<u>Ecological System</u>				
Low-gradient silty-sandy riverbank system	Epping	B+	S	2001
Low-gradient silty-sandy riverbank system	Exeter	B+	S	2001
Low-gradient silty-sandy riverbank system	Newfields	B+	S	2001
Low-gradient silty-sandy riverbank system	Newmarket	B+	S	2001

Rank: A-D = Excellent (A) to poor (D)

Precision: S = location known to within ca. 300 feet, M = location known to within ca 1.5 mile

The Lamprey River Protected Instream Flow Report (July 13, 2009) has identified several natural communities where flow levels of the river have a direct impact on the health and survival of these communities.

Lamprey Protected Instream Flows for Natural Communities and Plants	
Herbaceous Low Riverbank, mannagrass, hempweed – habitat maintenance	>500 cfs for one week or more – December 1 through April 30
Riverweed, Knotty Pondweed – growth and development	>100 cfs seasonal mean – May 1 through June 30
Floodplain vernal pools – protection/isolation	<1,500cfs daily mean – March 15 through July 31, except for natural events
Herbaceous Low Riverbank – growth and development	< or + 60 cfs daily mean – August through September, except for natural events

The Lamprey River system supports numerous rare species seldom located elsewhere in the state and the numerous exemplary natural communities mapped in the watershed reflect the importance of this watershed.

(d) Fish Resources

(1) List the fish species commonly found in the river.

Table 11 - Fish of the Lamprey River and Tributaries

FAMILY		Native or	Habitat use	Pollution	Thermal
Common name	Genus Species	Introduced	classification	tolerance	regime
Petromyzontidae					
Sea lamprey	<i>Petromyzon marinus</i>	N	FD	M	Eurythermal
Anguillidae					
American eel	<i>Anguilla rostrata</i>	N	MG*	T	Eurythermal
Clupeidae					
Blueback herring	<i>Alosa aestivalis</i>	N	FD	M	Warm
Alewife	<i>Alosa pseudoherangus</i>	N	FD	M	Eurythermal
American shad	<i>Alosa sapidissima</i>	N	FD	M	Warm
Salmonidae					
Rainbow trout	<i>Oncorhynchus mykiss</i>	I	FD	I	Cold
Atlantic salmon	<i>Salmo salar</i>	N	FS	I	Cold
Brown trout	<i>Salmo trutta</i>	I	FD	I	Cold
Brook trout (char)	<i>Salvelinus fontinalis</i>	N	FS	I	Cold
Esocidae					
Redfin pickerel	<i>Esox americanus</i>	N	MG	M	Warm
Chain pickerel	<i>Esox niger</i>	N	MG	M	Warm
Cyprinidae					
Common shiner	<i>Luxilus cornutus</i>	N	FD	M	Eurythermal
Golden shiner	<i>Notemigonus crysoleucas</i>	N	MG	T	Eurythermal
Bridle shiner	<i>Notropis bifrenatus</i>	N	MG	I	Warm
Spottail shiner	<i>Notropis hudsonius</i>	I	MG	M	Eurythermal
Blacknose dace	<i>Rhinichthys atratulus</i>	N	FS	T	Eurythermal
Longnose dace	<i>Rhinichthys cataractae</i>	N	FS	M	Eurythermal
Creek chub	<i>Semotilus atromaculatus</i>	N	FS	T	Eurythermal
Fallfish	<i>Semotilus corporalis</i>	N	FS	M	Eurythermal
Catostomidae					
Common white sucker	<i>Catostomus commersoni</i>	N	FD	T	Eurythermal
Creek chubsucker	<i>Erimyzon oblongus</i>	N	FS	I	Eurythermal
Ictaluridae					
Yellow bullhead	<i>Ameiurus natalis</i>	I	MG	T	Warm
Brown bullhead	<i>Ameiurus nebulosus</i>	N	MG	T	Warm
Cyprinodontidae					
Banded killifish	<i>Fundulus diaphanus</i>	N	MG	T	Warm
Moronidae					
White perch	<i>Morone americana</i>	N	MG	M	Eurythermal
Striped bass	<i>Morone saxatilis</i>	N	FD	M	Warm
Centrarchidae					
Rock bass	<i>Ambloplites rupestris</i>	I	MG	M	Eurythermal
Banded sunfish	<i>Enneacanthus obesus</i>	N	MG	M	Warm
Redbreast sunfish	<i>Lepomis auritus</i>	N	MG	M	Warm
Pumpkinseed	<i>Lepomis gibbosus</i>	N	MG	M	Warm
Bluegill	<i>Lepomis macrochirus</i>	I	MG	T	Warm
Smallmouth bass	<i>Micropterus dolomieu</i>	I	MG	M	Eurythermal
Largemouth bass	<i>Micropterus salmoides</i>	I	MG	M	Warm
Black crappie	<i>Pomoxis nigromaculatus</i>	I	MG	M	Warm
Percidae					
Swamp darter	<i>Etheostoma fusiforme</i>	N	MG	M	Warm
Yellow perch	<i>Perca flavescens</i>	N	MG	M	Eurythermal

Native (N) or introduced (I), Habitat use classifications: fluvial specialist (FS), fluvial dependent (FD), macrohabitat generalist (MG)

Pollution tolerances: intolerant (I), moderately tolerant (M), or tolerant (T),

Thermal regime tolerances: Cold, Eurythermal, or Warm water

(2) List any endangered or threatened fish species which inhabit the river. Check whether these fish are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level.

Fish Species Location E or T ,N or S

Lamprey River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	LastObs
Bridled Shiner (<i>Notropis bifrenatus</i>)	Raymond	005	S	***	T	-	1998
Swamp Darter (<i>Etheostoma fusiforme</i>)	Raymond	001	S	**	SC	-	1984

North Branch River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	Last Obs
Banded Sunfish (<i>Enneacanthus obesus</i>)	Deerfield	033	S	**	SC	-	2007
Swamp Darter (<i>Etheostoma fusiforme</i>)	Raymond	001	S	**	SC		2007

Pawtuckaway River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	Last Obs
No occurrences							

North River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	Last Obs
Banded Sunfish (<i>Enneacanthus obesus</i>)	Nottingham	025	S	**	SC	-	2005
Bridled Shiner (<i>Notropis bifrenatus</i>)	Nottingham	006	S	***	T	-	1998

Little River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	Last Obs
Banded Sunfish (<i>Enneacanthus obesus</i>)	Lee	030	S	**	SC		2006

Piscassic River Corridor

Name	Town	Occurrence	Precision	Rank	State Status	Federal Status	Last Obs
No occurrences							

Rank: ****=highest importance, ***=extremely high importance, **=very high importance, *=high importance

Precision: S = Location known to within ca. 300 feet, M = Location known to within ca. 1.5 mile

Listing Status: T=Threatened, E=Endangered

Sources: NH Natural Heritage Bureau, Lamprey River Instream Flow Final Report and Emily Brunkhurst, Wildlife Biologist, NH Fish and Game

(3) Describe the presence and location of spawning beds, feeding areas, and other significant aquatic habitat for warmwater, coldwater or saltwater fish populations of that is valued, but not necessarily rare, and as determined by the NH Fish and Game Department, based on the [NH Wildlife Action Plan](#), or the U.S. Fish and Wildlife Service.

Significant Habitat Diversity Rating

The NH Fish and Game Department is currently working to identify important wild brook trout habitat throughout the state. In southeastern New Hampshire, brook trout spawning habitat is restricted to isolated, spring fed streams. These streams are often well known by local residents, but overlooked when it comes to development and town planning. Two streams have been identified in the Lamprey River watershed so far, but there are likely more, including some unconfirmed reports of wild brook trout in the upper North River watershed and the Lamprey River headwaters in Deerfield. The known brook trout streams include Aunt Mary Brook, a small stream flowing north into the North Branch River, about one mile upstream from its confluence with the Lamprey River and Wednesday Hill Brook, which flows south under Wednesday Hill Road in Lee, just east of Route 155. (Matt Carpenter, NH Fish and Game)

The section of river from the head of tide up to the Wiswall dam is important spawning habitat for anadromous fish (river herring, sea lamprey, and a remnant population of American shad). Fish passage at the Wiswall dam will lead to important spawning habitat upstream. The Lamprey River upstream of Wadleigh Falls and another section in Raymond are important spawning areas for bridge shiners.

The Lamprey, North Branch, Pawtuckaway, North, Little, and Piscassic Rivers have a diverse assemblage of native fish species due to their clean, mostly free flowing waters and a variety of important habitat features. Intact floodplain forests and vegetated riparian zones provide an abundant source of wood and organic matter, which acts both as a food source and as a structural habitat component when trees fall into the river. Substrates in flowing water range from sand and gravel to cobble and boulders. The spaces between boulders and cobble provide important refuge for fish and aquatic invertebrates that are adapted to living in flowing water. Urbanization and poor agricultural practices can cause erosion and sedimentation which causes cobble and boulder substrate to become embedded with sand and silt. The Lamprey River watershed remains largely forested and therefore supports aquatic habitat that is less impacted by sedimentation and other forms of pollution.

Muddy backwaters and coves support submerged aquatic vegetation and act as important nursery areas for many fish species, including the state threatened bridge shiner, and species of concern, including banded sunfish, redbin pickerel, and swamp darters. Excellent spawning habitat for anadromous fish, including river herring, American shad, and sea lamprey, is known to exist throughout main stem of the Lamprey River, although exact spawning locations have not been mapped. The entire watershed is considered important habitat for the catadromous American eel, another species of conservation concern.

The Lamprey River is considered, by regional fisheries biologists, to be a “reference river” for healthy fish habitat.

The Lamprey River Watershed has a significant amount of land area that is the “Highest Ranked Wildlife Habitat by Ecological Condition in New Hampshire”. The river corridors of the watershed that meet this are:

- along the Lamprey River from the headwaters to the confluence with the North Branch River and along the north side of the Lamprey to the West Epping dam
- the headwaters of the North Branch River
- the Pawtuckaway River corridor
- the North River corridor and adjacent lands
- the Little River and adjacent lands
- the main stem of the Lamprey River from Rout 125 bridge all the way to Great Bay with significant adjacent lands

The North Branch River from New Boston Road to the confluence with the Lamprey River meets the criteria for “Highest Ranked Habitat in Biological Region” as does the Lamprey River in Newmarket upriver from the Macallen Dam. See the Wildlife Action Plan map on page 31 in Section VII b 3.

(4) Indicate whether the significant fisheries found in the river rely on natural reproduction or a stocking program. If fish populations rely on a stocking program, indicate whether they are partly or wholly dependent on the program.

Brook trout, rainbow trout, and brown trout are stocked in the Lamprey River. One of the few rivers with a fall stocking program, the Lamprey River is very popular with anglers. This fishery is entirely dependent on stocking, although there are some small, spring fed streams which support wild brook trout in the Lamprey River watershed. The main-stem of the Lamprey River is too warm in the summer to support cold water fish, but it provides excellent fishing for warm water species like largemouth bass, black crappie, chain pickerel, yellow perch, and sunfish.

The upper reaches and tributaries, such as the North River and Little River, provide colder water for brook and brown trout. These fish, along with rainbow trout and Atlantic salmon, are stocked by the State for a considerable distance along the river.

Table 12 Fish Stocking Rates for 2009 by River

2009 Stocking Species and Locations

Lamprey River – headwaters to Epping-Lee line

Northwood	eastern brook trout	240
Deerfield	eastern brook trout	1610
Deerfield	rainbow trout	1000
Deerfield	brown trout	300
Raymond	eastern brook trout	210
Raymond	rainbow trout	100
Raymond	brown trout	600
Epping	eastern brook trout	170
Epping	rainbow trout	1450
Epping	brown trout	630

North Branch River

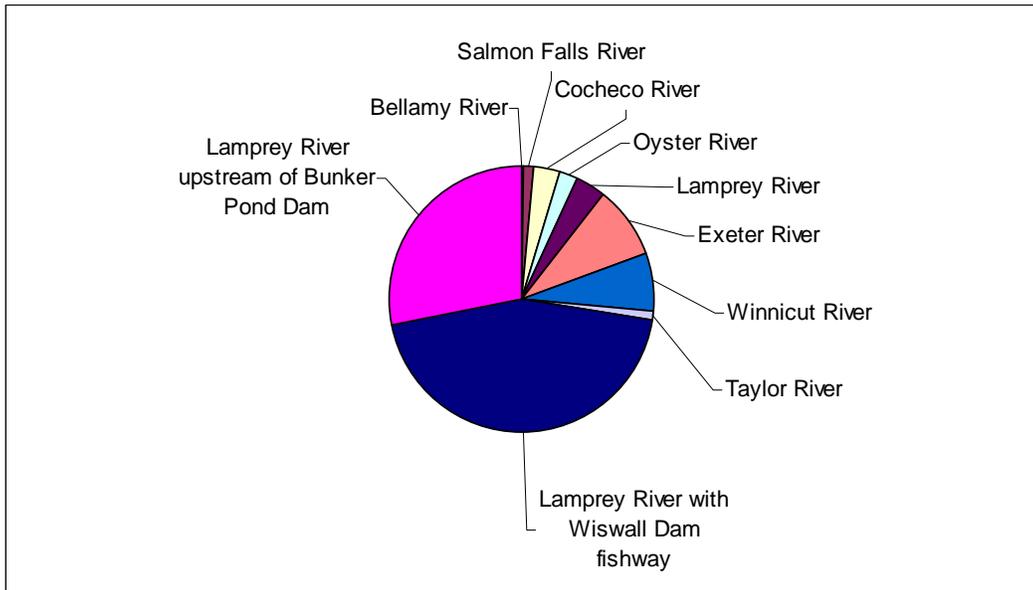
None stocked			
<u>Pawtuckaway River</u>			
None stocked			
<u>North River</u>			
Nottingham	eastern brook trout		1610
Nottingham	rainbow trout		250
Nottingham	brown trout		0
Lee	eastern brook trout		580
<u>Little River</u>			
Nottingham	eastern brook trout		250
Lee	eastern brook trout		690
<u>Piscassic River</u>			
Newfields	eastern brook trout		390
Newfields	rainbow trout		110
Newmarket	eastern brook trout		500

All stocked fish were at one year stage of growth.

(5) *Is the river a viable anadromous fish resource? If yes, identify any on-going or planned restoration programs.*

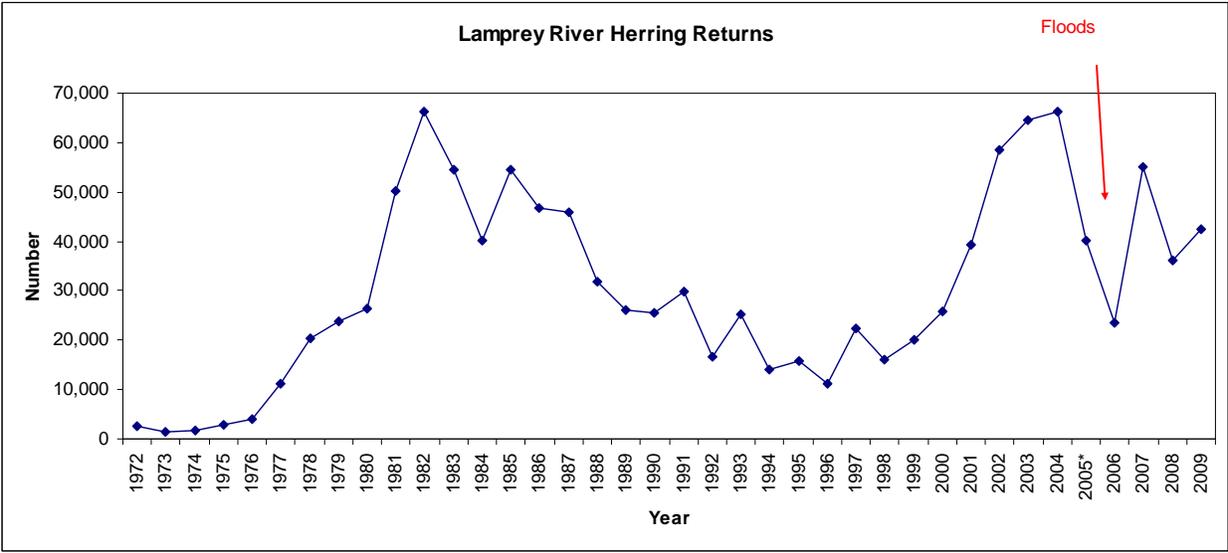
Of all New Hampshire’s coastal rivers, the Lamprey River has enormous potential for anadromous fish restoration. Shad, alewife, and Atlantic salmon are found up to the impassable Wiswall Dam in Durham. The river is also part of the anadromous fish restoration program, a cooperative state-federal restoration program which began in 1969. NH Fish and Game Commission identified the Lamprey River as “the most significant coastal river for anadromous fish”.

Figure 1 Current Accessible Anadromous Fish Habitat In Coastal Rivers vs. Potential Habitat In The Lamprey River (In Miles).

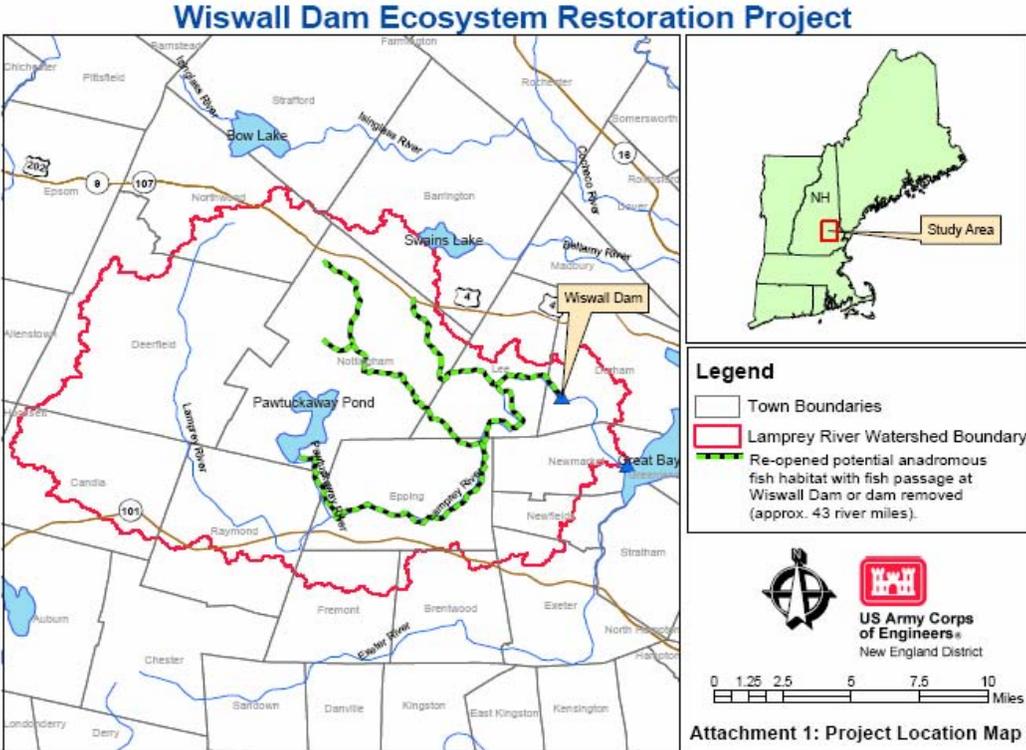


The river currently supports a river herring spawning run ranging between 10,000 and 70,000 adult returns per year. Access to approximately 3.5 miles of freshwater spawning habitat is provided by a fish ladder at a head-of-tide fish ladder in Newmarket. Some river herring are trapped at this fish ladder and transferred to Pawtuckaway Lake, a water body with excellent spawning habitat that is not currently accessible. The Wiswall Dam, in Lee, is the current limit of upstream migration in the Lamprey River.

Figure 2 Annual River Herring Return Counts

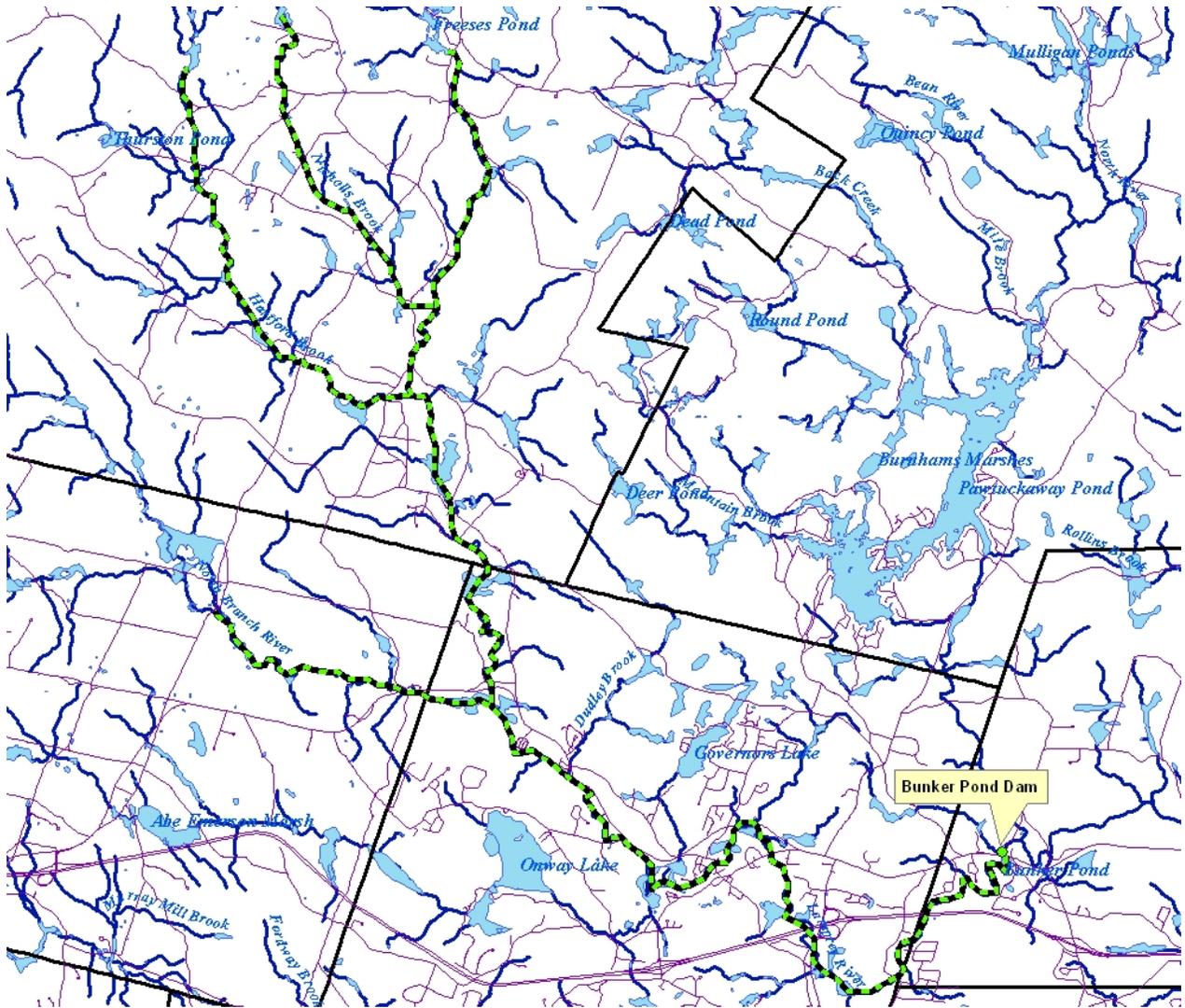


Map 10. Impact on Migration with Wiswall Dam Fish Ladder



The proposed construction of a fishway at the Wiswall Dam, would open over 43 river miles to migratory fish, including river herring, American shad, sea lamprey, and American eel. The potential removal of the Bunker Pond Dam would open up an additional 27 miles, making the majority of the Lamprey River main stem and many tributaries accessible to movement for both resident and diadromous fish species. This extensive accessibility would be unique compared to the other river systems within the Great Bay estuary.

Map 11 River Accessible to Fish Migration with Bunker Pond Dam Removed



(e) Water Quality

(1) Check the state's water quality classification that applies to this river or segment under state law.

Lamprey River, North Branch River, Pawtuckaway River, North River, and Little River:

Class A Class B

Piscassic River

Class A Class B

(2) According to readily available information, what is the actual water quality of this river under the state's water quality standards?

Lamprey River, North Branch River, Pawtuckaway River, North River, and Little River:

Class A Class B

Piscassic River

Class A Class B

(3) If the river is not currently supporting its water quality classification, identify the existing major causes of deficient water quality, e.g., industrial or sewage pollutants, agricultural fertilizer run-off, and possible corrective measures, e.g., regulations, enforcement, local and use controls.

Current water quality impairments in the Lamprey River watershed as listed in the 2010 New Hampshire Final 305(d) List of Impaired Waters submitted by the NH Department of Environmental Services to the Environmental Protection Agency (EPA) on April 1, 2010 include:

Lamprey River - Freshwater Section - pH, aluminum, dissolved oxygen saturation, dissolved oxygen, Escherichia coli

Lamprey River - Tidal Section - 2-Methylnaphthalene, acenaphthene, acenaphthylene, aluminum, arsenic, Anthracene, Benzo[A], Pyrene, (Pahs), cadmium, copper, Chlorophyll-A, Chrysene (C1-C4), DDT, DDE, DDD, Dibenz[A,H]Anthracene, Dissolved Oxygen Saturation, Estuarine Bioassessments, Fluoranthene, Fluorene, Lead, Light Attenuation Coefficient, Mercury, Nickel, Naphthalene, Nitrogen (Total), Oxygen, Dissolved, phenanthrene, Pyrene, trans-nonachlor, Ph, Polychlorinated Biphenyls, Chlorophyll-A, Enterococcus, Nitrogen (Total), Dioxin (Including 2,3,7,8-TCDD)

North Branch River - Dissolved Oxygen Saturation, pH

Pawtuckaway River - Dissolved oxygen saturation, dissolved oxygen, pH

North River - pH, Escherichia coli

Little River - Aluminum, lead, pH, Escherichia coli

Piscassic River - Dissolved oxygen saturation, dissolved oxygen, pH

The major sources of water pollutants are runoff from impervious surfaces, poorly functioning septic systems, road salt application, and impairment to the natural vegetative buffers of the river.

The Lamprey River, North River, Little River and Piscassic River are monitored bimonthly in the summer through the Volunteer River Assessment Program. A recent analysis of the data collected since the program began in 1998 indicates a slight trending downward for pH and no significant trend pattern for other parameters. Volunteers test for pH, turbidity, dissolved oxygen, specific conductance and temperature.

The Lamprey River Hydrologic Observatory is the study area for extensive research by the University of New Hampshire primarily by Michelle Daley, Associate Director of the Water Resources Research Center, Department of Natural Resources and the Environment. Findings include that Nitrate is increasing over time in the Lamprey River based on monthly sampling conducted from 1999 through 2008 (McDowell/Daley UNH). Nitrogen retention is higher in the Lamprey watershed than other New England sites or the Northeast in general. Surface water nitrate is best predicted by human population density. The more people, the more nitrate. Nitrate increased exponentially in response to areas with higher human population densities. Nitrate levels in the surface water will increase as it reaches equilibrium with the high nitrate levels found in the groundwater of the watershed. Six percent of homeowner wells sampled in the Lamprey watershed met or exceeded 4 mg NO₃-N L⁻¹ at least once during quarterly sampling which is the level considered contaminated and likely associated with other contaminants.

Chloride levels in drinking water wells of the Lamprey River watershed are on the rise. Some wells exceed the drinking water standard. The source of chloride is from the application of road salt and there is no best management practice to mitigate this except to use less salt. Chloride and sodium increase as surface areas become more impervious.

“Due to climate change, the frequency of extreme rainfall events is increasing in New England. At the same time, watersheds are being altered by impervious surface associated with development, such as roads, roofs, and parking lots. Both of these factors contribute to greater quantities of water running off the land and increase the potential for damaging floods.” EPA National Estuary Program – Piscataqua Region Estuaries Partnership

Low river flows, especially during extreme drought, concentrate nutrients and warm the water, causing excessive algae growth. On occasion, this has caused dissolved oxygen levels in the Lamprey to drop below standards for a Class B river. Growth of fish severely impacted when DO is less than 40%. Fish will die when DO is less than 20%.

(f) Natural Flow Characteristics

Describe the flow characteristics of the river. Note if the river is substantially freeflowing, i.e. no dams regulate the flow of the river, and describe the size and duration of the spring run-off, summer flow amounts and the frequency and duration of flood events. If the river is regulated, describe the purpose and effects of existing dams (both within and upstream from the river segment) diversion works and other minor modifications on the natural flow of the river. Indicate the locations where the river is free-flowing. Also, if applicable, indicate flow variations interbasin transfers.

Briefly describe the natural flow characteristics of the river, including natural periodic variation in flow, e.g., spring run-off and summer flow amount, and frequency and duration of flood events. If applicable, describe purpose of and flow variations caused by impoundments, significant diversions, or channel alterations, including interbasin transfers. Indicate which segments of the river are free-flowing.

Lamprey River

The Lamprey River is free-flowing for much of its 47 miles from Northwood to Newmarket. Dams are located at Meadow Lake (Northwood), Freeses Pond (Deerfield), Bunker Pond (Epping, proposed for removal), Wiswall Dam (Durham) and Macellan Dam (Newmarket).

Little River

The Little River has two active dams at Mendums Pond (Barrington) and Nottingham Lake (Nottingham).

North River

The North River has two active dams: the Lucas Pond Dam (Northwood) and North River Pond Dam (Nottingham).

North Branch River

The North Branch River has only one active dam, Beaver Pond Dam (Candia), at its headwaters. From this location the river is free-flowing until its confluence with the Lamprey River in Raymond.

Pawtuckaway River

The Pawtuckaway River begins at the outlet of Pawtuckaway Lake, and its flow is largely controlled by the Pawtuckaway Lake/Dollof Dam (Nottingham) that occurs at its beginning. the Pawtuckaway River is a free-flowing river and remains in pristine condition along its entire length.

Piscassic River

The Piscassic River is largely free-flowing due to the large wetland complexes it flows through with multiple channels. The three active dams include the small impoundment at its headwaters in

Fremont, Piscassic Brook Dam, and then two dams towards its confluence with the Lamprey River, the Piscassic Ice Pond Dam (Newfields) and the Piscassic River Dam (Newmarket).

Watershed Gaging Stations

Gaging stations operated by the U.S. Geological Survey (USGS) are located at Packers Falls in Durham (USGS 01073500 LAMPREY RIVER, near Newmarket, NH) and at Langford Road in Raymond (USGS 01073319 LAMPREY RIVER, Raymond, NH). The Packers Falls gauging station has been in operation since 1934. The average annual mean discharge at this station is 288 cubic feet per second.

Historic Crests for the Lamprey River at Packers Falls USGS gaging station:

1. 18.31 ft on May 16, 2006
2. 17.49 ft on April 18, 2007
3. 15.14 ft on April 7, 1987
4. 14.88 ft on March 20, 1936
5. 14.81 ft on March 16, 2010
6. 14.59 ft on October 22, 1996
7. 12.22 ft on March 15, 1977
8. 11.61 ft on March 20, 1983
9. 11.54 ft on April 3, 2004
10. 11.52 ft on June 15, 1998

The Raymond gaging station is part of a 2-year multipurpose streamflow monitoring network expansion project for 15 new stream gages across New Hampshire. The expansion project was requested by the New Hampshire Rivers Management Advisory Committee (RMAC), proposed by the Stream Gage Task Force (SGTF), and funding for installation was provided by the New Hampshire Legislature. Station operated in cooperation with the New Hampshire Department of Environmental Services.

Data for streamflow at the Raymond gauging station began July 1 of 2008. Mean daily discharges range from a low of 5.3 cubic feet per second in September of 2009 to a high flow of 2,420 cubic feet per second in February of 2010.

The water that ultimately makes its way into the Lamprey comes from precipitation, directly via runoff, and indirectly from groundwater. On average, 20 inches per year of water comes from overland runoff. About half of this occurs during the months of March, April and May. While in some watersheds low flows in summer and fall are augmented by adjacent aquifers, the Lamprey watershed contains relatively few aquifers in direct contact with the river. Instream flow, or the amount of water in the river at a given time, is important for several reasons

- Low water levels cause a rise in temperature with sometimes severe impacts on aquatic organisms; for example, warm water holds much less oxygen for them than cold water.
- When flows are low, any contaminants become more concentrated, which can cause wastewater treatment plants to have difficulty meeting their permit requirements.
- Very low flows cause wetlands to dry up and expose river banks, making aquatic animals more vulnerable to predation by raccoons and other predators.

- The Lamprey River provides the largest volume of fresh water compared to other sources for the Great Bay and to the Great Bay Estuary. The volume and rhythm of flow to those ecosystems are critical to their health.
- Finally, humans are affected because a low river means less recreation, poorer water quality for swimming, and shortages for municipal and commercial water supplies.

Groundwater plays an integral part in planning for protection of river flows. Not only does groundwater augment surface water stream flow, but it also provides an alternative water source for human use. Knowing where and how much groundwater is available for watershed communities' use is thus intimately tied to protecting the Lamprey's flow levels. So, also, is planning for wells withdrawing water near the river, including both large withdrawals and large numbers of private wells. A U.S. Geological Survey (USGS) groundwater/aquifer study has provided new information about the location of groundwater sources in NH Seacoast towns, including the Lamprey watershed, causing some municipalities to do further work in pinpointing the location of their groundwater resources.

Like other southern New Hampshire rivers, the Lamprey River is subject to extremely low flows during droughts. It is also seen as a major water resource by watershed towns. The UNH/Durham water system has been the largest consumptive user of the Lamprey (71 million gallons in 2004). UNH has used 70% of the system's water which on average produces 1 million gallons of water per day. UNH/Durham has submitted a request to NHDES to increase the amount of water to be taken from the river.

Many seacoast towns are facing a shortage of safe, reliable drinking water for their residential, commercial, industrial, and community needs. As the largest freshwater river in the Seacoast of New Hampshire, the Lamprey is viewed by many area towns as a possible source to augment their existing water supplies. Meeting the needs of aquatic plants and animals while addressing the needs of a growing human population is going to be increasingly challenging in the near future.

(g) Open Space

Briefly describe, give the location and identify the type, e.g., floodplain, forested, etc., and type of ownership, i.e., public or private of significant areas of open space in the river corridor. Describe and include the location of any protected land parcels within the river corridor, e.g., state parks and forests, national forest lands, municipal parks and conservation easements.

Table 13 Conservation Lands in the Nominated River Corridors

Conservation Lands in the Lamprey River Corridor

does not include conservation lands in Lee and Durham

Location and Conservation Parcel Name	Protection Type	Protection Agency	Agency Type	Acres
Northwood				
Northwood Meadows State Park*	Fee ownership	DRED	State	633.2
Forest Peters WMA#	Fee ownership	NH F&G	State	440.8
Deerfield				
UNH - Saddleback Mountain	Fee ownership	UNH	State	265.4
Devries	Fee ownership	Deerfield	Town	4.5
Freese's Pond	Fee ownership	Deerfield	Town	29.7
Levesque Lot	Fee ownership	Deerfield	Town	5.3
Menard Easement	Cons. Easement	Bear Paw	Privat	1.5
Raymond				
Cammet Recreation Area	Fee ownership	Raymond	Town	41.3
Raymond Water Department Land	Fee ownership	Raymond	Town	13.6
Epping				
Manchester-Portsmouth RR Bed	Fee ownership	NH DOT	State	167.5
Town of Epping Land	Fee ownership	Epping	Town	6.2
Folsom Conservation Area	Fee ownership	Epping	Town	28.4
Mary Blair Park	Fee ownership	Epping	Town	8.2
Scout Field	Fee ownership	Epping	Town	12.9
George Falls Woods	Fee ownership	Epping	Town	14.9
Lamprey River Forest	Fee ownership	SPNHF	Private	108.0
Lamprey River Forest	Fee ownership	SPNHF	Private	72.8
NLI - Cemetery Land	Fee ownership	Epping	Town	6.0
Tilton Bridge Landing	Cons. Easement	Epping	Town	12.1
Rosemarie Dumas Preserve	Deed restriction	Epping	Town	7.2
Lamprey River Wildlife Preserve	Fee ownership	SE Land Trust	Private	27.5
Flag Hill Winery	Cons. Easement	SE Land Trust	Privat	103.2
Sewall	Cons. Easement	Epping	Town	75.9
RCCD Lamprey Riverbend	Fee ownership	Epping	Town	36.0
Camp Hedding	Cons. Easement	NH DOT	State	19.7
Clarke I Easement	Cons. Easement	SE Land Trust	Private	23.8
NLI East Coast Land	Fee ownership	Atkinson	Town	4.7
Lamprey River Corridor Totals				2,170.4

*Northwood Meadows State Park is 666 acres in total, 633.2 of which are in the Lamprey Watershed

#The Forest Peters Wildlife Management Area is a total of 457.7 acres, 440.8 of which are in the Lamprey Watershed

Conservation Lands in the North Branch River Corridor

Location and Conservation Parcel Name	Protection Type	Protection Agency	Agency Type	Acres
Deerfield				
Bear Brook State Park	Fee ownership	DRED	State	817.0*
Deerfield Road Parcel	Fee ownership	Candia	Town	100.5
Candia				
New Boston Road Parcel	Fee ownership	Candia	Town	27.7
New Boston Road Parcel	Fee ownership	Candia	Town	2.1
North Branch River Total				947.3

*total acreage of Bear Brook State Park is 9,472.1

Conservation Lands in the Pawtuckaway River Corridor

Town	Conservation Parcel Name	Protection Type	Protection Agency	Agency Type	Acres
Epping	Primack Easement	Cons. Easement	SE Land Trust	Private	90.0
Nottingham	Bacon Easement	Cons. Easement	Bear Paw	Private	51.2
Raymond	Cramer / Evans Easement	Cons. Easement	Bear Paw	Private	155.2
					296.4

Conservation Lands in the North River Corridor

All within the town of Nottingham

Conservation Parcel Name	Protection Type	Protection Agency	Agency Type	Acres
Fernald - Mulligan Forest*	Cons. Easement	SPNHF	Private	2012.0
Nottingham State Forest	Fee ownership	DRED	State	13.9
Nottingham98-0156	Cons. Easement	Nottingham	Town	7.9
Roland B. Kimball Easement	Cons. Easement	Bear Paw	Private	21.7
Vienna Smith State Forest	Fee ownership	DRED	State	50.8
General Bartlett Memorial Forest	Fee ownership	NE Forestry Foundation	Private	54.2
Crosbie Easement	Cons. Easement	Lee	Town	17.7
Grumbling Easement	Cons. Easement	Lee	Town	114.9
North River Total				2,293.3

*Mulligan Forest is in the North River Corridor and beyond

Conservation Lands in the Little River Corridor

Location and Conservation Parcel Name	Protection Type	Protection Agency	Agency Type	Acres
Barrington				
Mendums Pond	Fee ownership	NHDES WRD	State	50.2
Nottingham				
Nottingham 04-099	Cons. Easement	Nottingham	Town	9.5
Nottingham 04-099	Cons. Easement	Nottingham	Town	0.3
Lee				
Claridge	Cons. Easement	Lee	Town	80.5
Little River Parcel	Fee ownership	Lee	Town	7.1
Cook	Cons. Easement	Lee	Town	79.6
Stevens Easement	Cons. Easement	Lee	Town	34.2
Mills/Little River Park	Fee ownership	Lee	Town	14.1
Little River Total				275.4

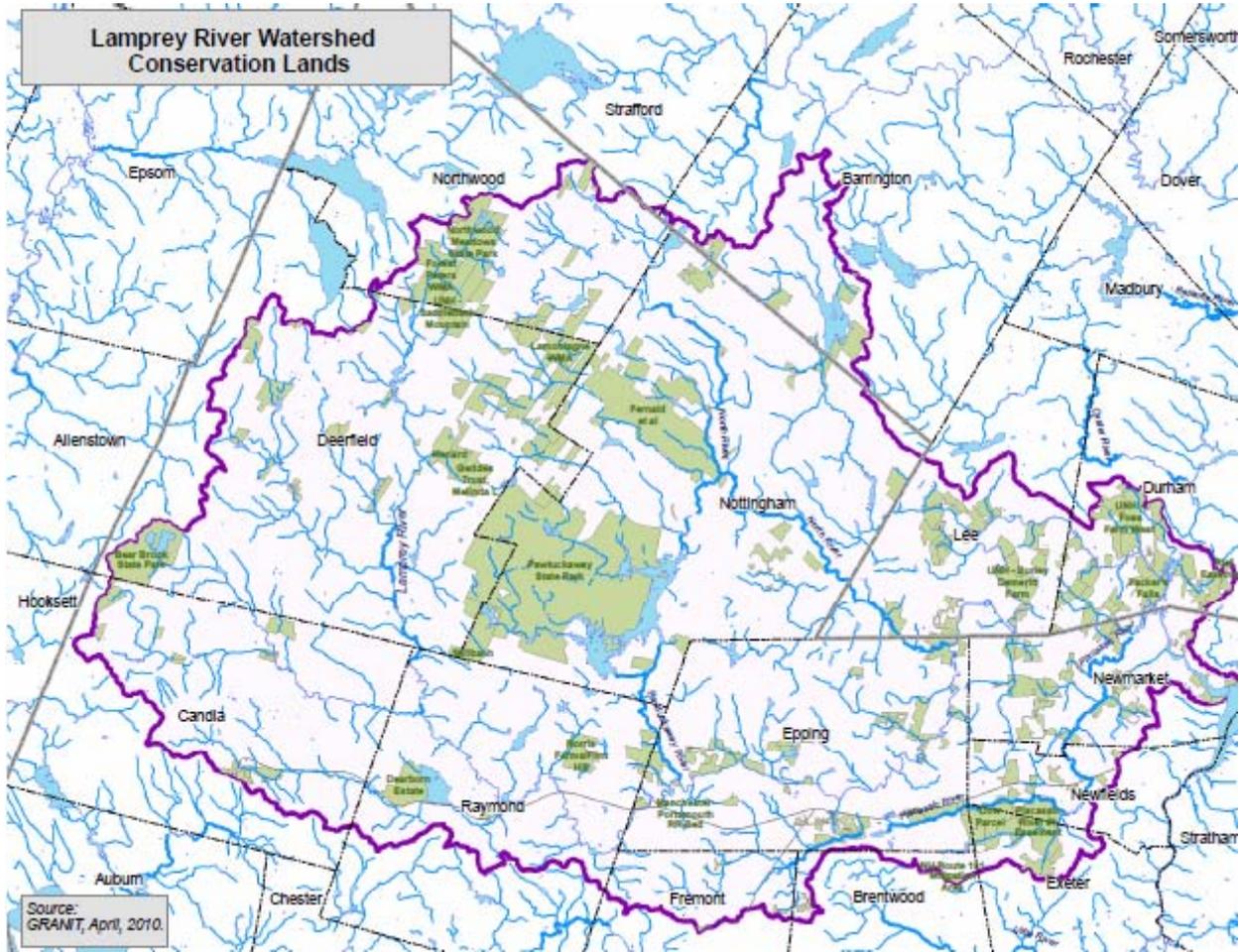
Conservation Lands in the Piscassic River Corridor

Each parcel is a combination of forest, floodplain and wetland.

Location and Parcel Name	Protection Type	Protection Agency	Agency Type	Parcel Size
EPPING				
Goodrich Marsh WMA	Fee ownership	NH F&G	State	17.2
Goodrich Marsh WMA	Fee ownership	NH F&G	State	40.6
Goodrich Marsh WMA	Fee ownership	NH F&G	State	15.1
Seymour + Fry	Cons. Easement	SE Land Trust	Private	5.6
Low Easement	Cons. Easement	SE Land Trust	Private	40.2
Low Easement	Cons. Easement	SE Land Trust	Private	13.4
Sweeney Easement	Cons. Easement	SE Land Trust	Private	29.0
Piscassic River Conservation Area	Cons. Easement	SE Land Trust	Private	16.3
Epping Crossing Mitigation Area	Cons. Easement	Brentwood	Town	73.0
Epping Crossing Mitigation Area	Cons. Easement	Brentwood	Town	22.2
NHDOT - Piscassic River	Fee ownership	NH DOT	State	13.0
Nature Conservancy Dow Tract	Fee ownership	Nature Conservancy	Private	76.7
Nature Conservancy Dow Tract	Fee ownership	Nature Conservancy	Private	29.9
Dow Parcel	Fee ownership	Nature Conservancy	Private	16.3
EXETER				
Dow Parcel	Fee ownership	Nature Conservancy	Private	245.2
NEWFIELDS				
Nichols Tract	Fee ownership	Nature Conservancy	Private	25.2
Cuba Road Parcel	Fee ownership	Newfields		4.7
Cheney-England	Fee ownership	Nature Conservancy	Private	13.4
Piscassic Wildlife Management Area	Cons. Easement	SE Land Trust	Private	389.5
Rivers Reach Open Space	Fee ownership	Newfields	Town	34.5

Anderson Easement	Cons. Easement	Newfields	Town	31.6
Byrne Easement	Cons. Easement	SE Land Trust	Private	23.0
Evergreen Easement	Cons. Easement	Newfields	Town	19.2
NEWMARKET				
Durrell Woods Open Space	Set Aside	Newmarket	Town	36.0
Durrell Woods Open Space	Set Aside	Newmarket	Town	39.4
Packer's Falls	Fee ownership	Nature Conservancy	Private	232.6
Loiselle Parcel	Fee ownership	Newmarket	Town	45.2
Silverman-Schneer Easement	Cons. Easement	Nature Conservancy	Private	42.8
Silverman-Schneer Easement	Cons. Easement	Nature Conservancy	Private	2.6
Richmond Easement	Cons. Easement	SE Land Trust	Private	28.0
Piscassic River East	Cons. Easement	Nature Conservancy	Private	66.0
Piscassic Corridor Total				1687.3

Map 12 Conservation Lands in the Lamprey River Watershed (GRANT data)



Ten of the 14 Lamprey River watershed towns have completed open space plans or land protection plans specific to their towns. The level of detail found within these plans varies greatly between towns, and the plans may not reflect conservation priorities from state, regional, or federal conservation plans. These plans often include prioritization criteria related to scenic views, farmland, historical value, recreational values, etc. And thus may not identify the highest conservation priorities from a conservation biology or water quality protection standpoint. Nevertheless, they are important conservation planning tools at the municipal level. (PREP Planning Assessment March 2010)

For decades, numerous land trusts, agencies and other organizations have actively purchased parcels or conservation easements to protect open space, wildlife habitat and water quality. Some of the key land protection partners in the watershed include Bear Paw Regional Greenway, Southeast Land Trust of New Hampshire, The Nature Conservancy, Strafford Rivers Conservancy, Society for the Protection of New Hampshire Forests, USDA Natural Resources Conservation Service, the Strafford County Conservation District, the Rockingham County Conservation District, and the local conservation commissions.

Partnering with towns, land trusts and other organizations, the Lamprey River Advisory Committee (with funds primarily through the National Park Service due to the federal designation of a portion of the Lamprey River as Wild and Scenic), has participated in the conservation of 20 properties totaling 1,072 acres and 7 ½ miles of river frontage.

2. Managed Resources

(a) Impoundments

List all of the dams that are present in the river, including any dams that are breached or in ruins. Identify their location, ownership, and purpose, i.e., flood control, low flow augmentation, or storage. Also indicate whether minimum flow requirements exist at any of the impoundments, if known. Include any proposals for new or reconstructed dams; indicate that this is a proposed dam by placing an asterisk (*) next to the name of the dam. Do not include existing or proposed dams which are used for hydroelectric energy production. These will be listed separately in the managed resources category.

Minimum Name of Dam Location Ownership Purpose Flow Requirements

The following lists provide information about dams on the Lamprey River, North Branch River, Pawtuckaway River, North River, Little River, and Piscassic River. These are dams that were constructed in the river, most for industrial purposes a long time ago and many now are in ruins. None of these dams are used for hydroelectric energy production.

Table 14 Dams of the Lamprey, North Branch, Pawtuckaway, North, Little, and Piscassic Rivers

Dams on the Lamprey River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Deerfield	Freeses Pond Dam	12.5	55.3	Town Of Deerfield	Active	Recreation
Deerfield	Lamprey River Mill Dam	15		Mr Walter A Brown	Ruins	Mill
Deerfield	Lamprey River Double Wall Dam	12		Owl Street Associates LLC	Ruins	Mill
Deerfield	Lamprey River Robinson Dam			Mr John Robinson	Ruins	Recreation
Deerfield	Lamprey River Hill Dam	5		Mr William E Hill	Ruins	Mill
Deerfield	Lamprey River V Dam	2	0.5	Dr Robert Rix	Exempt	Recreation
Deerfield	Lamprey River Dam	3	40	Mr Richard Mailhot	Exempt	Recreation
Raymond	Lamprey River I Dam			Mr Joseph E Lamire	Ruins	Recreation
Raymond	Lamprey River Pond Dam			Mr Crover Moulton	Ruins	Mill
Epping	Lamprey River Town Dam	6		Town Of Epping	Ruins	Recreation
Epping	Bunker Pond Dam	15	29	NHDES Water Division	Active	Recreation
Lee*	Lamprey River I Dam			Mr Philip M Sanborn	Ruins	Recreation
Lee*	Wadley Falls	13	20	Mr Dodge	Breached	Recreation
Durham*	Wiswall Dam	18	30	Town Of Durham	Active	Recreation
Durham*	Packer Falls Dam	12		Lamprey River Imp. Co	Ruins	Mill
Newmarket	Macallen Dam	27	120	Town Of Newmarket	Active	Recreation

* In currently designated section of the Lamprey River

Dams on the North Branch River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Deerfield	Beaver Pond Dam	4	62	DRED	Active	Recreation
Candia	Beane Island Dam	10		Mr Bruce Archambeault	Ruins	Mill
Candia	Village Mill Dam	9.9		Heirs Of Arthur Critchett	Ruins	Mill
Candia	North Branch River Dam	11		Heirs Of Arthur Critchett	Ruins	Mill
Candia	Turner Or New Gate Mill Dam	15		Town Of Candia	Ruins	Mill

Dams on the Pawtuckaway River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Nottingham	Pawtuckaway Lake/Dollof Dam	28	900	NH DES	Active	Recreation

Dams on the North River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Northwood	Lucas Pond Dam	4	40	NH Fish & Game	Active	Recreation
Nottingham	North River Pond Dam	8	80	NH DES	Active	Recreation
Nottingham	North River Pond Dam	13		HP Wicher & Son	Ruins	Mill
Lee	North River Dam	12	5	Mr Jerry Bickman	Ruins	Hydroelectric

Dams on the Little River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Nottingham	Mendums Pond Dam	31	265	NH DES	Active	Recreation
Nottingham	Little River Dam	9		Mr Elmer Thompson	Ruins	Mill
Nottingham	Nottingham Lake Dam	14	35	Mill Pond View LLC	Active	Recreation
Lee	Thompson Little River Dam	5		Mr A J Thompson	Breached	Hydroelectric

Dams on the Piscassic River

TOWN	NAME OF DAM	HEIGHT	IMP	OWNER	STATUS	USE
Fremont	Piscassic Brook	5	0.3	Stoney Brook Development	Active	Recreation
Fremont	Cole Dam	9		Mr Paul Bobby	Breached	Recreation
Newfields	Piscassic Ice Pond Dam	12	13.7	Mr Gilbert L Lang Sr	Active	Recreation
Newmarket	Piscassic River Dam	9	4	Town Of Newmarket	Active	Recreation

(b) Water Withdrawals and Discharges

(1) List any significant water withdrawals from the river, including withdrawals for public drinking water, industry, and agriculture. Identify the purpose (e.g., irrigation) and location of the withdrawal. Indicate if the river has been identified in a state, regional, or local study as a potential source of water supply and, if so, identify the study.

Withdrawal Purpose Location Potential Source (ID Study)

Within the Lamprey River watershed there are a few source water users who exceed the 20,000 gallons per day threshold. Most are for public drinking water and use water supply wells. A map of Lamprey River affected water user facilities is found in Section VI Maps. By river, they are listed below and are active in status except where noted. The list does not include anyone using less than 20,000 gallons per day on average.

Table 15 Registered Water Users in the Lamprey River Watershed

RIVER	USER	TOWN	PURPOSE
North Branch River	Scenic Nursery Inc.,	Candia	agriculture
	Severino Trucking Co.	Candia	commercial
Lamprey River	Raymond Water Dept.	Raymond	water supply
	Leisure Village	Raymond	water supply
	Pennichuck Water Works	Raymond	water supply
	West Epping Water Co.	Epping	water supply
	Epping Water Works	Epping	water supply
	Epping WWTF	Epping	sewage treatment
	Pennichuck Water Works	Newfields	water supply
North River	University of NH	Durham	water supply
	Newmarket Water Works	Newmarket	water supply
	Fernald Lumber Inc,	Nottingham	industrial*
Piscassic River	Chikalla, Gerald	Nottingham	hydropower*
	Deluge Incorporated	Brentwood	bottled water
	Epping Water Works	Epping	water supply
	Newmarket Water Works	Newmarket	water supply
Inactive facility *	Newmarket WWTF	Newmarket	sewage treatment

There are no known studies for potential water supply underway.

UNH/Durham diverts water from the Lamprey River at the Wiswall Dam and releases it to the Oyster River after use. UNH/Durham is planning to divert more water to the sand and gravel aquifer to utilize existing well systems. Newmarket has done a feasibility study and site evaluation of developing an aquifer storage and recovery project with surface water diverted from the Lamprey River in Lee to their Newmarket Plains sand and gravel aquifer. The funding for this project was rejected by Newmarket voters in February of 2009 and the town is instead permitting two new bedrock wells near the Piscassic River.

(2) List all known surface water and potential discharges to the river and identify the source, type (e.g., industrial wastewater) and location of the discharge. Indicate whether the discharge has been permitted by the state (yes or no).

Point Source Discharge Type Location Permit

Lamprey River Surface Water Returns

Epping WWTF	Permitted	ID # 20389-D01	Sewage treatment
Koi Fish Pond, Epping	Permitted	ID #20807-D01	Recreation
Newmarket WWTF	Permitted	ID#20323-D01	Sewage Treatment

North River Surface Water Returns

Fernald Lumber			
Nottingham	Permitted	ID#20557-D01	Industrial (inactive)
Little River Surface Water Return			
Nottingham	Permitted	ID#20126-D01	Hydropower

(c) Hydroelectric Resources

List all known existing or potential (as cited in the NH River Protection and Energy Development Project -Final Report; New England Rivers Center, 1983) sites of hydroelectric power production. Record the owner, location and whether the site is regulated or exempt from regulation by the Federal Energy Regulatory Commission (FERC).

FERC Hydroelectric Facility Owner Location regulated or exempt

There are no issued licenses from the Federal Energy Regulatory Commission for any dams in the Lamprey River Watershed.

According to the NH River Protection and Energy Development Project -Final Report; produced by the New England Rivers Center in 1983, several sites along the Lamprey River have potential for hydropower generation. Two of those sites, Wadleigh Falls in Lee and the Wiswall Dam in Durham, are in the currently designated section of the Lamprey River. The report also cites the Macallen Dam in Newmarket as a potential hydropower site with a capacity for 750 KW. Because of the anadromous fish who are present and use the fish ladder at the dam, the Lamprey River at the Macallen Dam has a "Degree of Perceived Conflict" as "High Conflict, Resolution Possible". The Macallen Dam is in downtown Newmarket at the historic mill districts. The dam is the point at which the Lamprey River becomes tidal. Route 108 passes over the impounded river. The dam is owned by the Town of Newmarket and has a deniel fish ladder in place.

The study further analyzed the significance of additional resource values to determine the feasibility of hydropower generation start up when weighed against natural resources, water quality and historical/cultural resources that could be affected. The Lamprey River and the North River were listed as having significant Inland Fisheries values, the Little River was listed as significant Water Supply, and the Piscassic River was cited for good water quality. Using Composite Resource Values, the Lamprey River is one of 18 New Hampshire Rivers with the highest values. The Piscassic River rated as having Moderate Composite River Resource Values. The North River was significant in one or more resource categories.

3. Cultural Resources

(a) Historical and Archaeological Resources

Describe any significant historical or archaeological resources or sites with significant potential for such resources (as determined by the state historic preservation officer) found in the river or river corridor. Identify whether the resource is listed or is eligible to be listed as a National Historic Landmark (NHL) or on the National Register of Historic Places (NRHP) or is a recognized Historic District (HD) or Multiple Use Area (MUA). If known, indicate whether these resources are significant at a national, regional (New England), state, or local level. Below this listing, note any local town histories, oral histories, or general historical knowledge about the use of the river and its corridor.

Historical/Archaeological Resource Listing/Eligibility Significance

Table 16 Historic Structures in the Nominated River Corridors

Historic Structures of the Lamprey River Corridor

Town	Historic Structure	Location	Category
Northwood	Northwood Congregational Church	Route 4	National Register
Northwood	Civic District	Area near Routes 4 and 43	NH Historic District Area Forms
Northwood	E. Northwood	Junction of Routes 4 and 43	NH Historic District Area Forms
Northwood	Ridge Area	Junction of Rt. 4 & Ridge Rd.	NH Historic District Area Forms
Northwood	unnamed	102 Old Route 4	Record of NHDHR Det. Of Eligibility Decisions
Northwood	Calvin Baptist Church	Route 4	Record of NHDHR Det. Of Eligibility Decisions
Deerfield	Deerfield Community Church	11 Old Centre Road	National Register
Deerfield	Town House	Old Centre Road	National Register
Deerfield	Deerfield Center Historic District	1 Candia Road	National Register
Deerfield	Deerfield Center Historic District	1-14 Old Center Rd South	National Register
Deerfield	Pawtuckaway CCC Camp Recreation Hall	Stage Road	NH Register of Historic Places
Deerfield	Old Center Road	Old Center Road	Record of NHDHR Det. Of Eligibility Decisions
Raymond	Raymond Boston & Maine Railroad Depot	Main Street	National Register
Raymond	Downtown District	Old Manchester Rd & Main St	NH Historic District Area Forms
Raymond	Main Street Residential Neighborhood	Main Street	NH Historic District Area Forms
Raymond	Prescott Bridge on Prescott Rd over Lamprey	Prescott Road bridge over Lamprey	Historic Bridge Inventory
Raymond	Deacon Ebenezer Prescott House & Jedidiah Brown House	1773 Prescott Road	National Register eligible
Epping	Watson Academy	Academy Street	National Register
Epping	Prescott, Benjamin Franklin House	Prescott Road	National Register
Epping	Hedding Camp Meeting Grounds	Hedding Road	NH Historic District Area Forms
Epping	Route 87 Crossing	Rt 87 bridge over Lamprey	NH Historic District Area Forms
Epping	Route 101/51 Project	Rt 101 Bridge over Lamprey	NH Historic District Area Forms
Epping	Route 125 & 27 Project	Bridge over Lamprey near	NH Historic District Area Forms

Town	Historic Structure	Location	Category
		intersection of Rts 125 and 27	
Epping	Sandborn/Liddy		NH Historic District Area Forms
Epping	Depot Neighborhood	Railroad Avenue	NH Historic District Area Forms
Epping	Calef Road over Lamprey(#109/055)	Calef Highway over Lamprey	Historic Bridge Inventory
Epping	Johnson House	106 Hedding Road	Record of NHDHR Det. Of Eligibility Decisions
Epping	Tilton House (Amethyst House)	Route 87	Record of NHDHR Det. Of Eligibility Decisions
Epping	John Leddy House	59 Railroad Ave.	Record of NHDHR Det. Of Eligibility Decisions
Epping	Thomas and Charles Leddy House,	61 Railroad Ave	Record of NHDHR Det. Of Eligibility Decisions
Epping	8 School Street	8 School Street	Record of NHDHR Det. Of Eligibility Decisions
Epping	Epping Historic District	Downtown Epping	Epping Historic Society
Epping	John Hoar House		Epping Historic Society
Epping	The Community Church	Downtown Epping	Epping Historic Society
Epping	Epping Town Hall	Downtown Epping	Epping Historic Society
Epping	West Epping Friends Meeting House	Friend Street	Epping Historic Society
Epping	Prescott Cemetery	Prescott Rd off Rt 27	Epping Historic Society
Epping	West Epping Bridge	Rt 27	Epping Historic Society
Epping	Folsom Mill site	Nottingham Road	Epping Historic Society
Newmarket	Stone School	Granite Street	National Register
Newmarket	Newmarket Ind. & Comm. Historic Dist.	NH Rt 108	National Register
Newmarket	Hotel Willey Complex		NH Hist. District Area Forms
Newmarket	Ind. & Comm. Historic Dist. Boundary	Downtown Newmarket	NH Hist. District Area Forms
Newmarket	Charles W. Chapman House	27 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	28 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	Harry Bassett House	3 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	Young House	31 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	32, 42, 43, 44, 48, 54, 55, 56, 58, 59, 60 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	5 New Street	Record of NHDHR Det. Of Eligibility Decisions

** = on list of "Record of NHDHR Determination of Eligibility Decisions". Most are not eligible for NR, but those included here need more information and might be eligible within a National Register District

Information gathered from: National register of Historic Places, Historic Bridge Inventory, New Hampshire Register of Historic Places, NH Historic District Area Forms, Epping Historic Society's research and notes of local historical importance.

Historic Structures in the North Branch River Corridor

Town	Historic Structure	Location	Category
Candia	Smyth Public Library	55 High Street	National Register
Candia	Old Deerfield Road Bridge (#151/123) over brook	Old Deerfield Road	Historic Bridge Inventory
Candia	Smyth Library	194 High Street	NH Reg. of Historic Places
Candia	Beane Island Sawmill	Off Rt 27	National Register
Candia	2 mills- behind stone dam	Near Old Deerfield Rd	National Register

** = on list of "Record of NHDHR Determination of Eligibility Decisions". Most are not eligible for NR, but those included here need more information and might be eligible within a National Register District

Information gathered from: National register of Historic Places, Historic Bridge Inventory, New Hampshire Register of Historic Places, NH Historic District Area Forms

Historic Structures in the Pawtuckaway River Corridor

Town	Historic Structure	Location	Category
Raymond	No historic structures in this section		

** = on list of "Record of NHDHR Determination of Eligibility Decisions". Most are not eligible for NR, but those included here need more information and might be eligible within a National Register District

Information gathered from: National register of Historic Places, Historic Bridge Inventory, New Hampshire Register of Historic Places, NH Historic District Area Forms

Historic Structures in the Little River Corridor

Town	Historic Structure	Location	Category
Nottingham	Square Schoolhouse	SR156 and Ledge Farm Road	National Register
Nottingham	Dame School	NH152	National Register
Nottingham	unnamed	171 Deerfield Road	Record of NHDHR Det. Of Eligibility Decisions
Barrington	Canaan Chapel	Canaan Road	National Register
Nottingham	David McDaniel Homestead	Mc Daniel Rd, E side, N Rt. 4	Record of NHDHR Det. Of Eligibility Decisions
Nottingham	Dame Cemetery	Merry Hill Road	Record of NHDHR Det. Of Eligibility Decisions
Nottingham	Vowel Leathers House	Mitchell Rd. at Smoke St.	Record of NHDHR Det. Of Eligibility Decisions
Nottingham	Furber/Dam Tavern	Old Turnpike Road	Record of NHDHR Det. Of Eligibility Decisions

** = on list of "Record of NHDHR Determination of Eligibility Decisions". Most are not eligible for NR, but those included here need more information and might be eligible within a National Register District

Information gathered from: National register of Historic Places, Historic Bridge Inventory, New Hampshire Register of Historic Places, NH Historic District Area Form.

Historic Structures in the Piscassic River Corridor

Town	Historic Structure	Location	Category
Fremont	Fremont Meeting House	464 Main Street	National Register
Fremont	Jonathan Beede and George F Beede Farm Barn	245 Beede Hill Road	Record of NHDHR Det. Of Eligibility Decisions
Fremont	Spaulding and Frost Cooperage	326 Main Street	Record of NHDHR Det. Of Eligibility Decisions
Fremont	Fremont Railroad Depot and Freight House,	562 Main Street	Record of NHDHR Det. Of Eligibility Decisions
Fremont	Trickey-Rogers House	Shirking Road	Record of NHDHR Det. Of Eligibility Decisions
Fremont	1883 Gagnon Family Cemetery	209 Main St.	Matthew E. Thomas 2008
Fremont	Gorden / Diphtheria Cemetery	236 Main St.	Matthew E. Thomas 2008
Fremont	Rockrimmon Granite Quarry		Matthew E. Thomas 2008
Fremont	Benjamin Whittier Tavern built ca. 1759-1765	239 Main St.	Matthew E. Thomas 2008
Fremont	Black Rocks Mill site built 1726/27		Matthew E. Thomas 2008
Fremont	Two Ancient "Poplin Squire" Trees over 250 years old		Matthew E. Thomas 2008
Fremont	Historic Red Paint Mines		Matthew E. Thomas 2008
Fremont	ca. 1725-1734 Copyhold Mill site	Mill Road	Matthew E. Thomas 2008
Fremont	Site of 1959 B-52 Bomber Plane Crash		Matthew E. Thomas 2008
Fremont	Site of 1753 Clough Saw Mill	13 Clough's Crossing	Matthew E. Thomas 2008
Fremont	Bog Island Indian Cemetery		Matthew E. Thomas 2008
Fremont	321 ft. high Whittier Hill & Mountain Pastures		Matthew E. Thomas 2008
Fremont	Beede Family Shoeshop & Schoolhouse	267 Beede Road	Matthew E. Thomas 2008
Fremont	Woodman's Causeway (a.k.a. Sunken Casey)	364 Beede Road	Matthew E. Thomas 2008
Fremont	ca. 1730-1760 Thomas Chase House	456 Beede Road	Matthew E. Thomas 2008
Fremont	Lyford's Boulder	Shirking Road	Matthew E. Thomas 2008
Fremont	ca. 1746-52 Beede-Carr Saw Mill Site	101 Leavitt Road	Matthew E. Thomas 2008
Fremont	ca. 1777 Knowles-Chase-Carr-Leavitt Cemetery	Leavitt Road	Matthew E. Thomas 2008
Fremont	Perley Robinson's 1825 Tailorshop	106 North Road	Matthew E. Thomas 2008
Fremont	1753 Josiah Robinson's Tavern	85 North Road	Matthew E. Thomas 2008
Fremont	Robinson City	84, 85 & 106 North Road	Matthew E. Thomas 2008
Fremont	Rum Hollow	85 & 106 North Road	Matthew E. Thomas 2008
Fremont	Ezekiel Robinson Tavern	84 North Road	Matthew E. Thomas 2008
Fremont	1848 Northside District Schoolhouse	234 North Road	Matthew E. Thomas 2008
Fremont	ca. 1750-1800 Mudgett Family Cemetery	Old Ridge Road	Matthew E. Thomas 2008
Fremont	ca. 1790 Ingall's – Sleeper Cemetery	Martin Road	Matthew E. Thomas 2008
Fremont	Site of Fellows Brickyard	Martin Road	Matthew E. Thomas 2008
Epping	John Hoar House		Epping Historic Society
Newfields	unnamed	34 Main Street	
Newfields	unnamed	Federal Highway	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	Stone School	Granite Street	National Register

Newmarket	Newmarket Ind. & Comm. Historic Dist.		National Register
Newmarket	Hotel Willey Complex	Downtown Newmarket	NH Hist. District Area Forms
Newmarket	Ind. & Comm. Historic Dist. Boundary		NH Hist. District Area Forms
Newmarket	Charles W. Chapman House	27 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	Harry Bassett House	3 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	Young House	31 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	28, 32, 42, 43, 44, 48, 54, 55, 56, 58, 59, 60 North Main Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	5 New Street	Record of NHDHR Det. Of Eligibility Decisions
Newmarket	unnamed	North Main Street	Record of NHDHR Det. Of Eligibility Decisions

** = on list of "Record of NHDHR Determination of Eligibility Decisions". Most are not eligible for NR, but those included here need more information and might be eligible within a National Register District

Information gathered from: National register of Historic Places, Historic Bridge Inventory, New Hampshire Register of Historic Places, NH Historic District Area Forms, Fremont's Matthew E. Thomas' 2008 research, noting sites of local importance.

Local Town Histories, Oral Histories or General Historical Knowledge

Lamprey River Watershed: History of the Watershed Towns

This history unfortunately largely begins with the colonial histories of each of the fourteen towns. Because the Lamprey River extends from the coast inland a considerable distance, it was likely heavily used by the Abenaki, the Native American people of southeastern New Hampshire, but there are no written records of the Abenaki's movements, or settlements. The river was originally called the Pascassick by the Abenaki, and early settlers referred to the river variously as: Lamprill, Lamer-eel, and Lampreel. These were all in reference to the Lamprey Eel which can still be found in the river. The Lamprey River name seems to have been well established by the 18th century.

One particularly significant archaeological site on the river, where prehistoric remnants were discovered in an undisturbed condition, dates back some 8640 years – placing it among the earliest dated sites in New Hampshire. Some of the materials used to create the tools found at the site were brought to it from elsewhere, indicating travel and possibly commerce among different groups. Bones of deer, beaver, muskrat, rabbit or hare, shad, snapping turtle, and timber rattlesnake were unearthed. A relatively high proportion of the bones are reptilian, possibly a function of sampling, but also perhaps indicative of seasonal eating patterns or some ritualistic activity. The absence of pottery suggests the site was a seasonal camp established to exploit seasonally abundant flora and fauna.

Other than these excavations, little is known of very early settlements. What is known holds promise that the Lamprey was an important area in terms of settlement patterns. The NH Division

of Historical Resources considers the Lamprey riverbanks to be archeologically sensitive, having a strong potential to possess previously unidentified Native American sites.

The colonial histories have similarities amongst the various towns as well as unique features to each. The similarities, in general, are that they all significantly relied on their rivers. Some for navigation, but all for harnessing the water power for mills. Below are short summaries of each of the town's colonial history, organized by each river that is included in this nomination packet.

Upper Lamprey - Northwood, Deerfield, Raymond and Epping

Northwood

Abenakis would have been living in the area well before 1600 and tried to maintain their territory as settlers began to move in. The Government of New Hampshire granted the Nottingham township in 1722 as an outpost to buffer the seacoast from Native American uprisings. Northwood was founded in 1773 when the settlers petitioned to separate from Nottingham. Since this section of Nottingham had been known as the great north woods, the newly formed town was called Northwood. The First New Hampshire Turnpike was built about 1800 to connect the seaport Portsmouth with the state capitol. Northwood is proud of its nine lakes and ponds, its mountain views, miles of country roads, and its many lovely old homes and public buildings.

Deerfield

The Town of Deerfield was originally part of Nottingham. In 1766, the residents petitioned and received permission from the royal governor to become a separate town. Deerfield was settled in the late 1730's. A garrison was built for protection from the Indians near the Parade in 1742. The town's 52 square miles are largely rocky and hilly. Lying along the main route between Concord and Portsmouth, the town soon became an active center of trade and commerce and remained so throughout its early history.

Today, forest has reclaimed much of the town which had once been painstakingly cleared. Old stone walls which marked the edges of mowed fields have disappeared into the forest, and new trees choke old cellar holes. It should be noted, however, that forest land is important to the community for purposes of recreation and conservation. This changing view of the forest's value provides a way of dividing the town's history.

Before 1770 - The earliest period, before 1770, was a time of clearing the forest, settling the land, building houses, and erecting the first meeting house. By 1773 the population had reached 911.

1770 to 1850 – This was a busy and prosperous time for the town. Several main roads had been laid through the town; one lead from Exeter to Concord. Drovers and freighters brought people and business to the town. Water-powered manufacturing was established on many of the brooks and rivers. Blacksmiths, cobblers, and people pursuing every occupation could be found working at home in early Deerfield. These jobs supplemented the main work of farming. Much of the town's land has remained in the same families for 200 years. By 1820 the population reached 2133, and the forests had been almost completely cleared.

After 1850 - Deerfield's population began a steady decline which continued for nearly 100 years. This third period saw forests encroach upon farmland. Reasons for the decline included the unprofitability of farming and the advent of railroads to the area. Deerfield was bypassed because of its hilly terrain. During the 1880's some old farms became a summer getaway for tourists, and the lakes and ponds became popular vacation spots. By 1930, however, the town's population had

dropped to a mere 635 year-round residents. Following World War II, this trend began to reverse as commuters working in nearby cities began to buy homes in the country. Since the 1980's Deerfield has seen a population boom, and the forest land is again being cleared for new housing and development.

Raymond

The territory was settled in 1717 by Colonel Stephen Dudley who claimed to have purchased the land from the Sagamore Indians. The township was called Freetown because it was exempt from the usual obligation of reserving its tall pine trees for masts in the royal English navy. In 1726, Freetown was included in the incorporation of Chester. It was separated from Chester in 1764, and renamed Raymond for Captain William Raymond, who had raised a company of soldiers to fight in the war against Canada. Land in Raymond was granted to soldiers from Beverley, Massachusetts, and it was also known as Beverley-Canada.

The Town of Raymond was originally part of West Chester, prior to Raymond's incorporation in 1764. The early settlers of West Chester came from England and the North of Ireland. In the early days of settlement, the few residents living in Raymond were primarily reliant on the timber industry, traditional farming and orchards. Timber mills helped derive the lumber industry within Raymond.

The first saw mill, Freetown Mill was built in 1725 even prior to the division of land into hundred acre lots in 1728. Many more lumber mills were built in what is now the Town of Raymond including; Griffin's Mill located on Rt. 27 near Griffin Bridge, Campbell's Mill on Rt. 27, Dudley Mill off of Dudley Road and Healey Mill and Batchelder Mill on Scribner Road on the outfall of Onway Lake. During the early settlement of Raymond grist mills also were very popular.

In the 1800s, the roads in Raymond were improved and the railroad was built in 1852 running from Portsmouth to Concord. In 1892, a terrible fire struck the Town of Raymond. The extent of the fires included some of the parcels that are included in the Raymond Historic Overlay District. The fire spread through the area from the common south along the east side of Main Street to just south of the rail road tracks. Most of the development within the downtown area was destroyed by the fire but was soon redeveloped. The 1892 fire encouraged the establishment of the Raymond Fire Department and various water companies.

Epping

Epping is the historic home of the Pennacook Indians. To encourage settlement, as early as 1710 Exeter awarded free wood lots in the area. In 1741, European settlers of Epping split from Exeter and received a town charter, the last New Hampshire town chartered by Massachusetts Governor Jonathan Belcher before the Province of New Hampshire separated from Massachusetts. Epping was named for Epping Forest, a suburb of London, England.

Through the 1800s, Epping was mostly a farming community. The town also had substantial reserves of clay, long used by local residents to make bricks, and in 1840, the first commercial brickyard was established in Epping.

North Branch River - Deerfield and Candia

Deerfield

Deerfield's history is fully covered under the Upper Lamprey section (see above).

Candia

Early historians are not in agreement as to who might have been the first European settlers in Candia. As elsewhere in the region, Native Americans had been in the area and used the rivers, but the tribes were driven away with the emergence of European culture and colonial settlements. According to local historians, Native American ‘campsites’ exist on the property of Camp se-Samarca, near Onway Lake. Evidence for this includes: boulders with impressions where corn would have been crushed to make cornmeal; presence of hand-built bridges; carved markings in a stonewall; stones used in rubbing fabrics found by the river, where Native Americans would have done their laundry.

As for the early settlers, they put together a petition of 38 residents to Provincial Governor Benning Wentworth and his council, and the North Parish of Chester was set apart in the name of Candia on December 17, 1763.

Originally settled as an agricultural community, the local economy gradually gave way to a variety of manufacturing enterprises, which were first established on a small scale to meet local needs, but later expanded to serve distant markets. In general, the North Branch most likely had higher flows and were navigable by canoe. These higher flows made it possible to build water-powered mills. Often the early settlers built and operated mills and towns sprung up around them. Prominent early activity centers included Candia Village (where the North Branch River crosses what is now NH Route 43); the Langford District (East Candia); the Corner (now known locally as the “Four Corners”), and Candia Depot on Main Street.

Soon after the Town was first settled, coopering became an important industry making barrels for both farms and homes. It was not long before the product was being exported by wagon to Portsmouth, New Hampshire and Salem and Newburyport, Massachusetts, where there were constant demands for fish barrels.

The Beane Island Sawmill was constructed around 1812, replacing a grist-mill. Several Greek revival style houses, dating to 1810, surround the mill. The area is relatively undisturbed, and parts of the old mill site can still be seen today. This mill played a large role in the historic Candia lumber industry. Two mills, one a sawmill and the other a gristmill, were located behind and slightly downstream of the Baptist Church. These were behind a stone dam, so they might have diverted the flow of the river. They too contributed to the lumber industry, and these mills were at one time part of a series of small mills along this section of the river. This entire section of town sprung up around a mill that was constructed in the 1760s.

When the Concord and Portsmouth Railroad was built in 1852 and the Candia Branch Railroad from Manchester in 1860, many forest products were transported by rail to Portsmouth, Manchester and elsewhere.

Pawtuckaway River - Raymond

Nottingham

The first sawmill built in Nottingham was constructed on the “Tuckaway River” in 1727. A committee was selected to “gitt the mill built with all possible speed, not to exceed one hundred Pounds.

Pawtuckaway Lake was built for the industrial expansion in Newmarket. The following is quoted from a Mr. Crompton’s ‘Historical Commentary’. Prior to 1825, the area was mostly brooks, which at high water ran into Pawtuckaway Pond. The run-off from this pond went into the North River. Also Mountain Brook at the southern end of the area formed small pools as it ran into what was called Pawtuckaway River, or as some called it – Stingy River. Both the North River and the

Stingy River then ran into the Lamprey, which furnished water power for the Newmarket Manufacturing Company, a textile mill.

Around 1825, the company must have decided that the water supply was not enough. They started to purchase land for a dam. Not knowing just how much land would be needed, they purchased flooding rights. The dams were completed about 1836, creating two artificial ponds, called Dolloff Pond and Pawtuckaway Pond, and flooding about 800 acres. A dike had to be built at what is now the entrance to Seaman's Point. It was called Gove's dike, named for the Gove family that owned the property at the time. Other small dikes had to be built to stop the flooding and run-off onto land not purchased. And thus was created Pawtuckaway Lake.

Raymond

Raymond's history is covered in the Upper Lamprey section (see above.)

North River - Nottingham and a little bit of Lee

Nottingham

On April 21, 1721, 101 residents of seacoast towns from Boston to Portsmouth petitioned Gov. Samuel Shute, then governor of the Province of New Hampshire, and the British king for a "tract of land ten miles square northwest of Exeter." The township was granted largely as an outpost to buffer the seacoast from Native American uprisings. Their request was granted, and the charter was issued on May 10, 1722. By May of 1723, a total of 132 persons had signed on as "proprietors" with the ability to draw "rights" or lots of land. The proprietors were required to build dwellings, clear the land and construct a town center, or square.

In 1729 a grist mill was built on the North River, "upon the South Branch near Bow Street". Much of the land in the town was too rocky for large scale planting or livestock, thus many people grew food for their own consumption. Lumbering was a means of employment and livelihood. Very large amounts of charcoal were produced for sale in the seacoast towns.

Water power stored behind many small dams allowed the building of mills for sawing lumber, grinding grain and 'fulling', a process of cleansing and working up a nap on rough, woolen homespun cloth. The first fulling mill was known as the Gebig Mill, on the upper reaches of the North River; it was also a lumber and gristmill. The first grain (grist) mill was built on the South Branch of the North River. A second was built by Richard Dolloff of Exeter on the Stugy (Stingy) River in 1732. At one time, records indicate that there were seventeen water-powered mills in operation in the town. Overtime, the mills along the streams and rivers became larger and operated improved machinery, turning out finished lumber, clapboards and handles.

The 1800's opened on the continued development of the town. The expansion of the various mills was limited by the amount of water that could be stored; waterpower was still the only energy source and would remain so for another half century. The size and volume of the streams kept the industries in Nottingham on a small scale.

Nottingham in 1860 had a population of about 1200 and a broad variety of industries. There were two shoe shops employing 33 workers, sixteen water-powered mills grinding grains, sawing logs and turning out shingles, clapboards and dimension lumber. A turning mill, operated by Daniel Garland, produced wooden bobbins for the growing textile industry in the river towns. In the tanning trade, a mill operated by John Hill used a steam boiler as well as waterpower and

produced various grades of leather for harnesses, belting, shoes and gloves. Two stores existed, a Peoples Union and a Protective Union.

Steam power became more evident when the first portable steam engine was set up at a sawmill near the Nottingham-Barrington line. The introduction of this new and unique power source was a major attraction. The railroads were spreading north and westward, running along what is now Rte 125.

Lee

Lee remained a part of Durham till 1766, when it separated from Durham and came onto itself on January 16, 1766. Lee was one of the last of the 129 towns chartered by Governor Benning Wentworth. The town was named for General Charles Lee, friend and kin of the Governor, who had fought with George Washington and others during the French and Indian Wars. Lee also fought under Washington during the American Revolution.

Little River - Barrington, Nottingham, and Lee

Nottingham

The history of Nottingham is covered above, both in the Upper Lamprey section and the Pawtuckaway section.

Lee

Lee’s history is covered above, under the North River’s history section.

Piscassic - Fremont, Epping, Brentwood, Newfields, Newmarket

Fremont

In its early years Fremont was a farming and lumbering community, while today it has evolved into a residential community.

Like Newmarket, Newfields, Epping and Brentwood, Fremont was originally a part of Exeter which was founded in 1638. This connection with Exeter made Fremont part of one of the earliest settled communities within the United States. In 1742, “Brintwood” (now Brentwood) was separated from Exeter and made into a new Town. Fremont in turn, separated from Brentwood twenty-two years later and became an incorporated town on Friday, June 22, 1764, and named “Poplin.” The Town held the name of “Poplin” for ninety years until 1854, when the name was changed to “Fremont” in honor of John Charles Fremont, the great American West Explorer / Pathfinder, who at that time was one of the most famous men in America. In 1856 John Fremont became the first nominated Presidential candidate of the newly founded Republican Party. His unsuccessful bid for the Presidency paved the way for Abraham Lincoln’s successful Republican Party bid just four years later in 1860. John C. Fremont (1813-1890) was not a native, nor a resident of Fremont, NH.

The area which later became Fremont remained a wilderness for many years prior to the 1720’s due to the threat of Native American Indian attacks, and the obstacle that the Great Spruce Swamp posed as a significant natural barrier between present-day Fremont and the more settled area of the original Township of Exeter. As settlers began to move inland from the coastal Towns during the 1720’s and 1730’s, Fremont gradually began to take shape.

After the Civil War, small industry and businesses began to settle in Fremont. In 1874 the Spaulding & Frost Barrel Cooperage was established. It thrived and gradually grew to become the oldest and largest white-pine cooperage in the world until closing in 1999 after 125 years of operation. The largest brickyard in New Hampshire was established on Martin Road in 1885. Five to seven million bricks were produced annually at the Fellows Brickyard between 1885 and 1890.

Shoes, furniture, farming, lumbering, palm leaf hats, carriage-making, gun-making, dairy farms, and poultry-raising have all played important roles in Fremont's economic heritage.

Fremont's Archaeological Resources

According to the Division of Historical Resources, there are two known archeological sites of significance in Fremont. The first archeological site was unearthed as part of the Route 101/51 highway realignment project, at the corner of Beede Hill Road and Shirkin Road. The site is a cellar hole from an old colonial residence and a number of 19th century artifacts were discovered there.

Epping

Epping's history is covered under the Upper Lamprey Section (see above).

Newfields

From the time it was settled in 1638 along either side of an ancient Squamscott Indian trail, Newfields was important to Seacoast New Hampshire commerce due to its location at the mouth of the Squamscott River as it empties into the large tidal estuary known as Great Bay. Fed by several inland rivers and emptying into the Piscataqua, Great Bay provided efficient commercial transportation between the port of Portsmouth and the other seacoast communities.

Newfields was a part of Exeter in colonial times when it was called Newfield Village. As of 1727 it became a parish of Newmarket, known as South Newmarket, before incorporating in 1849 to become the Town of Newfields.

Various industries thrived in Newfields, including lumber, shipbuilding, iron production and casting, tanning, and manufacturing. Exports from Newfields included lumber, ship's masts, beef, pork, pelts, as well as machinery, steam engines and small locomotives. The Boston and Maine Railroad first extended service through Newfields in 1841.

Newmarket

Newmarket's history is covered below in the Tidal Lamprey's history section.

Tidal Lamprey - Newmarket

Newmarket

Newmarket was incorporated on December 15, 1727. It was one of six towns granted by Massachusetts in the last year of the reign of King George I. It began as a parish of Exeter, but was granted full town privileges by the legislature in 1737. For a while the town was called Lampreyville. Newmarket was a center of the New England shipping trade with the West Indies. As a small but vital seacoast community, Newmarket continues to retain its character as a scenic mill town along the banks of the Lamprey River and Great Bay. Newmarket's historical past as a New England river town saw the growth and changing of its mills from early sawmills to a thriving textile industry which has in turn given way to new venture high tech companies and dozens of smaller businesses.

The Lamprey River, winding through the town, plays a special yet changing role in the town's life. Formerly serving as a major water transportation link connecting the inland regions with Portsmouth harbor and the Atlantic Ocean, the Lamprey is now appreciated as a significant recreational asset to the region with its opportunities for fishing, boating and access to the larger Great Bay tidal basin area.

The original dam at the fall-line in Newmarket, called the lower falls, was built by Valentine Hill of Durham in 1652. A later Newmarket mill was one of the most spectacular examples of a Waltham-type cotton textile manufacturing. It is at this site that the Newmarket Manufacturing Company located its textile mills. The first Newmarket Manufacturing Company mill was built in 1823. Textile mills operated continuously at this site until 1929. They dominated community life and life on the river. At one time or another during the first two hundred years of European settlement, dams for powering a variety of mills occurred throughout the watershed. The Newmarket Manufacturing Company also built and controlled dams at Pawtuckaway and Mendums ponds. Water releases from the ponds supplemented flows in the Lamprey during dry periods and guaranteed power in Newmarket year-round.

Included with the mills was housing for the mill workers, built by the Newmarket Manufacturing Company. The seven textile mills, a machine shop, office, storage buildings, agent's house, and multifamily residences built for the workers – some 140 sites in all - are listed on the National Register of Historic Places. They represent “a unique example of a New England mill town developed as a Waltham-type cotton textile manufacturing community.” The granite mill buildings are among “the most beautiful of all textile factories of the period” and are the best preserved examples in New Hampshire.

(b) Community Resource

Briefly describe how the river is recognized or used as a significant community resource. If the river's importance is recognized in any official town documents, such as a master plan, include reference to such documents.

Evidence of community support can be found in official documents that show support for the rivers, watershed, wetlands, source water protection, and wise land use protection. Mention of these issues comes mostly from town visioning sessions, Master Plans, and Open Space Plans. By and large, the 14 towns in the Lamprey River watershed all recognize the importance of the rivers and value them for their various properties: source water, drinking water, flood buffers, and recreation.

Northwood

The Northwood Master Plan was updated in 2004 and identifies Northwood's significance as "a hill town at the headwaters of the Lamprey, Isinglass, and Merrimack River watersheds." The plan recognizes that Northwood is unusual because it is not downstream of any other communities. "Because the town is hilly and located at the headwaters of several watershed towns, there are many sensitive areas and resources in need of protection." The plan calls out the Wild and Scenic River designation of lower stretches of the Lamprey and notes, "While the designation at this time applies only to the river from the Epping/Lee town downstream to the tidal reaches in Newmarket, this locally initiated federal action has raised awareness of the importance of conserving this valuable resource. There will also be an effort by the downstream communities to work with all communities in the watershed to cooperatively manage the river."

The Northwood Plan also calls out their status as a member of the Bear-Paw Regional Greenway, a regional land trust trying to protect regionally significant lands. The plan recommends, "Continued efforts to protect land with this area through conservation, as well as through protective ordinances that impose development constraints applicable to this area."

Deerfield

The following Vision Statement reflects the common values expressed by community residents who participated in the Master Plan process in 2007.

The Town of Deerfield, New Hampshire desires to maintain its character as a small, rural, but vibrant place with open space, natural beauty, and a strong sense of community. People live and move to Deerfield because of its rural and small town character, its quietness and privacy, its scenic qualities, and where a balanced mix of residents including age, economic abilities, education, professions and beliefs are valued and appreciated. These community qualities and values make our town a desirable and special place.

The following section contains a list of goals, objectives and strategies that were developed as part of the Master Plan process.

Natural Resources and Open Space Goals

- Recognize that the town's natural resources and open space form the basis of the overall character and well-being of Deerfield.

- Utilize the New Hampshire Department of Fish & Game's Wildlife Action Plan and other available resources to identify important natural resources and prepare strategies designed to preserve them for future enjoyment.
- Identify how the Natural Services Network (NSN) data can be utilized in Deerfield
- Propose adoption of riparian buffer regulations to protect the Town's 1st, 2nd and 3rd order streams, rivers and lakes.
- Consider the adoption of ground water protection regulations and a wellhead protection program.
- Preserve land through local land trusts with assistance from the Society for the Protection of NH Forests, Bear Paw, and such other organizations.
- Evaluate the Town's current site plan and subdivision regulations to determine if Low Impact Development (LID) Guidelines could be developed.
- Consider the establishment of a steep slopes ordinance to restrict and/or prohibit development in areas which may have high risk of erosion and mud slides.

Water Resource Protection

Deerfield recognizes the importance of protecting the region's surface waters. One of the most important concerns is the natural vegetation growing alongside riverbanks and shorelines. These natural shorelines not only serve as wildlife habitat, but also play a significant role in holding stream and riverbanks together, as well as preventing erosion and siltation. Also, stream banks are natural conductors for runoff, and therefore replenish surface water supply.

Parks and Recreation

Our parks and recreation facilities are enjoyed by all citizens and are a measure of our quality of life. With abundant forests, streams, and open spaces, Deerfield and the adjacent towns' communities offer a wide variety of outdoor recreational opportunities. Many out-of town and out-of-state travelers come to the parks to enjoy the natural beauty that residents of Deerfield experience on a daily basis.

Sewer and Septage Services

There are no current plans for the development of a municipal wastewater collection and treatment system. The town also has no known lagoon pits in town for septage. The community currently relies on individual septic systems. Septage is trucked to various waste water treatment facilities. At this time, the trucking companies choose where they will haul the septage to. There are currently no future plans to alter the Town's septage system in any large scale way.

Water Supply

The Town of Deerfield currently has no plans to develop a municipal water treatment and distribution system anytime in the future. All Deerfield residents and businesses depend primarily on individual wells for their domestic water supply. There are approximately 1,500 wells in town. Future water supply and water distribution needs will depend on the growth rate of the community and would be addressed during the planning phases of a project.

Candia

The Candia Open Space Plan talks about the importance of all of Candia's natural resources, but does focus on their undeveloped lands and the importance of rivers and wetlands.

The plan began by being concerned about the significant level of growth in the past two decades. According to the U.S. Census, Candia's year 2000 population of 3,911 represents a growth of 9.95 percent since 1990. Growth of this magnitude has already resulted in the loss of open space, and will continue to irreversibly alter the landscape and character of the community while threatening our natural resources. Therefore, community growth and the resultant loss of open space need to be managed and planned for appropriately in order to protect the features that many find attractive about Candia: rural character, clean water, abundant wildlife, close-knit communal town centers, and lower cost of living. Also, in order to preserve the historic attributes that reflect Candia's evolution, Candia recognizes that steps must be taken to ensure that new growth will be sensitive to the Town's cultural as well as natural environments.

Conclusions and Open Space Concepts from the Plan

Based on the Town's natural and cultural resources, an opportunity exists for Candia to remain a visually rural community with village centers surrounded by open space (timber management, agriculture, habitat areas and fields cut annually for hay production and visual appeal). In order to preserve the rural character and current visual quality of the Town's landscape, a concept plan (that is relevant to the Lamprey River watershed) describing the desired open space pattern would consist of:

- Preservation of the large open space blocks of land that currently contain wetlands, floodplains, steep slopes, woodlands, wildlife habitat, agricultural fields, historic farmsteads and early settlement mill works.
- Growth would be allowed as uses that blend with the residential, rural character of a country community (some selected uses could be carefully placed to minimize visual and functional conflicts with the character and lifestyle of a small community).

Candia's Master Plan

Land Use Planning and Development Regulation: Candia has had zoning since 1958. Currently, there is local concern that the regulations may not adequately maintain the town's rural character in coming years. A primary purpose of this plan is to articulate clear future land use goals and policies, thereby serving as a blueprint for anticipated changes to the town's land use and development regulations.

- ***Open Space and Natural Resource Protection:*** Candia residents have demonstrated their support for land conservation and have allocated funds for that purpose on more than one occasion. With an active conservation commission, Bear-Paw Regional Greenways, and likely continued public support for protecting open space, additional conservation projects should be anticipated. The town plan can help establish the community's conservation priorities and identify those properties, features and/or resources that are most deserving of protection.

Natural Infrastructure Summary

Candia's natural environment largely defined historic settlement patterns and land use, and continues to contribute to the town's rural character and the quality of life of its residents. Natural resources have not always been managed for sustainability, resulting in environmental degradation. Fortunately many of Candia's most significant natural features, remotely located away from development, retain much of their environmental and ecological integrity. The

Planning Board and Candia Conservation Commission have actively worked, in cooperation with the Southern New Hampshire Planning Commission, University of New Hampshire, Bear-Paw Regional Greenways and neighboring towns, to inventory the town's natural resources and develop priorities and recommendations for their protection. In planning for Candia's future the following issues and implications should be considered:

- Most, if not all, Candia residents get their drinking water from groundwater sources. Groundwater resources, especially recharge potential, have significant limitations.
- Candia's water quality is generally high. Potential pollution sources include bank erosion, storm water runoff, septic systems, construction sites, junkyards, fertilizers and pesticides, road salt and other potential point and non-point sources.
- Steep slopes, floodplains, wetlands, large un-fragmented forest lands and critical wildlife habitat serve important ecological functions and may pose significant development constraints, and therefore should be considered for protection.
- Less than 2% of Candia's land is permanently conserved (Bear Brook State Park (283 acres), and private land (30 acres)). Approximately 1,287 acres are currently being managed as conservation land without permanent conservation easements.

Land Use

Understanding and managing land use and development are among the most important concerns of community planning. Recent growth in population and its ensuing impacts have required the community to more actively guide the town's development. This guidance presents the challenge of balancing the interests of the community with those of the individual landowner.

Presently, Candia guides land use and development through its zoning ordinance, amended through 2003. Each of these tools is intended to implement the goals and policies of the master plan, especially those related to land use and development.

Implementing Candia's Master Plan

Natural Infrastructure Goal

The responsible stewardship and sustainable use of Candia's natural resources in a manner that protects and enhances the town's natural environment for the benefit of current and future generations. Candia will achieve this goal by:

- 1) Managing and protecting natural systems that maintain clean water, native wildlife populations, and unpolluted air.
- 2) Preventing the further degradation of water resources and improving the quality of groundwater, wetlands, ponds, streams and rivers.
- 3) Preventing the fragmentation and/or destruction of fragile natural resources, including wetlands and floodplains.
- 4) Encouraging land uses and related activities which support the economic viability of local agricultural and forestry enterprises.
- 5) New development should be accommodated in a manner that maintains and enhances the town's scenic resources and minimizes the loss of productive farm, forest and open land.

- 6) Managing for sustainable use and stewardship of natural resources; providing for the responsible extraction of renewable and finite natural resources for municipal and commercial purposes.
- 7) Preserving scenic features and open spaces that in combination help sustain Candia's rural character and ecological integrity.
- 8) Supporting the efforts of local, regional and statewide conservation organizations to protect important properties in town through voluntary programs.

Land Use Goal

- 1) To preserve the town's historic pattern of development with the traditional NH mixed-use and residential villages surrounded by rural countryside.
- 2) To regulate land development in order to protect the town's important natural, cultural and scenic resources while allowing diverse land uses in appropriate locations and striking a balance between community and individual interests.
- 3) To permanently preserve 25% of Candia's open space in such a way as to protect water quality, wildlife habitat, and other natural resources and to foster appropriate outdoor activities.

Raymond Master Plan

Raymond's Vision Statement is specifically crafted from the results of the Town's 2007-2008 Community Participatory Planning Process and reflects the desires of today's citizens for tomorrow's town, hence the title "The Town We Want".

Raymond's Vision Statement "Preserving Our Past Preparing Our Future"

The Town of Raymond's vision for the future reflects New Hampshire's unique quality of life and culture -- from preserving open spaces and natural resources, to maintaining a vibrant village life, thriving small businesses, and an independent volunteer spirit.

To enhance these elements, Raymond addressed the challenge of growth with planning that will broaden the tax base by adding commerce while safeguarding, especially, our water and floodplains from the stresses that development will bring.

Wise resource protection means proactive conservation as well as insuring that every planning decision considers the effect of our choices. Resource protection strives not just to protect, but also to enhance our natural resources so that we leave our children a better environment than we inherited.

Natural Resources

The citizens of the Town of Raymond will be successful in preserving its rural character and open lands through wise land use policies. Raymond will be a model in its preservation of open space and creation of natural recreation opportunities such as swimming, fishing, kayaking and canoeing on the scenic Lamprey, Exeter and Pawtuckaway Rivers. Open space will be preserved strategically throughout Raymond to create wildlife corridors and nature paths for walkers and bikers by linking open space, woods, and park areas. Preservation and wise land use policies will also protect the Town of Raymond's water bodies and waterways, its public wells and aquifers. Several new parks will be created throughout the Town of Raymond.

Existing Land Use

The Town of Raymond will strategically guide its growth away from the floodplain areas and will preserve these floodplains as pristine open space which in turn reduces the risk of flooding.

Conclusion

Twenty years from now the Town of Raymond will look much different than it is today; but the citizens of Raymond want the town to be recognizable as Raymond – its historic village character intact, open space, woodlands, wild river frontage, and rural character preserved – a place for people of all ages.

Guiding Principles

Given the above vision, this Master Plan sets forth the following guiding principles for managing the future growth and development of Town of Raymond.

1. Preserve Open Space. Practice proactive conservation by using strategic land

acquisition and zoning to protect the Lamprey River and Exeter River, floodplains, other water bodies and waterways, public wells, aquifers and wildlife corridors.

Revise and implement Raymond’s 2003 Open Space Plan. Create and publicize access to public conservation land.

2. Enhance Village Life. Clean up the Lamprey River and reopen the Town Beach. Create pocket parks.

Raymond Goals, as related to the protection and enhancement of their rivers:

Land Use

Expect all new development to preserve and protect Raymond’s valuable natural resources and open space for existing and future generations. This will be accomplished by preserving Raymond’s natural features such as lakes, rivers, ponds, streams, wetlands, woodlands, wildlife habitats, scenic views, and open spaces. Also by encouraging both mixed–use development and the conservation of natural resources on the same property.

Raymond is considerate of regional planning efforts, including natural resources protection. A goal recommends conducting annual meeting/discussions with neighboring communities regarding a variety of regional issues, including floodplain regulations along the Exeter and Lamprey River.

The Raymond Goals for Natural Resources include protecting groundwater/drinking water supplies for existing and future generations by:

- Preparing and adopting a Source Water Protection Plan for the community.
- Updating the existing groundwater protection district regulations to assure existing and future water quality protection.
- Protecting Raymond’s lakes, rivers, and wetlands as well as wildlife habitats through land use controls and as part of the review of site plans and subdivisions and other planning activities.
- Adopting zoning regulations to further protect the Town’s wetlands.

Natural Hazards

Goal 1: Reduce the potential impact of natural and man-made disasters on Raymond’s critical support services, essential facilities, infrastructure, as well as public and private property.

Mitigate future flooding events through a more stringent regulatory approach towards development adjacent to rivers, lakes, and steep slopes. Raymond can do this by implementing new buffer regulations to protect shorelands from erosion and reduce development impacts that can lead to flash flooding. Adopt the model Fluvial Erosion Hazard Ordinance Overlay District (developed as part of the Geomorphic Assessment and Watershed Restoration Plan for the Exeter River). Finally, conduct annual meeting/discussions with neighboring communities regarding a variety of regional issues, including floodplain regulations along the Exeter and Lamprey River.

Goal 2: Encourage Low Impact Development (LID) stormwater practices for development projects.

Reduce stormwater runoff and increase flood storage capacity through low impact development, natural and vegetative landscape features.

Long Hill Road is a locally designated Scenic Road in Raymond NH. There are currently no State scenic byways or roads in Raymond; however, there may be stretches of land along the Lamprey River that could be considered for scenic byways designation.

Epping

The Epping Master Plan

The Epping Planning Board revised the Master Plan in 2007. Below are the topics that relate to the Lamprey and Piscassic Rivers. Residents want to protect the small-town character of Epping, but the benefits of economic growth are also welcomed by many. Epping’s current strategy for managing growth revolves around zoning. And the rural residential areas should help protect the farms, forests, and open space.

Downtown

Epping’s downtown remains very important to the community, from its beautification to creating a park next to the Lamprey behind Town Hall, from maintaining a quaint downtown with trees and sidewalks to preserving the historic buildings. A core project involving the Lamprey details the recently purchased land next to the town hall to add parking and improve the riverbank park. Remove blacktop between the Town Hall and the Lamprey, and more effectively treat runoff that drains into the Lamprey. Reduce the height of the hill, and make a more visually appealing, central, downtown, open park, which should also help enhance recreational access to the Lamprey.

Farmlands, Natural Resources, and Open Spaces

Protecting open space, working farms and forests, and wildlife habitat remains a priority with Epping residents. There should be a connected network of open space woven in among the developed parts of town. The network should build on and include existing protected areas, like the Lamprey River Forest, and the Fresh River Conservation Area. Ideally, it should connect to Pawtuckaway State Park in the northwest, and to the Piscassic Greenway in the southeast. Such an “Epping Greenway” would provide room for hiking and horseback trails, fishing, hunting, as well as provide habitat for wildlife, and help protect the “rural quality” of the town.

Finally, drinking water is a critical resource, both for the town and for the region as a whole. Epping is unusually fortunate in this regard. Preserving wetlands, and limiting impervious

surfaces, are key components in protecting our drinking water. Wetlands also have the additional benefit of buffering against floods, a benefit whose need the town has seen during the floods of the last two years.

To these ends, the Planning Board must aggressively regulate impervious surfaces, zealously regulate encroachments on the wetlands and rivers, and continue to monitor and protect the aquifer overlay districts

Recreation

In addition to wild areas, Epping should have a sufficiency of small parks scattered around all parts of town for picnicking, playgrounds, and ball playing.

Agricultural Uses

Despite subdivision encroachment, Epping’s agricultural areas remain active, if threatened. Two working dairy farms remain in Epping, and other full- and part-time agricultural operations are active. Much of Epping is still forested, and many of those parcels are registered tree farms. Private stewardship has long played a role in maintaining the state’s forests, and Epping is no exception. These forests are a critical part of Epping’s rural character. Together, these farms and forests provide much of the rural character that Epping residents treasure.

Future Land Use

Route 27 west from Main Street

We envision a gradual shift to more commercial uses on the western portion of Route 27, but that shift needs to be both gradual and carefully managed. Site permits on the north side of 27 must be careful to protect the Lamprey, and zoning should be reviewed to ensure inappropriate uses are prohibited.

Cultural Resources and Recreation

In addition, the Lamprey River is easily accessible from a variety of places, and many people continue to fish, canoe, and sometimes swim there. Finally, private land in Epping is still used extensively for hiking, hunting, and fishing. Another part of Epping’s cultural and recreation resources not strictly related to land use but nevertheless worth mentioning, are the activities available in town. Epping hosts an annual canoe race and an annual fishing derby for children.

Natural Resources

Natural resources are the “green infrastructure” that provide, for free necessities we sometimes overlook in planning for growth. These include:

Clean Water, available groundwater is required by current residents, and needed for future business growth. Protecting water quality, and availability, is critical. Groundwater in Epping exists in several aquifers. Epping’s municipal water supply draws from these aquifers near the Hoar Pond area, and the wells of residents and businesses depend on aquifers throughout Epping.

There are a wide variety of potential threats to groundwater quality, including, for example: subsurface sewage disposal systems; agricultural runoff; road salt storage and application; storm runoff from construction sites, parking lots, and roads; sediments from silted-in catch basins and detention ponds; lawn fertilizers and pesticides; junkyards, landfills, and leaking storage tanks; and snow dumping into water bodies. The particular threats facing water in any part of Epping depends on the density and type of development in the area.

Protecting rivers, ponds, and wetlands is as important as protecting groundwater. Wetlands, rivers, and surface waters provide groundwater recharge, flood storage, and recreation. In addition to feeding to our water supply, rivers and wetlands provide critical wildlife habitat, and contribute to Epping's rural quality of life. The Epping Wastewater Treatment Plant also depends on adequate and clean flow from the Lamprey.

There are a variety of zoning ordinances in place on the local level establishing no-build and no-septic buffers for wetlands and rivers. At the state level, the Shoreland Protection Act helps regulate rivers.

Open Space. The most recent Natural Resource Inventory maps identify the outlying areas of Epping, not surprisingly, as having the most remaining unfragmented habitat. Eastern Epping includes a long stretch of the Wild and Scenic Lamprey River, and associated riparian habitat; and the undeveloped portion of the southeast corner of Epping helps form a connection to the Piscassic Greenway.

There should be a connected network of open space woven in among Epping's developed parts. The network should build on and include existing protected areas, like the Lamprey River Forest, the Fresh River Conservation Area and others. Ideally, it should connect to Pawtuckaway State Park in the northwest, and to the Piscassic Greenway in the southeast. It should include land that was prioritized in the Land Conservation Plan for New Hampshire's Coastal Estuaries, prepared for the New Hampshire Estuaries Project. Such an "Epping Greenway" would provide room for hiking and horseback trails, fishing and hunting, habitat for wildlife, and would help protect the rural quality of the town.

Lee

Lee updated their Master Plan in 2006. The relevant goals for their rivers included:

- To plan for future water, septic, and waste needs for the community
- To identify, preserve and protect the natural resources of the community
- To identify and maintain rural and agricultural land through land use regulations, easements, and conservation easements

The Master Plan identifies working towards linking the Lee Town Forest Complex trails with the Little River Park trails; and integrating the scenic roads of Lee into the community trail system by providing for safe pedestrian and bicycle use.

Natural Resources

The Town of Lee possesses a diversity of natural resources that have played, and will continue to play, important roles in the development and life of the community. Among these resources are water (surface waters and groundwater), important soils for agriculture and forestry, and biological resources such as wildlife (both resident and migratory), and native plant communities. There is also the resource of open -space lands that contributes greatly to the scenic vistas and the Town's rural character.

For many years, the Town has been mindful of threats, actual and potential, to many of these resources. It has adopted ordinances, appropriated funds to protect lands for conservation, and has been the beneficiary of gifts of land or conservation easements from generous landowners.

To assist in the conservation of the Town's natural resources, the Conservation Commission has prepared a series of maps that show surface waters, groundwater aquifers, important soils, large un-fragmented blocks of land, and scenic vistas. Frequently the Conservation Commission works in

concert with other conservation organizations to protect resources in the Town. Among these are the Lamprey River Advisory Committee, the Lamprey River Watershed Association, the Oyster River Watershed Association, Strafford Rivers Conservancy, Strafford County Conservation District, and the Society for the Protection of New Hampshire Forests.

Water Resources

The Town of Lee's water resources are discussed below in two broad categories: surface waters and groundwater. In order to protect its surface water resources, the Shoreland Conservation District and the Wet Soils Conservation Zone have been introduced into the Zoning Ordinance in recent years. The Shoreland Conservation District has been identified as 100 feet from the shores of all. Clearing and development in the 100 ft. area is prohibited. The intent is to protect the water quality, visual character, and the wildlife habitat of the shoreline areas. The Wet Soils Conservation Zone consists of soils that are classified as poorly drained or very poorly drained. The ordinance is intended to protect surface or groundwater, maintain natural flood protection, and protect wildlife habitat and natural areas.

The Lamprey, Oyster, Little, and North Rivers comprise the main streams in the Town of Lee. Lee's Shoreland Conservation District regulations help to protect these shores and the adjacent waters. In 1995, the Town of Lee voted to support designation of the Lamprey River as part of the National Wild and Scenic Rivers program. Within Lee there are 2,966 acres of wetlands (swamps, marshes and bogs) which have been inventoried, measured and scored by value of relative importance. Wetlands account for almost one fourth of the area of the town. The protection of watersheds and groundwater resources, both in quality and in quantity, is an important objective for the Town. The intent is to ensure that the resource is not degraded or depleted so that there will continue to be water available to meet the needs of the Town and its residents. The Aquifer Ordinance was introduced into Lee Zoning in 1985.

Water Resources Goals

- Conserve and protect the integrity of the Town's watersheds and surface water resources in their quality, quantity, and their intrinsic scenic and wildlife habitat values.
- Conserve and protect the integrity of the Town's groundwater resources in their quality and quantity for their availability for use by the Town and its residents.
- Determine the drinking water quality and quantity deficiencies in the local water supplies.
- Define the future water resource needs of the community and consider developing Town owned water supplies.
- Reduce the growth of impervious surface cover in watershed areas.

Protected Lands

Over the years, the Town has acquired land for conservation purposes, and has acquired conservation easements on other lands. These have been obtained through donations, grants, Town appropriations, or some combination of these techniques.

The Town is moving forward with plans for the Little River Park near the village center. There is an extensive network of marked and mapped walking paths which cover much of the Lee Forest Complex. Acquisition of conservation easements has been a high priority for the Town for the past several years. As of 2005, there are 2,154 acres of land in Lee protected in perpetuity by conservation easements, and more have been authorized by Town Meeting.

Fremont Vision 2006

The citizens of Fremont have continuously voiced a strong desire to maintain Fremont's rural character. The residents have shown a strong desire to maintain the Town's open space and forested areas for the enjoyment of all. Support for preserving the Town's natural resources is also very strong. The citizens of Fremont have voted consistently at Town meetings to protect these areas.

Fremont's goal for the coming years is to balance its small town charm with the inevitable growth throughout the region. It is the goal of Fremont's citizens to follow a path that has proven elusive to so many; to preserve the rural character of the Town and, at the same time, find a way to share these prized features with those who wish to settle here today and in the future.

Conservation Commission and Open Space Committee Goals

- Preserve 25% of the total acreage in Fremont for conservation purposes.
- Focus specifically on preserving the integrity of the Spruce Swamp by protecting the uplands surrounding the swamp.
- Identify, evaluate and protect other critical natural resources.
- Create the largest unfragmented block of land beginning with the recently purchased Glen Oaks parcels.
- The Conservation Commission should create and maintain an accurate inventory of Fremont's natural resources (see Fremont NRI report and maps).
- Identify areas that have high natural resource value to the general health and welfare of Fremont and to the ecological systems within the community.
- Identify and promote best management practices to minimize impact from development while maximizing the benefits of natural resource stewardship.
- Integrate ecological integrity and wildlife habitat in the Town planning, zoning, subdivision and site review.
- Protect undeveloped land with high natural resource value through the acquisition of conservation lands and/or conservation easements.
- Preserve parcels that add to large contiguous blocks of natural spaces.
- Create greenways to connect existing open space to enhance wildlife habitat.
- Establish benchmarks regarding the state of Fremont's natural environment and monitor these for changes.
- Prevent inappropriate development of land within the watershed and aquifer protection zones.
- Protect the quality of the area's groundwater resources through pollution prevention, conservation and appropriate regulation of uses within the watershed and aquifer protection zones.
- Remain involved in regional efforts to protect the water quality of the Exeter River (e.g. ERLAC; Exeter River Local Advisory Committee).

Fremont Community Goals

The Planning Board encourages the establishment of conservation areas and the protection of open space and natural resources (ponds, wetlands, woodlands, prime agricultural land and unique and fragile areas).

This goal is based upon the results of recent visioning sessions which showed that maintenance of open spaces and preservation of wetlands should be a town priority. By coordinating open space preservation concerns with the need to protect water resource areas, and can be protected for a variety of reasons and uses. Open space, wildlife corridors, and buffers also decrease impending

tax impacts, preserve rural character, protect visual resources, establish and protect wildlife habitat, and provide numerous and unquantifiable intangible benefits to the citizens.

The Planning Board supports the goal of avoiding the necessity for developing a municipal water and sewer system, through the proper management of sustainable growth.

Brentwood

Only a small amount of Brentwood is within the Lamprey watershed and is part of the Piscassic River watershed. Brentwood does respect and care about their flood plains and regulates them through overlays on Flood Plain Districts. They do not want development, fill or other encroachments in the flood plain. They also talk about wetlands protection to protect the public health, safety and general welfare by controlling and guiding the use of land areas which have been found to be saturated and subjected to high water tables for extended periods of time -- including established and seasonal wetlands. They want to limit development, sewage and toxic substances, as well as limit the destruction or change to natural wetlands which provide flood protection; provide filtration of water flowing into ponds and streams, augment stream flow during dry periods and are connected to the ground or surface water supply; protect unique and unusual natural areas; protect wildlife habitats, maintain ecological balances and enhance ecological values; and protect potential water supplies and existing aquifers (water bearing stratum) and aquifer recharge areas. The goal is to preserve and enhance the aesthetic values associated with wetlands in the town of Brentwood; prevent damage to structures and properties caused by inappropriate development in wetlands; and to preserve the viability of the protective wetlands buffer areas. The town developed a "Brentwood Wetlands Conservation District Map" to define their wetlands.

Newfields

Newfields wants to have sound planning and wise land use that will conserve their rural character, preserve large areas of open space, provide visual buffers from existing roads and residential developments and permit farming. The Master Plan spoke to preserving large, contiguous parcels of open space throughout town, especially land determined to be of significant importance for protection and preservation. The town wants to provide connected corridors of open land for preservation of habitat, environmental resources and public enjoyment.

The town created Land Conservation areas, and they note special flood hazard area and discourage development in the floodplain and floodway area. They also recognize the importance of wetlands and want to prevent the development of structures and land uses which will contribute to pollution wetlands; they want to protect natural wetlands, aquifers, water supplies and recharge areas. Newfields sees the aesthetic values of wetlands and wants to protect structures and properties that might have been inappropriately developed in wetlands.

“In the interest of environmental quality, public health, resource conservation and the general welfare of the public, and in recognition of the special cultural and ecological significance of the Great Bay estuarine system, the Shoreland Protection District is established: to promote the preservation and maintenance of surface water quality in Newfields; to conserve and protect aquatic and terrestrial habitat associated with intertidal and riparian areas; to preserve and enhance those aesthetic values associated with natural shoreline; to encourage those uses that can be appropriately located adjacent to shorelines.”

Newmarket

Master Plan, Water Resources Chapter.

The 2009 Master Plan, as adopted by the Newmarket Planning Board contains much support for their water resources and water-dependent resources in the watershed. The Vision Statement reads that the town should, “Vigorously protect water resources in Newmarket from contamination, depletion, alteration, and degradation. Act as stewards for municipal and regional water supplies located within the Piscassic River and Lamprey River watersheds.

“The protection and use of water resources are critical concerns to the town of Newmarket. With virtually all residents dependent upon wells for domestic use, the quantity and quality of available groundwater must be protected from depletion and contamination. Other water resources, such as swamps, ponds, streams and wetlands, are important because they are hydrologically related to groundwater, and they provide ecological, scenic, and recreational value to residents and visitors. There is a direct relationship between land use and water quality. It is the responsibility of the Town to take reasonable and prudent precautions to protect all water resources from incompatible uses, thus protecting the health and general welfare of the community.”

There are strong statements for:

Surface Waters Policy Statement: Provide for comprehensive protection of shorelands to protect the quality of surface waters through regulatory, educational and voluntary efforts. The loss of shoreland buffers through variances, waivers and through illegal activities should be minimized.

Water Quality and Habitat Protection: Develop and implement policies, regulations and standards that ensure protection of water quality and wildlife habitat. These efforts should focus on land use, and conservation and management measures that ensure the sustainability of these resources.

Groundwater Resources Policy Statement aims to protect groundwater as well as the hydrology of surface waters and wetlands.

Areas of ecological Concern Policy Statement establishes new and maintains existing local, regional, state and federal partnerships to prevent the loss of significant wildlife habitat and ecosystems by implemented regulatory, educational and voluntary measures for land conservation, forest preservation, open space planning, and wise land use and growth.

The Plan protects local aquifers through an Aquifer Protection Overlay District to protect groundwater supplies, prevent development and land use practices that would increase risk of contamination, and provide for future growth and development of the town, while insuring the future of water. The Plan strongly encourages water utilities to use conservation measures. It supports the Water Management Program of the Town to ensure adequate drinking water during periods of drought. The plan references a study to determine if the Lamprey River could be used to recharge the current aquifer. That study has been put on hold, but there are no guarantees that this project might be pursued in the future. The Town of Newmarket currently holds two NPDES discharge permits around the Newmarket Wastewater Treatment Facility. One allows discharge into the Lamprey River below Macallen dam and the water treatment plant intake. The Town of Epping also holds a permit to discharge treated municipal wastewater into the Lamprey River.

The plan recommends establishing a Water and Sewer Utilities Advisory Committee to assist with evaluating the capacity of the wastewater treatment facilities, including pumping stations, to minimize overflows and/or treatment by-passes to the Lamprey River during storm events.

The Plan recommends that the Planning Board require such measures as additional stormwater treatment in paved areas close to the Lamprey River, Piscassic River, and Great Bay. It goes on to desire broader and stronger use of buffer areas or structural setbacks from sensitive wetlands and along major tributaries. The plan supports the Lamprey River Advisory Committee to increase septic system setbacks to 150 feet (from 125 feet currently) along Class A waters. This would include waters associated with the Lamprey and the Piscassic Rivers.

For Areas of Ecological Significance, the Plan recommends working to prevent the loss of significant wildlife habitat and ecosystems by implementing land conservation, open space planning and wise land use and growth. Specific areas that are highlighted include the Lower Piscassic River, shared with the Town of Newfields, as it contains 1,720 acres of unfragmented forest, 18,800 acres of aggregated forest blocks, 4.6 miles of first order streams, 3.6 miles of second order streams, and 4.0 miles of fourth order streams, 2 state threatened plant species (Climbing Hempweed and Large Bur-reed), 4 species of animals of concern, significant wildlife habitat including grassland, marsh and peatland, an exemplary natural community and system (as identified by the NH Wildlife Action Plan), low-gradient silty-sandy riverbank system, 41.4 acres of high yield aquifer, 3 wellhead protection areas, 399.7 acres of prime farmland, and 185 acres of farmland of state importance, and 13.5 acres of permanently protected managed forest lands. The plan recommends more conservation easements on the large, undeveloped parcels in the watershed to protect drinking water supplies.

The plan recommends an inventory and management plan for invasive species, including the Lamprey River area. It also recommends the establishment of an advisory committee to study long-range growth management and water resource planning for the town.

The Newmarket Open Space Plan echoes much of what the Master Plan, Water Resources Chapter says about land conservation, protecting drinking water sources, protection of the quality of surface waters, and working closely with the Lamprey River Advisory Committee and the Lamprey River In-Stream Flow Study Committee.

Additional recommendations include establishing interpretive signs and educational programs to raise awareness of important water resources along recreational trails. Encourage new recreational trails to provide exposure and educational experiences about water resources, for example, the Riverwalk Trail.

4. Recreational Resources

(a) Fishery

Identify the type and location of any high quality recreational fisheries or areas with such potential that are present in the river, as determined by the NH Fish and Game Department. Also indicate areas that have potential to be significant fisheries.

The Lamprey River is a popular resource for recreational fishing. Fishing from the shoreline or by wading is popular at a number of reaches that are accessible by the public from roads or park areas. The flat-water areas in Epping and Raymond provide recreational anglers with opportunities to fish from small boats. In the Newmarket section of the river, where it is impounded by the Macallen Dam, fishing opportunities can be accessed by larger watercraft (powerboats) via the Piscassic Street boat ramp. Aside from these locations the Lamprey River above Raymond and each of the tributaries – North Branch River, Pawtuckaway River, North River, Little River and the Piscassic River - must be accessed on foot.

The fisheries resource of the Lamprey River and the tributaries includes both coldwater and warmwater species and a variety of both native and introduced species that are popular among recreational anglers. Largemouth bass, smallmouth bass, bluegill, black crappie, rainbow trout, and brown trout are all species that have been either historically or currently introduced to the Lamprey River system and were found within the designated segment during the 2003 baseline survey. A number of native fish species are also popular with recreational anglers. Included in this group are: redbreast sunfish, pumpkinseed, yellow perch, eastern chain pickerel, and Atlantic salmon.

Eastern brook trout, a fish species native to New Hampshire, do occur within the Lamprey River but appear to be limited in distribution to the headwaters. Trout are the most targeted fish species by recreational anglers within the Lamprey River. The New Hampshire Fish and Game Department and the Great Bay Chapter of Trout Unlimited both routinely stock trout into the Lamprey River. The New Hampshire Fish and Game Department releases hatchery-reared trout into the Lamprey River in the towns of Deerfield, Raymond, Epping, Lee, and Durham.

Although returns are generally small and variable by year, upriver spring movements of Atlantic salmon occur within the Lamprey River. During 2007, a single fish passed through the fish ladder at Macallen Dam in Newmarket (Dionne, personal communication 2008). In addition to Atlantic salmon, over 55,000 river herring (alewife and blueback herring), 255 sea lamprey and four American shad passed through the Macallen Dam and into the lower reach of the Lamprey River during the spring run (Dionne, personal communication 2008). These fish are currently able to access the river as far upstream as the Wiswall Dam (approximately three river miles).

A Denil fish passage is proposed for the Wiswall Dam and completion of this project will allow anadromous fish access to an additional 45 miles of riverine habitat in the mainstem of the Lamprey River and its associated tributaries.

(b) Boating

Describe any significant recreational boating opportunities that are present on the river, including whether it is used for motorized boating. Indicate if the river is cited as significant for recreational boating in a publication of a national, regional or statewide recreation organization. Refer to the NH River Protection and Energy Development Project to determine the river's significance as a recreational boating river. Also note if boaters are attracted from beyond the local area and if there are areas with potential to be significant boating resources.

According to the NH River Protection and Energy Development Project -Final Report; produced by the New England Rivers Center in 1983, the Lamprey River, North Branch River, Pawtuckaway River, North River, Little River and the Piscassic River do not have significant white water or flat water boating potential.

However, several stretches of the Lamprey River and tributaries are known for good kayaking and canoeing. The Appalachian Mountain Club River Guide for New Hampshire and Vermont (2nd Edition) gives a complete description of the river for paddling and where to put in and take out.

LAMPREY RIVER

The Lamprey River is one of the longest rivers in the Piscataqua Watershed, and it is probably the flattest. The section above Raymond offers Class I rapids for spring paddlers. Below town, the river can be run for most of the year because there are few rapids. Packers Falls, Class II or III, depending on the water level, can be run well into the summer by kayakers and canoeists.

The tidal portion of the Lamprey River can be accessed by venturing upriver from Great Bay (being careful of narrow and shallow channels) or from the boat launch in downtown Newmarket.

NORTH RIVER

The North River's paddling season is brief, but it definitely offers the best whitewater fun in the Piscataqua Watershed, a 2 ½ mile continuous Class II run above NH 152. Below the NH 152 bridge is the best white water spot on the North River, a favorite of kayakers, fisherman, and photographers alike. This is also the site of an old grist mill.

PISCASSIC RIVER

The Piscassic River is a large brook that flows eastward from Fremont and Epping to the Lamprey River just above Newmarket. The section above NH 87 is extremely difficult and is not recommended unless you enjoy hacking your way through thick alder and vine tangles. Below NH 87 the river is more open, and it has many narrow, tight turns in quickwater. There are a number of downed trees.

(c) Other Recreational Opportunities

List any other recreational areas, facilities, or opportunities or potential for such on the river or in the river corridor, e.g., hiking, camping, picnicking, etc. Indicate ownership, if known.

*Recreational Area Ownership Location*Lamprey River – Headwaters to Epping-Lee Line

Northwood - Northwood Meadows State Park, 17 acres, hiking trails, horseback riding trails, Meadow Pond (no motors allowed), owned by State of NH

Deerfield – Deerfield Fairgrounds

Raymond - Pine Acres Campground off of NH 107/102, private ownership

Raymond – Langford Road bridge, fishing access

Raymond - Scotland Road Beach, Scotland Road loop off Rt. 27, private ownership

Raymond – Riverside Park, off of Rt. 27 and off of Sundeen Parkway, hiking, riverfront picnic areas, owned by Town of Raymond

Raymond - Carroll Beach, swimming, owned by Town of Raymond

Raymond - Town Beach behind Lamprey River Elementary School

Epping – Folsom Dam, canoe access point, picnic area, dam owned by State of NH, park owned by Town of Epping

Epping – Lamprey Forest, conservation area owned by Society for the Protection of New Hampshire Forests

Epping – Town Hall, canoe access

Lamprey River – Durham-Newmarket line to Great Bay

Newmarket – Boat launch, picnic area on Piscassic Street to Piscassic River near junction with Lamprey River, managed by Newmarket Parks and Recreation Department

Newmarket – Boat launch downtown in tidal portion of the Lamprey River

Newmarket – Heron Point Sanctuary, trails and lookouts, Town owned

Newmarket – Macallen Dam, swimming hole, Town owned

North Branch River

Deerfield - Bear Brook State Park, picnic areas, hiking, horseback riding trails, owned by State of NH

Candia – Liquid Planet, water park, privately owned

Candia – Conservation area between High Street and North Road, hiking

Pawtuckaway River

Nottingham - Pawtuckaway State Park, 900 acres, hiking, camping, Pawtuckaway Lake, warm water fishing, boating, owned by State of NH

North River

Nottingham – North River Pond, warm water fishing, privately owned

Nottingham – North River, Town Hall, Rt. 152 trout fishing, kayaking, canoeing

Nottingham – Fernald Campground

Nottingham – Fairgrounds trails, owned by Town of Nottingham

Little River

Barrington – Mendums Pond, warm water fishing, boating, public (UNH) and private ownership

Nottingham – Little River, trout fishing
 Nottingham – Nottingham Lake, boating, private ownership
 Nottingham – Sunrise Nudist Camp, private ownership
 Lee – Lee Speedway, motor car racing, unpaved parking area next to Little River, private ownership
 Lee – Little River Park, 40 acres, river access for fishing, viewing, owned by Town of Lee

Piscassic River

Epping – Epping Drag Racing, motor cars, private ownership

(d) Public Access

List any existing public access sites located along the river. These may be formal or non-formal access points. Include the type of public access (e.g., canoe only), related facilities (e.g., parking), and if known, ownership at each site.

Location Type of Access Related Facilities Ownership

Table 17 Public Access Locations in the Nominated Rivers

Community	Waterbody	Location	Type of Access	Ownership
Northwood	Lamprey River	Northwood Meadows State Park	Fishing, canoe, trails	State of NH
Deerfield	Lamprey River	Freeses Dam off Rt. 107	fishing	Town of Deerfield
Deerfield	Lamprey River	Rt 107 crossing	Fishing, footbridge	power line ROW
Raymond	Lamprey River	Carroll Beach	sandy beach, boat launch	Town of Candia
Epping	Lamprey River	Mary Blair Park	Canoe launch, fishing	Town of Epping
Epping	Lamprey River	Bunker Pond Dam	canoe launch, fishing	State of NH
Epping	Lamprey River	Mill Street Bridge	fishing, small parking area	Town of Epping
Newmarket	Tidal Lamprey	Downtown	public landing	Town of Newmarket
Newmarket	Lamprey River	Macallan Dam	Fishing	Town of Newmarket
Nottingham	North River	Rt. 152	fishing	Town of Nottingham
Nottingham	North River	Town Hall Park	fishing, open grass	Town of Nottingham
Barrington	Little River	Mendums Pond	boating, fishing	University of NH
Newmarket	Piscassic/Lamprey	Piscassic Street Park	boat launch	Town of Newmarket

5. Other Resources

(a) Scenic Resources

Briefly describe any significant scenic focal points along the river including designated viewing areas and scenic vistas and overlooks. Indicate the location of the significant views to and from the river.

Lamprey River from headwaters to Epping/Lee line

The Lamprey River gets its start in Northwood Meadows, beautiful and special enough to be a state park. Much of the land in this area is publicly owned and what is privately owned is carefully managed by landowners working together for common conservation goals.

Starting as a small stream, the Lamprey River is visible at various road crossings in Deerfield, one of the most visible being the outlet of Freeses Pond where the river crosses under NH 43. The river is visible at the James City Road bridge where VRAP volunteers draw samples throughout the summer. Looking upstream, one sees alders and a shrub/open/beaver wetland and turning to face downstream the river passes through floodplain forest.

At the Mountain Road crossing, one must walk down to the stream and look upriver to see a beautiful stone arched bridge (pictured on the front cover). Few would know that this beautiful structure is located here.

At the intersection of NH 43 and Cotton Road, the Lamprey River again is very visible as patrons come and go to the Deerfield Fair each fall. Still barely more than a large stream, the river will meet saltwater in 37 miles.

The Lamprey River in Raymond provides the residents with over a dozen locations to access the river for wading, swimming, boating, fishing or simply sitting and relaxing in the cool water on a warm summer day.

Beginning near the Candia town line, the North Branch River bridge accessing the Thibeault property has been a safe haven for schools of small fry and a great frog catching spot for school children. Heading east along Route 27 there are 3 different neighborhoods that abut the river that provide calm wide open waters from beaver dams for residents to swim, canoe, kayak and sunbathe.

For the past few years on Earth Day over 200 residents visit Riverside Park, accessible from the Sundeen Road entrance, for the annual trout stocking event. The kids just love sticking their hands into the buckets feeling the skins of the swimming fish before they are released into the river. The park has a trail up to a high look out spot for viewing about a mile of the river heading into town and a trail from the dog park to the river for owners to let their dogs swim.

At the intersection of Langford Road and Route 27 the river is used by many families taking their children to fish for the first time. There are large boulders in the river that create rapids when the water level is high but when its low, it becomes a very soothing smooth flowing river that is safe for children to fish in.

Traveling about a quarter mile east on Route 27 there is a 50 foot wide section of dry land that has the sign for Riverside Park and a picnic table. This site happens to be across the street from the ice cream shop and is used daily for lunch time enjoyment as well as a resting spot for passing tourists and bicyclists.

From the beach at the Lamprey Elementary School heading east into town past the end of the Plains Road neighborhood houses is a wide open section in the river with grassy yards right down to the water making perfect summer nesting grounds for families of Canada Geese.

The bridge on Route 107 has a naturally formed rock ford and spill way that creates beautiful white water rapids in the spring time. Continuing east to the bridge on Prescott Street is the perfect spot for watching lots of Mallard Ducks and Canada Geese that rest in the river after eating the grasses from the abutting landowner's fields.

At the West Epping Dam or Bunker Pond, visitors are treated to historic mill ruins and Mary Blair Park, named after the Epping resident and school teacher who donated the land. This is the location of the beginning of the annual Epping Canoe Race with entrants from far and wide.

Downriver from Mary Blair Park is the Lamprey River Forest, an area that is highly scenic and relatively undisturbed. There is stonework from a colonial period farm pond dam.

At Blake Road, if one is to leave your car and venture down to the river on the upstream side of the road crossing you will be treated to a shaded quick water river with ferns and moss covered rocks. The river is fresh and lively here.

At the NH 87 road crossing, the official ending for the Epping Canoe Race, the Lamprey River Advisory Committee has erected a kiosk for visitors to see maps and utilize a trail guide for a riverwalk created here. This is also a canoe put-in location for a paddle on to Wadleigh Falls although frequent portages over downed trees is likely.

Lamprey River from Durham/Newmarket line to Great Bay

Known locally as "the Moat", this part of the Lamprey River is backwater from the Macallen Dam at NH 108. With the boat launch nearby, this area can only be seen from a kayak or canoe. The area offers quiet paddling in sometimes dense vegetation and the opening to paddle upriver to Packers Falls can be hard to find.

Many people stop at the Macallen Dam in downtown Newmarket to marvel at the flow of water over the dam, especially during exceptionally high water. Restoration of some of the mill properties makes this one of the most scenic and historical places along the river. River herring can be seen making their runs in late April or early May at the fish ladder.

On the opposite shore from downtown Newmarket is Heron Point Sanctuary. Boardwalks and decks make for easy access to one of the most beautiful locations around. Here the river is tidal and old fish weirs are still in place. This is the location to look upriver at the Macallen Dam and the whole complex of historic mills.

In downtown Newmarket, the Richard Schanda Conservation Park and town boat landing offers many access to the tidal portion of the Lamprey River and on out to Great Bay. The view is of the river, the mills and across to Heron Point Sanctuary.

North Branch River

The North Branch River begins inside Bear Brook State Park. With the official entrance to this park on the other side, few people reach the Beaver Pond where the river gets its start. Dense brush and few road crossings make the North Branch River relatively inaccessible except for the crossing at Old Boston Road.

Dudley Road, a spur off of NH 27, is the location of Scenic Nursery where the North Branch River crosses under the road. Well named, Scenic Nursery provides a lovely view of seasonal plants and open sky next to the river.

Pawtuckaway River

The Pawtuckaway River is a free-flowing river and remains in a pristine condition along its entire length. There is an exemplary alder-dogwood-arrowwood alluvial thicket plant community extending along the Pawtuckaway River from just north of the bridge on Stingy River Road south along a pending conservation property (about 2,000 feet of shoreline).

Current conservation projects (4 pending) will add to and link existing blocks of abutting conservation land to create a more than 600-acre area on the Epping and Raymond town line, the largest block of conservation land in Epping. This conservation block lies mostly within the Pawtuckaway River Core Focus Area of the Land Conservation Plan for NH's Coastal Watershed. Collectively these conservation lands help protect water quality, freshwater mussel and fish habitat, wildlife travel corridors and dispersal routes, riverine and riparian habitats, and large, relatively unfragmented habitat blocks.

North River

The North River begins at North River Lake in the towns of Barrington, Northwood and Nottingham, and flows from an outlet in Northwood under a small dirt road then under Cooper Hill Road near an old mill site. It then flows under US Route 4 in Nottingham just east of the Northwood town line (not easily viewable from a passing vehicle).

The river is more easily visible as Mountain Brook flows into it in a wetland bordering NH Route 152, a little north of Gebig Road. It then flows between properties between Gebig Road and Garland Road eventually passing by the Kimball Family easement before flowing under Freeman Hall Road where VRAP testing takes place biweekly during the summer by volunteers from the town of Nottingham. The river then flows through the Merriam-Daggett property which will shortly be protected by an easement funded by the Wetland Reserve Program (WRP).

The North River then flows into the Tasker property which contains a large wetland that overlies the largest aquifer in Nottingham. This property will also be protected by an easement funded by a WRP grant. As the river continues downstream it flows by the Nottingham Elementary School then under NH Route 152 where many people fish and occasionally put in canoes, kayaks, and rowboats.

Eventually it passes through the Falzone property which will also be protected by an easement funded by WRP. It then flows under NH Route 152 again by the Town Office property with two ball fields which are used throughout the summer. This is also the location for the annual Kids' Fishing Derby sponsored by the Nottingham Recreation Department in June. Canoes and kayaks are also launched here when the river runs high and some swimming occurs especially after some of the ball games.

Further downstream it flows under McCrillis Road where more VRAP testing occurs biweekly during the summer and then closely follows the road for about a half mile before heading to NH Route 152 at the town line with Lee. The North River also passes by some of the best farm land in Nottingham. Just beyond the town line, at the bridge, is the best white water spot on the North

River, a favorite of kayakers, fisherman, and photographers alike. This is also the site of an old grist mill.

Little River

The Little River flows out of Mendums Pond just north of US Route 4 into a large wetland visible from US Route 4. It then flows under Kennard Road to Smoke Street where more VRAP water testing is done. At the Old Mill Road crossing, travelers can pause on the bridge to look upstream at the newly reconstructed Nottingham Lake dam (privately owned) to instantly check on the volume of flow.

The Little River is visible near Kelsey Road as Pea Porridge Brook flows under Kelsey Road into the Little River then continues under NH 125 at the Lee Speedway. From here the river passes through forested lands, some in conservation easements and then becomes the western border for the newly created Little River Park, owned by the Town of Lee and managed by the Lee Recreation Commission. Trails lead to the water and the river changes from a rippling stream to slow flat water.

From Rt. 155 to confluence with Lamprey, the Little River passes by an historic mill, open pastures and then joins the Lamprey one-half mile upriver from the Lee Hook Bridge. The Stevens Farm on Tuttle Road is in conservation easement and the site of the annual Lee Fishing Derby enjoyed by dozens of Lee children each May. At other times of the year, anglers enjoy the great fishing this location has to offer.

Piscassic River

If you can spot the Piscassic River in Fremont you should win a prize. With barely a visible channel at Martin Road on the Fremont-Epping line, you can enjoy the scenery of hayfields and pastures and productive farmland. The next road crossing is NH 125 and the channel is still barely detectable but the river is a wide open wetland. Recent development nearby stands to threaten the Class A water of this river from polluted runoff. The widening of NH125 into the wetlands has also put pressure on this system to filter and purify.

The Piscassic River passes under NH 27 after moving through an open natural pond. Access beyond this point becomes very limited and explains why the river has managed to maintain high water quality in the face of nearby growth. In Newfields, the Piscassic Ice Pond can be seen on the south side of NH 87 and then again at Ash Swamp Road. Up until this point the river is hard to find and not easy to follow.

From Ash Swamp Road to the Piscassic River dam on Packer's Falls Road in Newmarket, the river is someone's backyard and flows through rural residential neighborhoods. At the dam, you can see open water with the confluence of the Lamprey River and a large cemetery. This is the location of an inactive water treatment plant for the Town of Newmarket.

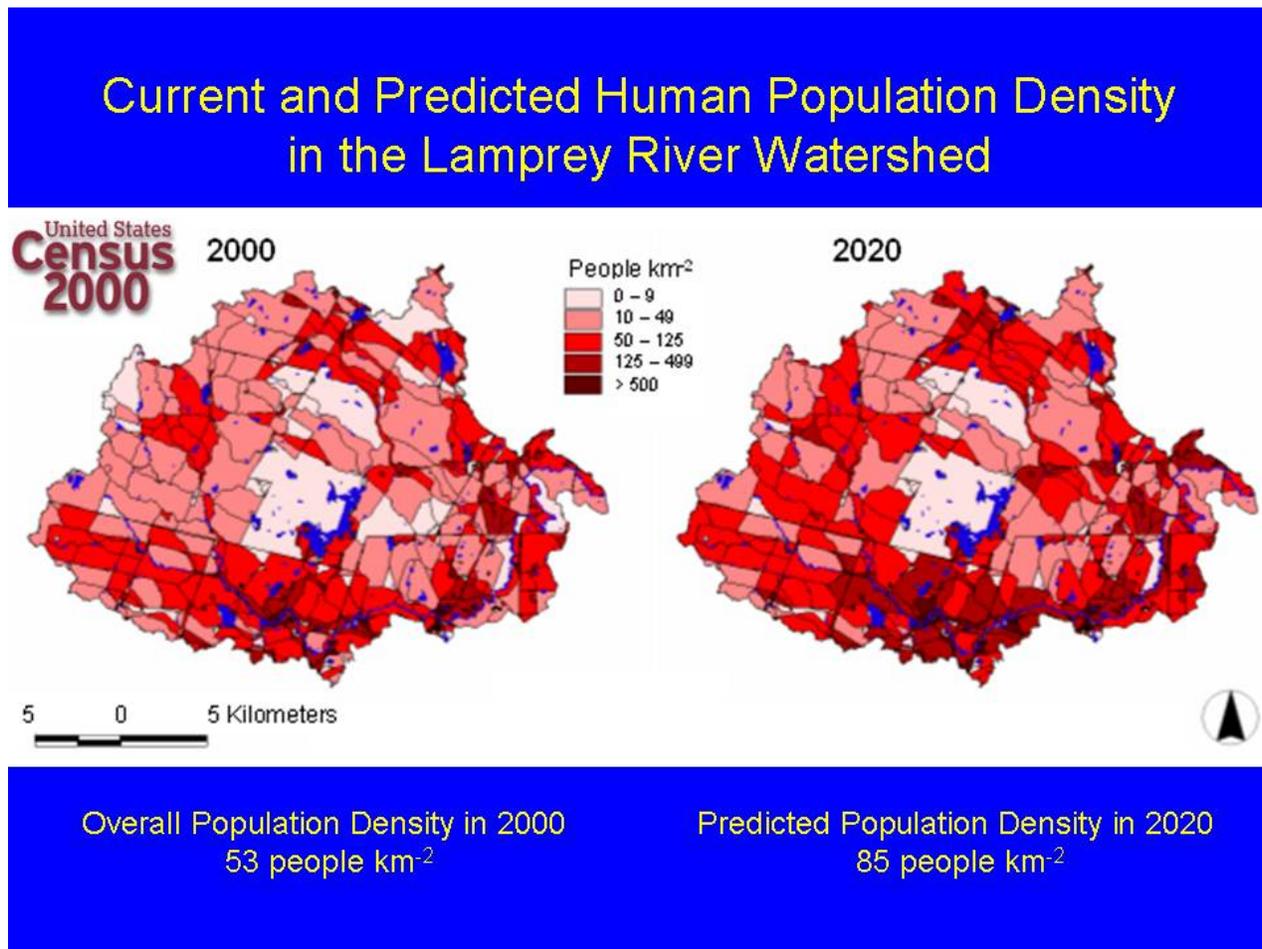
(b) Land Use

Briefly describe the general patterns of current land use in the river corridor. Include location of significant developments within the river corridor including agricultural, residential, commercial, and industrial developments, and solid waste management facilities. Also include location of lands used for forest management or which are undeveloped. Identify such features as roads along the river, railroads, bridges, and utility crossings. Describe the type and location of any proposals for major developments within the river corridor.

The Lamprey River Watershed (479 km²) is rural with an overall population density of 53 people per square kilometer as estimated using a geographic information system (GIS) and Census 2000 data. The areas of concentrated development are in downtown Raymond, downtown Epping, and in Newmarket.

Being in the Seacoast region of the state, the watershed has experienced rapid growth in population and in density as seen in the following chart.

Figure 3 Current and Predicted Population Density



The lack of population density in the center of the watershed is attributable to Pawtuckaway State Park and conservation lands in the Saddleback Mountain area.

Lamprey River – from headwaters to Epping/Lee line

Beginning at the outlet to Meadow Lake, the Lamprey River flows through forestland and riparian shrub lands and is a well buffered stream. There is little to no agriculture along this section of the river and houses are individual homes with few subdivisions. When the Lamprey River reaches Raymond, there are several apartment complexes and condominium developments before reaching downtown Raymond. Here the Lamprey widens out and resembles a pond more than a river. Just after the downtown Raymond section of the Lamprey there is a gorge and then another flat section of water called “Dead Pond”. Here the river picks up it’s pace again and except for the backwater area of the Bunker Pond dam, the Lamprey moves fairly swiftly. A few subdivisions are along the way but most of the development is limited to single houses on a few acres. Just after the downtown Epping segment, the Epping Waste Water Treatment Plant has it’s discharge point. Below the Route 87 bridge the river becomes almost unreachable due to few crossings and thick brush, and many downed trees that make a clear run almost impossible.

The Lee and Durham segments of the Lamprey are already designated and are the largest sections of agricultural land to be found anywhere in the river system.

In Newmarket, the river becomes surrounded by apartments, duplexes and a former industrial mill complex. The tidal portion of the Lamprey River is forested with scattered single family homes.

North Branch River

This river is more like a stream and is generally not very accessible due to shrubs and dense vegetation. The headwaters is Bear Brook State Park and except for a few road crossings, the North Branch River is relatively undisturbed and unseen. Scenic Nursery is on the banks of the river at Rt. 27. Otherwise, the land use is mostly forest.

Pawtuckaway River

Beginning at the outlet (one of two) of Pawtuckaway Lake, this river passes through mostly forested land with a few farms and orchards. The Southeast Land Trust has targeted the Pawtuckaway River for conservation easements to maintain the rural character of the area.

North River

The North River is almost exclusively forestland with large tracts of forest for most of its beginning. Relatively inaccessible except for some road crossings, the North River is a cool mountain stream. One former saw mill is at the mid-point of the river’s length and a few farms are found in the lower reaches. There are no concentrated areas of development except for the Town Hall and Fire Station near the intersection of Routes 152 and 156. At the Route 152 crossing, an historic mill site is located although the mill buildings and workings have been dismantled and are being stored in another location for future restoration.

Little River

Mendum’s Pond is a UNH recreational facility and surrounded by camps and houses. After leaving the pond, the river is thick with brush and travels through forest land to Nottingham Lake. About a mile south of the lake and just before the Little River passes under Route 125, there is a motor speedway with a gravel parking lot immediately adjacent to the river. After passing under Route 125, the Little River becomes less accessible and is the backyard to a few houses and farms along the way. The Town of Lee is developing a recreational park on land between Lee Hill Road and Route 155 with the river as its western boundary. At the confluence with the Lamprey River, the Little River flows through hayfields protected by conservation easements.

Piscassic River

This “river” is merely a small stream for much of its beginning. Even at road crossings, a channel is not easily determined until the Piscassic River reaches Route 27. The upper reaches are mostly forested with dots of a few hay farms and pastures. At Route 125, the Piscassic has come under assault recently with major developments of shopping centers, acres of paved surfaces, and road widening projects. This high concentration of urbanization threatens the current Class A rating of this river. Downstream past the Route 27 crossing is a dragway and racetrack. Fortunately, the river becomes much more rural immediately and is also very unaccessible until a few road crossings in Newmarket. Newfields has made land conservation in the mid-Piscassic section a priority and this has helped the Piscassic maintain its high water quality rating. At the confluence with the Lamprey River, the Town of Newmarket has a dam and a water treatment facility.

Proposals for Major Developments Within the Corridor

The Raymond Community Development Department is working with existing business owners within the Route 101/Route 27 Exit 5 corridor along the east side of the Lamprey River to expand Commercial/Industrial development. The plans include building a Waste Water Treatment Facility that could service existing businesses, entice new businesses and support development on the 70 acres at Flint Hill on Route 27.

The town has identified approximately 200 acres south of the Boston and Maine Rail Trail, west of the Lamprey River, east of Old Main Street and north of Route 101 as the next possible location for a Business Park. This is a significantly sized area for potential business and residential development that might be accessed from the end of Gove Street along with a variety of other potential locations along Main Street on the south side of Route 101.

The total proposed buildable acreage in Raymond is approximately 600 acres within the Lamprey River watershed from Exit 5 down Route 27 to Exit 4 along Route 101.

(c) Land Use Controls

Identify the municipalities with existing master plans and zoning ordinances within the river corridor. Identify existing or significant proposed land use controls which affect the river and the river corridor (e.g., zoning, easements, subdivision regulations).

Table 18 Summary of Town Master Plans and Zoning Ordinances

Town	Master Plan?	Zoning Ordinances?	Other Ordinances/Controls
Northwood	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetlands Conservation Overlay District, Conservation Overlay District, Agricultural Soils Overlay District, Wellhead Protection Overlay District, Steep Slope Protection Overlay District. Open Space Design, Floodplain Management Ordinance, and Growth Management Ordinance
Deerfield	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Low Impact Development guidelines, Wetland Conservation District, Floodplain Overlay District
Raymond	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Space Plan, Aquifer Protection Policy, Source Water Protection Plan
Epping	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetlands Conservation Overlay District, Shoreland Protection Overlay District, Flood Hazard Overlay District, Aquifer Protection Overlay District
Candia	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Space Plan
Durham	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetlands Conservation Overlay District, Shoreland Protection Overlay District, Flood Hazard Overlay District, Aquifer Protection Overlay District
Nottingham	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Conservation Overlay District, Aquifer Conservation District, Wetland Conservation District, Flood Hazard Area
Barrington	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Natural Resources Inventory, Wetlands Protection District Overlay, Shoreland Protection District Overlay, Floodplain Management District Overlay, Groundwater Protection District Overlay
Lee	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shoreland Conservation District, Wet Soils Conservation Zone, Aquifer Conservation District
Fremont	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Space Committee, Smart Growth Principles, Wetland and Watershed Protection Ordinance, Floodplain Ordinance, Aquifer Protection District Ordinance,
Brentwood	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetlands Ordinance, Aquifer Protection Ordinance, Flood Plain District Regulations, Shoreland Protection Ordinance
Exeter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wetlands Conservation District, Aquifer Protection District Ordinance, Exeter Shoreland

			Protection District Ordinance, Floodplain Development Ordinance
Newfields	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Floodplain Development District, Wetland Ordinance, Aquifer Protection District, Shoreland Protection Ordinance, Growth Management Ordinance
Newmarket	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Space Plan, Open Space Plan, Aquifer Protection Overlay District

Upper Lamprey - Northwood, Deerfield, Raymond and Epping

Northwood

Norwood's Development Ordinance was adopted in 1999 and reformatted in 2009 They have several overlay district's which would impact the Lamprey River watershed, including:

Wetlands Conservation Overlay District
 Conservation Area Overlay District
 Agricultural Soils Overlay District
 Wellhead Protection Overlay District
 Steep Slope Protection Overlay District

Northwood also has an Open Space Design, Floodplain Management Ordinance, and Growth Management Ordinance.

Deerfield

LAND USE

The management of land use patterns is fundamental to all other aspects of community development. The basic purpose of public land use regulation through planning, zoning and site standards is to segregate incompatible uses. The public thereby benefits in a variety of ways including protection of capital investments, protection of environmental quality, and ensuring the coordinated development of public services and infrastructure, such as roads, emergency services and schools.

The Town of Deerfield's Zoning Ordinance divides the Town into the following districts: the Agricultural-Residential District (AR); the Wetland Conservation District; the Floodplain Overlay District; Commercial/Industrial Flexible Overlay District; the Senior Housing Overlay District; and the Pleasant Lake Watershed Overlay District.

The Wetland Conservation District was created in order to protect the health, safety, and welfare of the public by regulating the use of land that is located in areas found to be subject to high water tables for extended periods of time. The Flood Plain Overlay District applies to lands that are designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA). These regulations overlay and supplement the Town's Zoning Ordinance and are considered part of the Zoning Ordinance.

Low Impact Development (LID)

Low Impact Development (LID) is a stormwater management strategy concerned with maintaining or restoring the natural hydrologic functions of a site to achieve natural resource

protection objectives. Developed in the mid-1980s, LID addresses stormwater through small, cost-effective site design and landscape features that are distributed throughout the site. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. LID techniques include conservation of forests and sensitive waters, water reuse, and stormwater controls that detain and retain runoff.

The LID approach includes five basic tools, as follows:

1. Encourage conservation measures
2. Promote impact minimization techniques such as impervious surface reduction
3. Provide for strategic timing by slowing flow using the landscape
4. Use an array of integrated management practices to reduce and cleanse runoff
5. Advocate pollution prevention measures to reduce the introduction of pollutants into the environment

The Planning Board should evaluate the Town's current Site Plan and Subdivision Regulations to determine if LID Guidelines could be developed for Deerfield. At a minimum, the Town should review the existing stormwater regulations to identify where LID techniques could be implemented.

Epping

Epping has a Wetlands Protection Ordinance which limits excavating, removing, filling dredge or constructing any structure or altering any bank, flat, marsh, swamp, bog or waters in the required setback to any wetlands. The setbacks vary, but for those contiguous to the shoreline of the Lamprey River, North River, Pawtuckaway (Stingy) River, and the Piscassic River, the setback for structures is 75 feet. All wetlands located within the area of the Piscassic River bounded on the north and east by NH Route 101, on the west by NH Route 125, and on the south by the Epping/Brentwood town line, setbacks is 150 feet.

Epping also has an Open Space Ordinance, Aquifer Protection District, Floodplain Development Ordinance, and a Riverbank Protection District.

The Riverbank Protection District was written in the interest of protecting Epping's rivers, and providing corridors for wildlife. The Epping Riverbank Protection District regulates the uses of land adjacent to the several rivers and is defined as all land within 150 (one-hundred and fifty) feet if the banks of the Lamprey River, North River, Pawtuckaway (Stingy) River, and the Piscassic River. Banks are to be determined by mean Spring High Water. Within this zone, no permanent structure shall be built; commercial enterprises with river frontage may have one access point which cannot exceed twenty (20%) percent of the total frontage; no septic system, stormwater drainage structure, outfall, or other conveyance of water that will degrade water quality shall be permitted within the 150 foot Riverbank setback.

North Branch River - Deerfield and Candia

Deerfield – covered above

Candia

Candia has an Open Space Plan which speaks to the importance of the wide array of Candia's natural resources, opportunities for recreation, low cost of living, lack of crime and rural community character. Because of these attributes, Candia is an attractive place to live and continues to grow at an unprecedented pace. Such overwhelming growth pressure results in loss of open space that denigrates the environment and the Town's rural community character. Candia's floodplain lands also contain a number of historic mill and dam sites. These lowland areas can become important greenway corridors for recreation trails linking historic sites, natural areas and recreation features in the community. Flood insurance regulations, which are administered by the Town as a requirement for flood insurance availability, mandate that the central channel of the floodplain, called the floodway, be kept development free to allow the flow of flood waters without damage to man-made structures.

Habitat Features

In order to avoid fragmentation and isolation of plant and animal populations, as well as to maintain continuity of natural landscapes, it is necessary to provide wildlife corridors for plant and animal species. It is also essential to protect critical or threatened habitats, with an emphasis contiguous unfragmented forest blocks, locations of rare species and natural communities, wetlands, water bodies, open space and recreation areas and conservation land.

Open Space and Recreation Lands

Candia lands having the potential for passive recreation could include river and stream corridors, steep topography or wildlife habitat resources.

Forest Blocks (Unfragmented Land Areas)

Within the Town of Candia there are several large pieces of unfragmented land that are over 2,000 acres in size, and an even greater number of parcels that are between 500 and 2,000 acres. Keeping these portions of land from being further subdivided and fragmented should be made a priority for the Town.

Existing developed land in Candia generally parallels the Town road system and has not expanded into the interior natural open space areas. A limited area of broader development is located along Old Candia Road in the south-central section of the Town. The relatively small area of land dedicated to development results in a very large expanse of forest landscape. Forested areas surround the five villages as well as wetlands and ponds in Candia and border the water course network throughout the Town.

Riparian Corridors

Riparian corridors or streambelt buffers are undisturbed, naturally vegetated areas contiguous with, and parallel to, rivers and streams that attenuate development's impact on water quality and quantity. Riparian corridors protect water resources by filtering pollutants, maintaining water temperature, stabilizing stream banks and channels, supplying woody debris for stream habitat and providing food for aquatic life. To identify riparian corridors a 300-foot buffer was placed around the edge of the water along the shoreline of rivers, lakes and streams. When the open space resources are overlaid, a pattern of areas that should be prioritized becomes apparent. In Candia a great deal of undeveloped land would be placed in a low-density development or preservation category. Priority protection efforts should focus on these concentrated open space value areas.

Wetland Buffers

A buffer around a wetland can serve many functions, including protecting water quality, protecting wildlife habitat and reducing direct human disturbance from dumped debris or noise. For this project, a buffer of 100 feet was placed around the NWI wetlands.

Ranked Priority Open Space Areas

After reviewing how open space has been ranked and evaluated in various studies, the members of the Candia Planning Board and Conservation Commission ranked and prioritized open space in Town based on what they felt were priority areas in terms of environmental and cultural importance. Open space areas were placed into three categories: highest, medium and lowest priority. The highest priority category includes steep slopes greater than 15%, wetlands, wetland buffers (100-foot buffer around wetlands), floodplains, aquifers, hydric soils, surface waters, riparian corridors (300-foot buffer around water bodies), forest blocks greater than 1,000 acres, prime/high quality agricultural land, historic properties/sites, greenway, land which provides access or links to a proposed greenway, and wildlife habitat areas. In the medium priority category there is land which provides alternate local connections to the proposed greenway. The lowest priority category contains forest blocks that range from 250 to 500 acres in size.

It appears that most of the highest priority open space areas can be found in the northern and western portions of the Town, which are in the Lamprey watershed.

Pawtuckaway River - Raymond

Raymond – covered above

North River - Nottingham and Lee

Nottingham

Nottingham's Zoning Ordinances cover specific areas that concern the Lamprey River watershed. These include Aquifer Conservation Districts, Wetland Conservation Areas and Flood Hazard Areas.

Lee has a Shoreland Conservation District (Article XI) that limits development and disturbance within 100 feet of any river or pond. There is also a Wet Soils Conservation Zone that prevents erection of structures within 75 feet of any wetland, no septic tanks or leach fields within 125 feet of a wetland, and no dredging or filling of a wetland. Lee's Article XIII is the Aquifer Conservation District that prohibits more than 10% of a lot from being covered by impervious surfaces; storage of hazardous or toxic materials; discharge of process waters on site; subsurface petroleum product storage; septage and solid waste disposal.

Little River - Barrington, Nottingham, and Lee

Barrington

Barrington has five base zoning districts:
General Residential

Neighborhood Residential
 Village District
 Regional Commercial
 Town Center

In addition to these base districts, this Ordinance also establishes the provisions of a series of overlay zoning districts that function in concert with the base districts. These overlay districts may or may not occur within all parts of the town and are intended to regulate the use of specific features or characteristics of the community. Where the extent of an overlay district coincides with the extent of a base district the regulations for both districts shall be applied. These districts shall be referred to by the following designations:

Wetlands Protection District Overlay
 Shoreland Protection District Overlay
 Floodplain Management District Overlay
 Groundwater Protection District Overlay
 Wireless Communications Facilities Overlay

Nottingham – see above.

Lee – covered above.

Piscassic - Fremont, Epping, Brentwood, Newfields, Newmarket

Fremont

Vision for Fremont's Future Land Use

Existing land use was described as predominantly residential with “spotty” second or third tier-type business (small cottage industry or in home businesses). It was also noted that much of Fremont is wetlands, and that no zoning districts exist for commercial, industrial or residential uses. The only current zoning district is the Fremont Village District.

Possible Zoning Districts for Fremont

The land use visioning discussions led to a discussion of zoning districts. This type of zoning had been proposed in the past but defeated at Town Meeting. A consensus emerged that a district zoning would have a much better chance at Town Meeting now, if only for the potential to curb increases in property taxes.

Most of the development in the past 20 years has been residential and residents understand that keeping residential-only zoning would lead to increased property tax burden on land owners. A possible way to mitigate this burden is to diversify the types of development, and four zoning options are being considered:

- **Mixed-use zoning** that would allow residential-friendly business to be located near residential zones, including small apartments above commercial uses.
- **Develop a light industrial or office-professional zone**, located off of NH RT 101. This area might have public water and sewer.

- **Open-space or Conservation subdivisions.** These areas were designated as “low-density” residential in the 1987 Future Land Use Map but could now be zoned as Open space subdivision (formerly called Cluster subdivisions). This type of zoning allows for smaller lot sizes in exchange for areas of conserved open space. Any open-space zoning should include design and buffering regulations.
- **Create a wildlife corridor** in the northern portion of Town. This corridor could link the large areas of unfragmented forest that still exist and provide contiguous habitat. This corridor could be accomplished in tandem with open-space subdivisions.

Fremont’s Community Goals included:

The Planning Board seeks to protect Fremont's rural residential character.

The protection of the quality of the town's residential areas is a central theme and a central feature of the Master Plan. The Master Plan and associated regulations will be directed toward maintaining Fremont's character as a residential town with a rural atmosphere, balanced by limited commercial and industrial land uses.

The Planning Board seeks to actively control the location, design, and operation of commercial and industrial land uses within appropriately zoned areas.

Visioning sessions and survey results indicate a real interest in controlling commercial and industrial development. Such a goal suggests that the town take a variety of steps including improved zoning for these particular uses, site plan review regulations, and sign control.

Fremont's population growth should be commensurate with its ability to service new residents while continuing to effectively serve existing residents.

Support for growth control was reflected in the visioning sessions and the Town survey. The Town’s Capital Improvement Program (CIP) allows the Town to prioritize capital expenditures from all Town departments and collect impact fees. The Town will update the CIP annually so that it may adapt to changes in the rate of growth and development.

In order to assist in the preservation of Fremont's rural character, the Planning Board seeks to protect its historic resources.

Fremont is fortunate to have a very active Historical Society. The Planning Board supports the recommendation to designate more roads as "Scenic Roads" and encourages the establishment of a Historic District (or Districts) conservatively with the permission of landowners.

The Planning Board continues to encourage the establishment of new public recreational facilities, and the expansion of existing public recreational facilities.

Considerable interest exists among townspeople for public recreational opportunities. Further steps here would be an analysis of existing town lands and the potential for their use as sites for public recreation and an analysis of existing recreational facilities.

Smart Growth and Regional Planning Principles

Fremont Planning Board endorses the concepts outlined by the New Hampshire Office of Energy and Planning as found in their anti-sprawl report entitled, “*Achieving Smart Growth in New Hampshire*” The natural resource related concepts that relate to river protection are enumerated below:

- Maintain traditional compact settlement patterns to efficiently use land, resources and infrastructure investments.

- Preserve New Hampshire’s working landscape by sustaining farm and forest land and other rural resource lands to maintain contiguous tracts of open land and to minimize land use conflicts.
- Protect environmental quality by minimizing impacts from human activities and planning for and maintaining natural areas that contribute to the health and quality of life of communities and people in New Hampshire.
- Manage growth locally in the New Hampshire tradition, but work with neighboring towns to achieve common goals and more effectively address common problems.

Epping – See Lamprey River Section above.

Brentwood

Only a small amount of Brentwood is within the Lamprey watershed and is part of the Piscassic River watershed. Brentwood only has three classes of zoning, and two of these can be found in the watershed. The zoning in the northeastern part of Brentwood is Multi-family/Professional along Route 101, and a slim section of the northwestern section of the watershed is Commercial/Industrial bordering Route 125.

Newfields

The land use in Newfields is classified as agricultural or residential within the Lamprey River watershed. Newfields has seven different land use classifications. The entire Lamprey watershed/Piscassic River area is zoned as Residential-Agriculture. The town has several zoning ordinances in place aimed at protecting the town’s water resources:

Newmarket

Newmarket identifies partnerships and regional groups that need to work together for watershed enhancement. Newmarket calls for working in partnerships with local, regional, state and federal partners to implement strategies to address sustainability of shared water, land and air resources. There are a number of state and federal programs working with the coastal towns to protect and enhance the region’s water resources. These programs include:

- Piscataqua Region Estuaries Partnership – a US EPA National Estuary Program
- The Natural Resources Conservation Service Programs – a lead program within the US Depart. of Agriculture.
- NH Comprehensive Shoreland Protection Act, based out of NH Department of Environmental Services
- Great Bay National Estuarine Research Reserve Program – supported by the National Oceanic and Atmospheric Administration under the US Depart. of Commerce
- Great Bay Resource Protection Partnership, a consortium of local organizations.

To reduce stormwater runoff, Newmarket recommends Low Impact Development (LID) to develop land in a manner that mimics the natural hydrologic functions on the developed landscape. “LID helps to manage the impacts that stormwater runoff has on wetlands, streams, lakes and coastal environments, and recharge natural groundwater aquifers. “ The plan recommends requiring developers who propose any new large developments to conduct a hydrologic analysis to evaluate the cumulative effect of how additional impervious areas in the drainage area might affect the timing and magnitude of peak flow conditions downstream.

Tidal Lamprey

Newmarket – See Piscassic River Section above.

Table 19 Lamprey River Watershed Towns – Land Use Controls

Prepared by Derek Sowers, Piscataqua Region Estuaries Partnership 2010

Table 1 of 12 Fundamentals

Municipality	Conservation Commission?	Code Enforcement Officer?	Natural Resource Inventory in Master Plan?	Natural Resource Chapter in Master Plan?
Barrington	yes	yes	yes	yes
Brentwood	yes	yes	yes	no
Candia	yes	yes	no	yes
Deerfield	yes	yes	yes	yes
Durham	yes	yes	yes	yes
Epping	yes	yes	no	yes
Exeter	yes	yes	no	yes
Fremont	yes	yes	yes	yes
Lee	yes	yes	no	yes
Newfields	yes	yes	no	yes
Newmarket	yes	yes	yes	yes
Northwood	yes	yes	yes	yes
Nottingham	yes	yes	no	no
Raymond	yes	yes	no	yes
Totals	14 (100%)	14 (100%)	7 (50%)	12 (86%)

2 of 12 Wildlife

Municipality	Pre-Development Reviews Required?	Conservation Focus Areas in Nat.Res. Inventory?	Overlay District for Conservation Focus Areas?	Wildlife Action Plan Habitat in Nat.Res. Inventory?
Barrington	no	no	no	No
Brentwood	yes	Yes	no	Yes
Candia	no	No	no	No
Deerfield	no	No	no	No
Durham	yes	No	no	No
Epping	no	No	no	No
Exeter	yes	No	no	No
Fremont	yes	Yes	no	Yes
Lee	no	No	no	No
Newfields	no	No	no	No
Newmarket	yes	Yes	no	Yes
Northwood	no	No	no	No
Nottingham	no	No	no	No
Raymond	no	No	no	no
Totals	5 (36%)	3 (21%)	0 (0%)	3 (21%)

3 of 12 Wetlands

Municipality	Wetlands Protection Ordinance?	Indirect Wetland Impacts Considered?	Designated Prime Wetlands?	Vernal Pools Protected?	Wetland Inventory Done in Past 15 Years?
Barrington	yes	no	yes	yes	no
Brentwood	yes	no	yes	no	yes
Candia	yes	yes	no	no	no
Deerfield	yes	yes	no	no	no
Durham	yes	yes	no	yes	yes
Epping	yes	no	no	no	no
Exeter	yes	yes	yes	no	yes
Fremont	yes	no	yes	no	yes
Lee	yes	no	No	no	no
Newfields	yes	no	No	no	yes
Newmarket	yes	no	Yes	no	yes
Northwood	yes	no	Yes	no	yes
Nottingham	yes	no	No	yes	yes
Raymond	yes	yes	No	no	no
Totals	14 (100%)	5 (36%)	6 (43%)	3 (21%)	8 (57%)

3 of 12 Wetlands (cont.)

municipality	No Vegetation Disturbance Buffer	Septic Setback	Building Setback	Fertilizer Setback
Barrington	0	0	35	0
Brentwood	75	75	100	0
Candia	0	75	100	0
Deerfield	0	100	100	0
Durham	75	125	75	75
Epping	0	50	50	0
Exeter	100	75	100	0
Fremont	0	100	100	0
Lee	0	125	75	0
Newfields	0	50	50	0
Newmarket	75	125	100	0
Northwood	0	75	20	0
Nottingham	0	75	0	0
Raymond	0	75	50	25

4 of 12 Stormwater

Where are the stormwater management provisions in each municipality's regulations?

Municipality	Stormwater Management Ordinance?	Site Plan Regulations?	Subdivision Regulations?	What Size Disturbance Triggers Regulations?
Barrington	No	yes	yes	not stated
Brentwood	Yes	yes	yes	40,000 sq. ft.
Candia	No	no	yes	not stated
Deerfield	No	Yes	yes	not stated
Durham	No	Yes	no	not stated
Epping	No	Yes	yes	not stated
Exeter	No	Yes	yes	40,000 sq. ft.
Fremont	No	Yes	yes	not stated
Lee	No	Yes	yes	not stated
Newfields	No	No	yes	not stated
Newmarket	No	yes	yes	not stated
Northwood	No	yes	no	not stated
Nottingham	no	no	no	not stated
Raymond	yes	yes	yes	20,000 sq. ft.
Totals	2 (14%)	11 (79%)	11 (79%)	11 (79%) ND

ND = not defined

5 of 12 Stormwater (2)

Municipality	Low Impact Development (LID) Required?	Mimic Pre-Development Site Hydrology?	Maximize On-Site Infiltration?	Require Bond From Developers?	Stormwater Utility Fee?
Barrington	No	yes	no	no	no
Brentwood	Yes	yes	yes	yes	no
Candia	No	no	no	yes	no
Deerfield	No	no	no	no	no
Durham	No	yes	yes	yes	no
Epping	No	yes	yes	yes	no
Exeter	No	no	yes	yes	no
Fremont	No	yes	no	yes	no
Lee	No	no	no	no	no
Newfields	No	no	no	yes	no
Newmarket	No	no	no	no	no
Northwood	No	yes	no	yes	no
Nottingham	No	no	no	no	no
Raymond	no	no	yes	yes	no
Totals	1 (7%)	6 (43%)	5 (36%)	9 (64%)	0

6 of 12 Erosion and Sediment

Municipality	Erosion & Sediment Control Ordinance?	Site Plan Regulations	Subdivision Regulations	What Size Disturbance Triggers Regulations?
Barrington	no	yes	yes	not stated
Brentwood	no	yes	yes	20000 sq ft
Candia	no	No	yes	not stated
Deerfield	no	Yes	yes	not stated
Durham	no	Yes	yes	not stated
Epping	no	No	yes	not stated
Exeter	no	Yes	yes	10,000 sq. ft.
Fremont	no	No	yes	not stated
Lee	no	No	No	not stated
Newfields	no	Yes	No	20000 sq. ft.
Newmarket	no	No	Yes	1 acre
Northwood	no	Yes	yes	not stated
Nottingham	no	no	yes	20,000 sq. ft.
Raymond	yes	yes	yes	20,000 sq.ft.
Totals	1 (7%)	8 (57%)	12 (86%)	6 (43%)

7 Of 12 Erosion and Sediment (2)

Municipality	Refer Developer to Technical Manual?	Require Bond From Developers?	Peak Runoff Flow Rate Standard Up To Date?	Site Inspection Composite Score (0-5)
Barrington	yes	yes	yes	5
Brentwood	yes	yes	no	1
Candia	No	yes	no	1
Deerfield	Yes	yes	no	1
Durham	Yes	yes	yes	3
Epping	No	yes	yes	1
Exeter	Yes	yes	yes	2
Fremont	Yes	yes	yes	2
Lee	No	yes	yes	5
Newfields	Yes	yes	no	1
Newmarket	No	no	no	4
Northwood	no	yes	yes	4
Nottingham	yes	no	no	0
Raymond	yes	yes	yes	1
Totals	9 (64%)	12 (86%)	8 (57%)	AVG (2.2)

The higher the inspection score, the more oversight the municipality has.

8 of 12 Drinking Water

Municipality	Wellhead Protection Regulations?	Aquifer Protection Regulations	Source Water Protection District?	Prohibits Large Water Withdrawals for Export?	Water Resource Plan Part of Master Plan?
Barrington	yes	yes	no	no	no
Brentwood	No	yes	no	no	yes
Candia	No	no	no	no	no
Deerfield	No	yes	no	no	no
Durham	No	yes	no	no	no
Epping	No	yes	no	no	yes
Exeter	No	yes	no	no	yes
Fremont	No	yes	no	no	yes
Lee	No	yes	no	no	yes
Newfields	No	yes	no	no	yes
Newmarket	Yes	yes	no	no	yes
Northwood	Yes	yes	no	no	yes
Nottingham	no	yes	no	yes	no
Raymond	yes	yes	no	no	yes
Totals	4 (29%)	13 (93%)	0 (0%)	1 (7%)	9 (64%)

9 of 12 Floodplains

Municipality	National Flood Insurance Program Community?	Hazard Mitigation Plan Completed?	Has Mitigation Plan Resulted in Regulatory Changes?	Mapped Floodplain Overlay District?	Any Prohibitions on Floodplain Development?
Barrington	yes	yes	No	yes	No
Brentwood	yes	yes	No	yes	Yes
Candia	yes	yes	Yes	No	Yes
Deerfield	yes	yes	No	No	Yes
Durham	yes	yes	No	Yes	Yes
Epping	yes	yes	No	Yes	Yes
Exeter	yes	yes	No	Yes	Yes
Fremont	yes	yes	No	Yes	Yes
Lee	yes	yes	No	Yes	Yes
Newfields	yes	yes	No	Yes	No
Newmarket	yes	yes	No	Yes	Yes
Northwood	yes	yes	no	Yes	Yes
Nottingham	yes	yes	yes	Yes	Yes
Raymond	yes	yes	yes	no	no
Totals	14 (100%)	14 (100%)	3 (21%)	11 (79%)	11 (79%)

10 of 12 Impervious Surfaces

Municipality	Aquifer Protection Area	Rural Zone	Residential Zone	Commercial
Barrington	ND	ND	50	50
Brentwood	65	20	ND	ND
Candia	ND	ND	ND	ND
Deerfield	ND	ND	ND	ND
Durham	20	20	33	100
Epping	10	30	40	75
Exeter	10	60	ND	ND
Fremont	10	ND	ND	ND
Lee	10	ND	ND	25
Newfields	25	ND	ND	ND
Newmarket	ND	10	ND	ND
Northwood	ND	ND	ND	50
Nottingham	10	ND	ND	50
Raymond	20	ND	ND	ND
Totals	36 % ND	64% ND	79% ND	57% ND

yellow means high threshold that should be evaluated and potentially lowered

11 of 12 Other Controls

Municipality	Are Conservation Subdivisions Mandatory?	Steep Slope Protection Ordinance?	Charge Development Impact Fees?	Are Septic Regulations More Stringent Than State Regulations?
Barrington	No	no	yes	No
Brentwood	No	no	yes	Yes
Candia	No	no	No	No
Deerfield	Yes	no	Yes	No
Durham	Yes	no	Yes	Yes
Epping	No	no	Yes	No
Exeter	No	no	No	No
Fremont	No	no	Yes	Yes
Lee	Yes	no	No	Yes
Newfields	Yes	no	Yes	No
Newmarket	No	yes	Yes	No
Northwood	No	yes	No	No
Nottingham	no	no	no	Yes
Raymond	yes	yes	yes	no
Totals	5 (36%)	3 (21%)	9 (64%)	5 (36%)

12 of 12 Non regulatory

Municipality	Town Has an Open Space Plan?	Worked on Land Conservation in Past Year?	Placed Easements on Town-Owned Lands?	Raised Public Funds for Land Conservation?	Value of Bond or Appropriation
Barrington	no	yes	yes	yes	800000
Brentwood	yes	yes	yes	yes	2500000
Candia	yes	yes	No	yes	216742
Deerfield	yes	yes	No	yes	1200000
Durham	No	yes	Yes	yes	2500000
Epping	Yes	yes	Yes	yes	150000
Exeter	Yes	yes	Yes	yes	2500000
Fremont	Yes	yes	Yes	yes	1500000
Lee	Yes	yes	Yes	yes	3503100
Newfields	No	yes	Yes	yes	2000000
Newmarket	Yes	no	Yes	yes	200000
Northwood	Yes	yes	No	yes	0
Nottingham	no	yes	Yes	yes	850000
Raymond	yes	yes	no	no	0
Totals	10 (71%)	13 (93%)	10 (71%)	13 (93%)	\$17,919,842

(d) Water Quantity

List the location of all operating stream gauge stations maintained by the U.S. Geological Survey, U.S. Army Corps of Engineers or the Department of Environmental Services. Include the number of years of record and whether it is a partial or full record station.

Lamprey River at Packers Falls, Durham

The US Geological Survey operates a continuous-record gaging station on the Lamprey River at Packer's Falls. This station has been in operation since July of 1934.

(<http://wdr.water.usgs.gov/wy2009/pdfs/01073500.2009.pdf>)

DESCRIPTION:

Latitude 43°06'09", Longitude 70°57'11" NAD27

Strafford County, New Hampshire, Hydrologic Unit 01060003

Drainage area: 183 square miles

Datum of gage: 38.28 feet above sea level NGVD29.

AVAILABLE DATA:

Data Type	Begin Date	End Date	Count
Real-time	-- Previous 120 days --		
Daily Data			
Discharge, cubic feet per second	1934-07-24	2010-05-29	27700
Daily Statistics			
Discharge, cubic feet per second	1934-07-24	2009-09-30	27463
Monthly Statistics			
Discharge, cubic feet per second	1934-07	2009-09	
Annual Statistics			
Discharge, cubic feet per second	1934	2009	
Peak streamflow	1935-01-11	2008-03-11	74
Field measurements	1985-03-14	2010-04-30	158
Field/Lab water-quality samples	1953-10-20	1999-09-07	214
Additional Data Sources	Begin Date	End Date	Count
Instantaneous-Data Archive **offsite**	1990-10-01	2008-09-30	428536
Annual Water-Data Report (pdf) **offsite**	2006	2009	4

OPERATION:

Record for this site is maintained by the USGS New Hampshire Water Science Center

Of particular interest is the historical flow data for this station. Three of the top five historic crests for the Lamprey River at this site have all occurred in the past five years. Climate change effects are very evident in the storm frequency and storm intensity. Record amounts of rainfall have been observed in a 24 hour period with several of these high flow events.

Langford Road Bridge, Raymond

A second full station is located on the Lamprey River at Langford Road in Raymond. Established in July of 2008, this station is part of a 2-year multipurpose streamflow monitoring network expansion project for 15 new stream gauges across New Hampshire. The expansion project was requested by the New Hampshire Rivers Management Advisory Committee (RMAC), proposed by the Stream Gage Task Force (SGTF), and funding for installation was provided by the New Hampshire Legislature. Station operated in cooperation with the New Hampshire Department of Environmental Services. This station managed by the Pembroke, NH Field Office.

(<http://wdr.water.usgs.gov/wy2009/pdfs/01073319.2009.pdf>)

DESCRIPTION:

Latitude 43°02'32", Longitude 71°12'04" NAD27
 Rockingham County, New Hampshire, Hydrologic Unit 01060003
 Drainage area: 55.7 square miles
 Datum of gage: 182.49 feet above sea level NAVD88.

AVAILABLE DATA:

Data Type	Begin Date	End Date	Count
Real-time	-- Previous 120 days --		
Daily Data			
Discharge, cubic feet per second	2008-07-01	2010-05-17	685
Field measurements	2008-07-03	2010-05-04	24

OPERATION:

Record for this site is maintained by the USGS New Hampshire Water Science Center

(e) Riparian Interests/Flowage Rights

Under New Hampshire common law, owners of frontage on surface waters have riparian rights to divert or withdraw surface waters as long as the use is reasonable with respect to uses of other riparian owners and has no undue adverse effect on public trust uses of surface waters. Describe riparian interests within the corridor, including any existing or planned water withdrawals not previously listed under the Managed Resources section. Also describe any legislatively granted water rights such as a town given legislative authorization to surface waters for public water supply in the 19th century. DES has an inventory of legislatively granted water rights.

Include any known flowage rights. Flowage rights are recorded easements granted by property owners to dam owners to allow operation of a dam to flow or flood their land. Many older dams do not have recorded flowage rights.

Historical legislatively granted water use rights for public water supplies have been issued for several towns in the watershed; Durham, Newmarket, Epping, Lee and Raymond were all given the right to use the Lamprey River and its tributaries for public water supplies (NH Chapter 335, Laws of 1965). Currently, the only town using the Lamprey River as its public water supply is Durham (and the University of New Hampshire). The primary water supply for Durham is the Oyster River; the town has historically used the Lamprey River as a secondary source. This water transfer from the Lamprey River to Durham is located in the currently designated section of the Lamprey River.

Additional legislatively granted riparian interest within the proposed river corridors include the establishment of several municipal water works, including:

Durham Water Works (NH Chapter 332, Laws of 1965)
 Exeter Water Works (NH Chapter 220, Laws of 1893)
 Newfields Water Works (NH Chapter 299, Laws of 1893)
 Newmarket Water Works (NH Chapter 289, Laws of 1893)
 Northwood Water Works (NH Chapter 150, Laws of 1890)
 Nottingham Water Works (NH Chapter 138, Laws of 1893)

In recent years, the town of Newmarket has explored the feasibility of using the Lamprey River to recharge aquifer that serves as the Newmarket water supply. However, Newmarket has moved away from this and is seeking permits for two wells in the vicinity of the Piscassic River. The town of Raymond has also begun exploring the feasibility of installing wells within the Lamprey River corridor. The town of Durham is also considering using the Lamprey River to recharge an aquifer that serves as a public water supply.

All other information regarding withdrawals, discharges and flowage rights can be found in the Managed Resources Section of this document.

VIII. RIVER POINT EVALUATION SUGGESTION AND JUSTIFICATION

			Suggested Points to be Awarded						
Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
NATURAL RESOURCE CATEGORY		205							
(a) Geologic Resources		30							
(1) national or regional significance	30								Each river has significant aquifers and sand and gravel resources.
(2) statewide significance	20		20	20	20	20	20	20	Each river has significant sand and gravel deposits and stratified drift aquifers. Pawtuckaway and Lamprey drainage areas share volcanic dikes in Pawtuckaway State Park.
(3) local significance	10								
(b) Wildlife Resources		30							
(1) endangered or threatened species		15							Each river has threatened and/or endangered species
a. national significance	15		15						The bald eagle listed for the Lamprey River
b. statewide significance	10		15	15	15	15	15	15	Each river has state listed species that are threatened or endangered
(2) significant wildlife habitat		10							
a. Habitat that is within a conservation focus area or that is known to have contained or currently contains state or federally listed endangered or threatened species	10		10	10	10	10	10	10	Each river has extensive area of highest ranked habitat for the state and conservation focus areas.
b. Habitat that is within an area of highest quality habitat statewide or highest quality in the biological region and/or is a habitat for a species of special concern	5								
c. Habitat that is within an area of supporting landscapes or that contains other species of greatest conservation moderately diverse	3								
d. Adjacent habitat	1		1	1	1	1	1	1	Substantial acreage of supporting habitat

Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
(3) fish reproduction		5							
a. natural reproduction	5			5					No stocking occurs
b. some stocking	3		3		3	3	3	3	
c. stocking	1								
(4) anadromous fish		5	5						The Lamprey is a "reference river"
a. reproducing populations of diadromous fish	5		5						Access to the Wiswall Dam
b. restoration begun	3								
c. documented restoration plan	1								
(e) Water Quality		30							
(1) Class A	30							30	
(2) Class B	15		15	15	15	15	15		
(f) Open Space	10 per occurrence	30	30	30	30	30	30	30	Significant numbers and acres of conservatin easment lands, state parks, town owned forests.
(g) Natural Flow Characteristics		30							
(1) 100 percent free-flowing	30			30	30	30			Either ruins, beaver dams or no dams
(2) largely free-flowing	15		15				15	15	Several operational dams
SUBTOTAL NATURAL RESOURCES		205	209	191	189	194	169	189	
Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
MANAGED RESOURCE CATEGORY		90							
(a) Impoundments		30	30	30		30	30	30	DRED owned Beaver Dam on North Branch River. No dams on Pawtuckaway in nominated reach.
(b) Water Withdrawals and Discharges		30							
(1) water withdrawals		20							
a. existing public drinking water supply	10		10					10	Raymond, Epping, Durham and Newmarket public water supplies of Lamprey River.
b. potential public drinking water supply	5								
c. existing industrial water supply	5		5	5		5		5	Epping and Newmarket use Lamprey or Piscassic River for sewage treatment. Saw mill in Nottingham uses North River water.
d. potential industrial water supply	3								
e. existing agricultural water supply	5			5					Scenic Nursery uses North Branch River for irrigation.
f. potential agricultural water supply	3								
(2) wastewater discharges		10							

Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
a. wastewater treatment facility discharge	10		10			10	10		Epping and Newmarket WWTF discharge to Lamrpey River.
b. industrial wastewater discharge	5					5	5		Saw mill in Nottingham discharges to North River. Little River has surface water return permit
(c) Hydroelectric Resources		30							
(1) existing hydroelectric power production	30					30			inactive
(2) potential hydroelectric power site	15								
SUBTOTAL MANAGED RESOURCES		90	55	40	0	80	45	45	
Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
CULTURAL RESOURCE CATEGORY		60							
(a) Historical or Archeological Resource		30							
(1) national significance	30		30	30		30	30	30	Multiple historic structures on national register
(2) regional significance	15								
(3) statewide significance	10				10				State listed historic structures
(b) Community River Resource	10 per occurrence	30	30	30	30	30	30	30	All of the towns withing the corridors have significant language about eh protection and preservation of the river in their master plans.
SUBTOTAL CULTURAL RESOURCES		60	60	60	40	60	60	60	
Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
RECREATIONAL RESOURCE CATEGORY		120							
(a) Fishery		30							
(1) Year-round coldwater, warmwater, and saltwater fish species fish habitat.	30		30						The Lamprey has all fish habitats
(2) Year-round habitat for 2 or more coldwater, warmwater or saltwater fish species.	20				20	20	20	20	Each river has significant recreational fishing opportunities
(2) Year-round habitat for either coldwater, warmwater or saltwater fish species.	10			10					
(b) Boating		30							

Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
(c) Other Recreation	10 per occurrence	30	30	5	20	25	20	15	Except for the Lamprey, limited to kayaks and canoes, some with portages.
(d) Public Access		30							
(1) on publicly-owned land	30		30	30			30	30	State parks and town owned land
(2) on privately-owned land	15				15	15			Several access points for boating, fishing or walking
SUBTOTAL RECREATIONAL RESOURCES		120	90	45	55	60	70	65	
Category	Points Available	Maximum Points	Lamprey River	North Branch River	Pawtuckaway River	North River	Little River	Piscassic River	Justification for Points
OTHER RESOURCE CATEGORY		120							
(a) Scenery		30	30	30	30	30	30	30	Many places on each river are considered scenic by locals and visitors from away.
(b) Land Use		30							
(1)high quality scenic and natural resources; corridor generally undeveloped or limited to forest management or scattered housing	30			30	30			30	These rivers are remote
(2)corridor partially to predominantly used for agriculture, forest management and residential housing	20		20			20	20		These rivers are used by people for recreation, agriculture and residences. Little development except for downtown Raymond, Epping and Newmarket.
(3)corridor populated; some residential or other building developments; readily accessible by road	10								
(4)corridor highly populated; contains significant development	5								
(c) Land Use Controls	10 per occurrence	30	30	30	30	30	30	30	All towns have river protection ordinances.
(d) Water Quantity		30	30			30			There are two gauging stations on the Lamprey and one on the North River.
SUBTOTAL OTHER RESOURCES		120	110	90	90	110	80	90	
TOTAL POINTS		595	524	426	374	504	424	449	