

Nomination of the Warner River to the New Hampshire Rivers Management and Protection Program



Autumn at the Headwaters: Confluence of the West Branch and Andrew Brook, Bradford. Photo Credit: Scott MacLean

**Submitted by the
Warner River Nomination Committee**

**With assistance from the
Central New Hampshire Regional Planning Commission**

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River Nomination Form

New Hampshire Rivers Management and Protection Program



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) 271-2959.

I. NOMINATION INFORMATION

1. Name of River: **Warner River**

2. River/River Segment Location (and start/end points) and Length (miles): **20.05 miles**

The Warner River and the West Branch of the Warner River, starting from the confluence of the West Branch of the Warner River and Andrew Brook in Bradford and ending at the confluence of the Warner and Contoocook Rivers in Hopkinton.

3. (a) Sponsoring Organization or Individual: **Central New Hampshire Regional Planning Commission (CNHRPC) – on behalf of the Warner River Nomination Committee (WRNC)**

(b) Contact Person: **Sam Durfee**

(c) Address: **28 Commercial Street, Suite 3, Concord, NH 03301**

(d) Daytime Telephone Number: **603-226-6020**

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:

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.

Natural Resources

	Value Present Local Significance	Value Present Regional Significance	Value Present Statewide Significance
Geologic or Hydrologic Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wildlife Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vegetation/Natural Communities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fish Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rare Species or Habitat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Water Quality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Open Space	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Natural Flow Characteristics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Managed Resources

	Value Present Local Significance	Value Present Regional Significance	Value Present Statewide Significance
Impoundments	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water Withdrawals/Discharges	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydroelectric Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Cultural Resources

	Value Present/ Local Significance	Value Present Regional Significance	Value Present/ Statewide Significance
Cultural/Historical/Archaeological Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Community Resources	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Recreational Resources

	Value Present/ Local Significance	Value Present Regional Significance	Value Present/ Statewide Significance
Fishery Resources	☒	☒	☒
Boating Resources	☒	☒	☒
Other Recreational Resources	☒	☒	☒
Public Access	☒	☒	☐

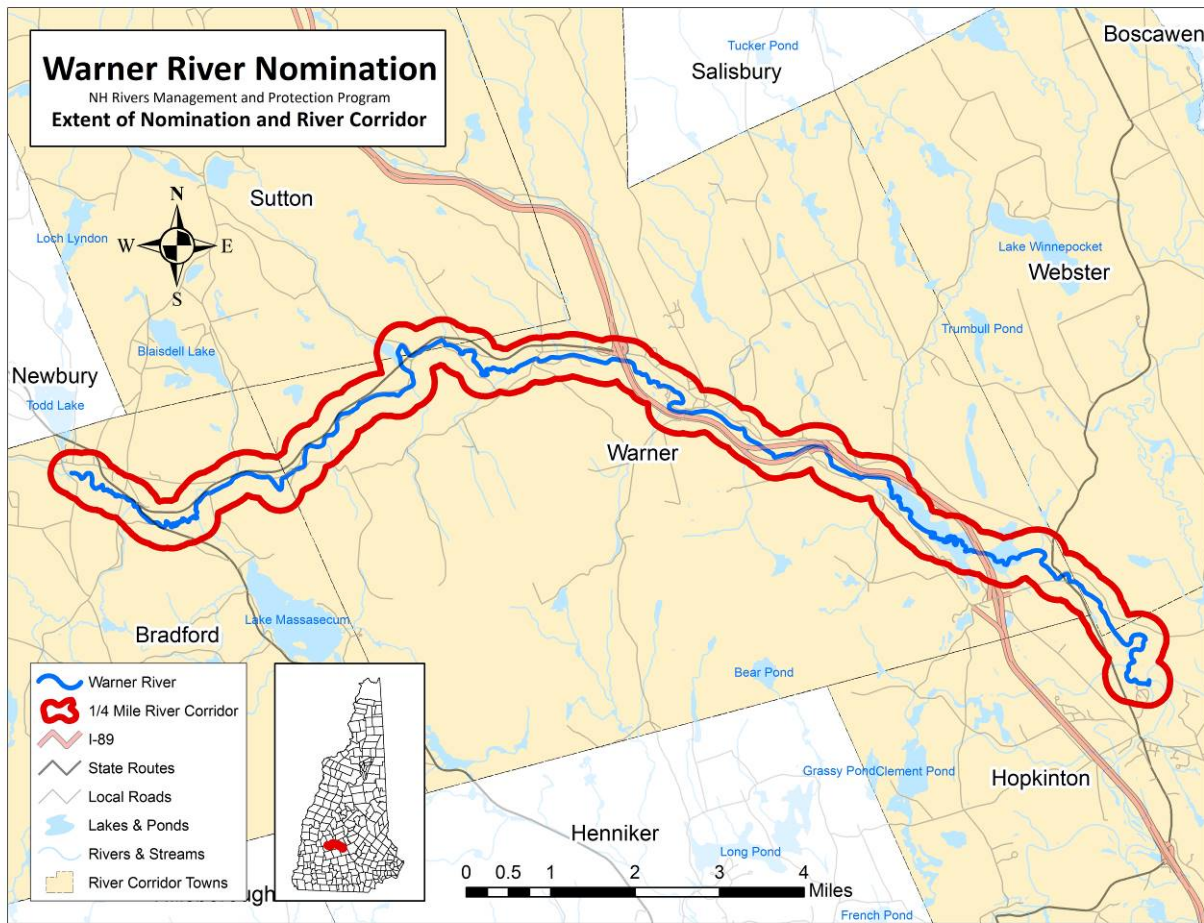
Other Resources

	Value Present/ Local Significance	Value Present Regional Significance	Value Present/ Statewide Significance
Scenic Resources	☒	☒	☒
Land Use	☒	☒	☐
Land Use Controls	☒	☒	☐
Water Quantity	☒	☒	☒
Riparian Interests/ Flowage Rights	☒	☒	☐
Scientific Resources	☒	☒	☒

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 Warner River, a fifth order stream, flows for just over 20 miles, cutting and meandering its way from its headwaters in Bradford Tall Pines Natural Area to its confluence with the Contoocook River in Hopkinton which maintains a designation status of its own. With a watershed drainage basin of over 148 square miles across Merrimack and Sullivan Counties, the Warner River is an integral part of New Hampshire’s landscape. This river provides many valuable resources, and helps define the five communities it flows through (Bradford, Sutton, Warner, Webster, and Hopkinton). While collaborative management and planning efforts exist, there is no formal mechanism for facilitating coordinated cooperation relative to river issues. Designation under the Rivers Management and Protection Program would afford this

opportunity for cooperation across municipal boundaries while providing the support necessary to manage and maintain the Warner River corridor into the future.



The most important resource values present in the Warner River are as follows:

1. Natural Resources: The Warner River forms a natural greenway corridor between multiple large protected open space areas including the Chandler Reservation in Warner, the Warner Town Forest and the Mount Kearsarge State Forest Park which stretches into Sutton, Wilmot, Andover, and Salisbury. There are numerous other publicly and privately protected open spaces throughout the river corridor which provide habitat, movement corridors, and public access to the river's resources. The habitat within the river corridor and connected open space provided to the local flora and fauna is paramount to maintaining a healthy and diverse ecosystem which serve to benefit the local communities through a variety of ecosystem services.

A number of rare, threatened, and endangered plant and animal species are documented within the river corridor including the American water-awlwort, Common Loon, and Wood Turtle. Significant areas of high quality habitat can also be found along the Warner River, as identified in the New Hampshire Wildlife Action Plan. The Warner River and several its

tributaries are stocked with Brook and Rainbow Trout every year. In several areas, the banks of the Warner River are dominated by invasive Japanese Knotweed and Oriental Bittersweet. Variable Milfoil is also a concern as it has been documented in Lake Massasecum and the Contoocook River. Tracking and managing invasive species could be a future task of a Local River Management Advisory Committee (LAC).

2. Recreational and Cultural Resources: A wide variety of recreational activities are available to community residents and visitors to the Warner River. Seasonally variable flow conditions offer whitewater opportunities unique to this part of the State including numerous class IV rapids and a three-foot dam sluice in Warner. American Whitewater identifies the Warner River as a highly popular destination due to its large watershed, long whitewater season and incredible in-stream features. Several dams along the river impound sizeable swimming holes that are enjoyed during the summer months. Many access points exist as the river parallels NH 103 for a significant length, encouraging frequent use and enjoyment of the river.

New Hampshire Fish and Game's stocking program, in conjunction with the river's naturally variable aquatic habitat, provide anglers with several excellent fishing spots. Fish and Game's Freshwater Fishing Guide claims the Warner River to be an excellent location for brook and rainbow trout fishing. The River corridor is a hot bed for wildlife observation due to the proximity of large areas of conserved open space and the adjacent Mink Hills offer renown hunting prospects. There is also an effort to develop a rail-trail that would parallel the Warner River and link Bagley Field to Riverside Park in Downtown Warner up to the I-89 Exit 9 commercial area.

3. Managed and Community Resources: The Town of Warner taps the aquifers underneath the Warner River for its water supply. Many homes have private wells yet none draw from the River itself. The Warner Village Water District has voiced their support for the project in recognition of the importance of high water quality. The Warner Waste Water Treatment Plant is the only registered discharge into the Warner River and there are no registered water withdrawals.

There is a desire within the town of Warner to develop hydroelectric facilities on the river. This is in step with the river's industrial history a century ago, once playing host to many mills along the river. A degree of energy independence provided by future hydroelectric development is important to several members of the public and the nomination committee believes it is quite possible to balance the hopes for hydroelectric development and the protection of habitat and recreational opportunities. The communities through which the Warner River flows have all recognized the importance of protecting riparian lands and have language present in their respective master plans outlining best practices for land use and development along waterbodies.

In short, the Warner River is integral to the communities through which it flows. As a dynamic and highly interconnected system, it is increasingly important for the towns in the corridor to establish a formal mechanism through which they can thoughtfully plan and manage the river as a whole. Without such a collaborative effort, these communities may gradually find it more

difficult to protect the shared river resources and productively address issues relating to public safety, land use and development, and regional resources. Designation of the Warner River to the New Hampshire Rivers Management and Protection Program would set up an inter-municipal forum enabling a continued conversation pertinent to long-term strategies for the river's protection and management.

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, and documentation that written notice to riparian landowners has been provided.

1. Impetus for the Nomination: In 2012 Ben Nugent, a cold-water fisheries biologist with NH Fish & Game, approached the Warner Conservation Commission (WCC) with a proposal to add the Warner River watershed to his assessment of NH rivers and streams that still support populations of wild brook trout. Since raising the public's awareness of opportunities to conserve Warner's natural environment is key to the mission of the WCC, the Commission partnered with Mr. Nugent and George Embley of Basil Woods Trout Unlimited to engage area volunteers and wildlife experts to learn more about the water quality, insects and conditions necessary to support native brook trout in our region. Survey results indicated that two-thirds of the streams studied in the Warner River watershed are home to these beautiful fish; they inhabit some very unlikely streams, and excellent stream water quality has been the key to their survival. The project has expanded to include identifying barriers, such as elevated culverts, to their natural movement in the streams. These inadequate road-stream crossings can also increase stream erosion and flood risk.

In an effort to protect the water quality that enables the wild trout to thrive in the watershed the WCC approached Central New Hampshire Regional Planning Commission to assist in the formation of a nomination document. The Warner River Nomination Committee is composed of members representing a variety of interests from the five towns through which the river flows. The Nomination Committee began meeting monthly in November of 2015.

2. Public Outreach: On April 20th, 2016, an initial river-wide public information meeting was held in Warner to introduce the nomination process. The Warner Nomination Committee and CNHRPC sent mailers to riparian landowners, distributed press releases to local news

sources, and posted previous meeting minutes on the Warner town website under the Conservation Commission.

It was clear from the initial public information session that further public outreach and education was required. Additional information sessions were held in each of the river corridor towns. Riparian landowners were sent notice as first class mail and notice was also posted in town halls and various town publications for the following dates:

- Warner – November 16, 2016
- Bradford – November 17, 2016
- Sutton – November 21, 2016
- Webster – November 29, 2016
- Hopkinton – December 19, 2016

The public information sessions were preceded by brief presentations to the Boards of Selectmen of each town on the following dates:

- Webster – October 11, 2016
- Bradford – October 17, 2016
- Sutton – October 25, 2016
- Warner – November 10, 2016
- Hopkinton – December 12, 2016

In addition to the public information sessions there were various other outreach events where the Warner River Nomination was either the primary focus of the event or at least brought up and discussed. Appendix D provides a summary of these events.

3. Community and Public Support: In addition to the public meeting, the Warner River Nomination Committee solicited support from municipal boards, community organizations, and a range of nonprofit groups. Thus far, the following entities have provided letters of support for the nomination:

- American Whitewater – July 11, 2017
- Clinton Begley – July 11, 2017
- Webster Conservation Commission Addendum – May 26, 2017
- Warner Planning Board – May 23, 2017
- Trout Unlimited: New Hampshire Council – May 23, 2017
- The Nature Conservancy – May 15, 2017
- Webster Planning Board – April 28, 2017
- Warner Historical Society – April 27, 2017
- Hopkinton Planning Board – April 11, 2017
- Upper Merrimack LAC – April 11, 2017
- New Hampshire Rivers Council – March 21, 2017
- Trout Unlimited: Basil W. Woods, Jr. Chapter – March 2, 2017

- Warner Conservation Commission – February 1, 2017
- New Hampshire Fish & Game Department – January 31, 2017
- Hopkinton Conservation Commission – January 23, 2017
- Warner Board of Selectmen – January 17, 2017
- Sutton Conservation Commission – December 28, 2017
- Webster Conservation Commission – December 19, 2016
- Hopkinton Board of Selectmen – December 5, 2016
- Frank Moltz and Laura Russell: Warner Residents – November 30, 2016
- Warner Village Water District – November 28, 2016
- David Halsted: Bradford Resident – November 17, 2016
- Judith Anderson: Bradford Resident – November 17, 2016
- David B. Gaudes Sr.: Bradford Resident – November 14, 2016
- Scott A. Biron: Outdoorsman and angler on the Warner River – November 12, 2016
- Lake Massasecum Improvement Association – November 3, 2016
- Sutton Board of Selectmen – October 24, 2016
- Bradford Board of Selectmen – October 17, 2016
- Bradford Conservation Commission – October 17, 2016
- Webster Board of Selectmen – October 11, 2016
- The Contocook and North Branch Rivers LAC – April 29, 2016
- The New England Grassroots Environmental Fund – May 26, 2016
- Michael & Shirley Dorrington: Warner Residents – April 22, 2016

IV. OTHER SUPPORTING INFORMATION

Explanation: In addition to the information provided on this nomination form, sponsors are encouraged to submit any other information which they believe will support the nomination of the river. This information may include a visual presentation, for example, a slide program or a map showing the location of significant resources, or studies and reports on the river.

Instructions: List what, if any, additional supporting information has been submitted with this river nomination.

The following items are attached to this nomination as appendices:

- **Appendix A:** Map Set – please see Section VI for a complete listing of maps
- **Appendix B:** Letters of Support
- **Appendix C:** Documentation of Riparian Landowner Notification
- **Appendix D:** Public Notice of Information Sessions & Summary of Outreach Efforts
- **Appendix E:** Press Release
- **Appendix F:** Warner Watershed Study
 - **Appendix F1:** Species Profiles
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- **Appendix G1:** Comparative Analyses – SWQPA & Local Zoning Ordinances
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- **Appendix I:** The Status of Stream Crossings in the Warner River Watershed

A notable study has been undertaken by FEMA relative to the severity and unpredictability of flooding along the Warner River:

Federal Emergency Management Agency, July 2008. *Independent Evaluation of Recent Flooding in New Hampshire*. FEMA, Washington, DC. Available at <http://www.fema.gov/library/viewRecord.do?id=3374>.

This study examined the impacts of widespread flooding and property damage in 2006 and 2007 in central and southeastern parts of New Hampshire. FEMA's subcontractors prepared this report to better understand why and how the flooding occurred at such high levels of severity, whether flooding was exacerbated by manmade causes, and to recommend future actions to prevent and ameliorate flooding impacts. The study noted that flooding along the Warner River was more difficult to predict than with many other rivers in the state. The three main recommendations of the study were to: 1) improve floodplain management; 2) improve flood forecasting; and 3) take a watershed approach to flood operations and dam coordination. FEMA also recommended the implementation of Vermont's Fluvial Erosion Hazard methodology in New Hampshire; determining benefits and costs of potential dam improvements, and ensuring that flashboard operations at dams can be operated safely.

V. RIVER CLASSIFICATIONS

Explanation: Each river or river segment that is designated by the state legislature will be placed into a river classification system. This classification system consists of four categories: natural, rural, rural-community and community rivers. Refer to Appendix A in the Guide to River Nominations, for a complete description and explanation of the river classification system and the instream protection measures which have been adopted by the state legislature for each classification. In this part of the nomination form, DES and the state Rivers Management Advisory Committee are interested in learning which river classification(s) you believe is most appropriate for your river.

Note: If tidal or tidally influenced sections of river are included in your nomination be sure to include the recommended downstream extent of the section(s) suggested by the NH Fish and Game Department and the Piscataqua Regional Estuaries Project.

Instructions:

1. River Segment Criteria

For each classification criteria listed below (a-d), check the one box that most accurately describes the nominated river or segment. Please note if any section of the river is tidal or tidally influenced.

(a) General Description

	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 that 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

	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

	The actual water quality of the river or segment meet Class A standards under the state's water quality standards. (Natural Rivers)
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X	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)
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(d) Distance to Roads

	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

2. River Segments

Based on the boxes checked above, and your knowledge of the river or segment, identify those segments of the river that you believe should be classified as either a Natural, Rural, Rural-Community, or Community River. Be sure to include the start and end point of each segment and the length of the segment in miles (for example: Natural River: headwaters, Z miles, to the Town of ABC town line; Rural River: Town of ABC town line, Y miles, to the state border). Although a river or segment may be given more than one classification, the number of differently classified segments should be kept to a minimum. If your recommendation is incompatible with any of the above-listed criteria for a particular river classification, and you believe the classification is nevertheless appropriate and justified, explain why.

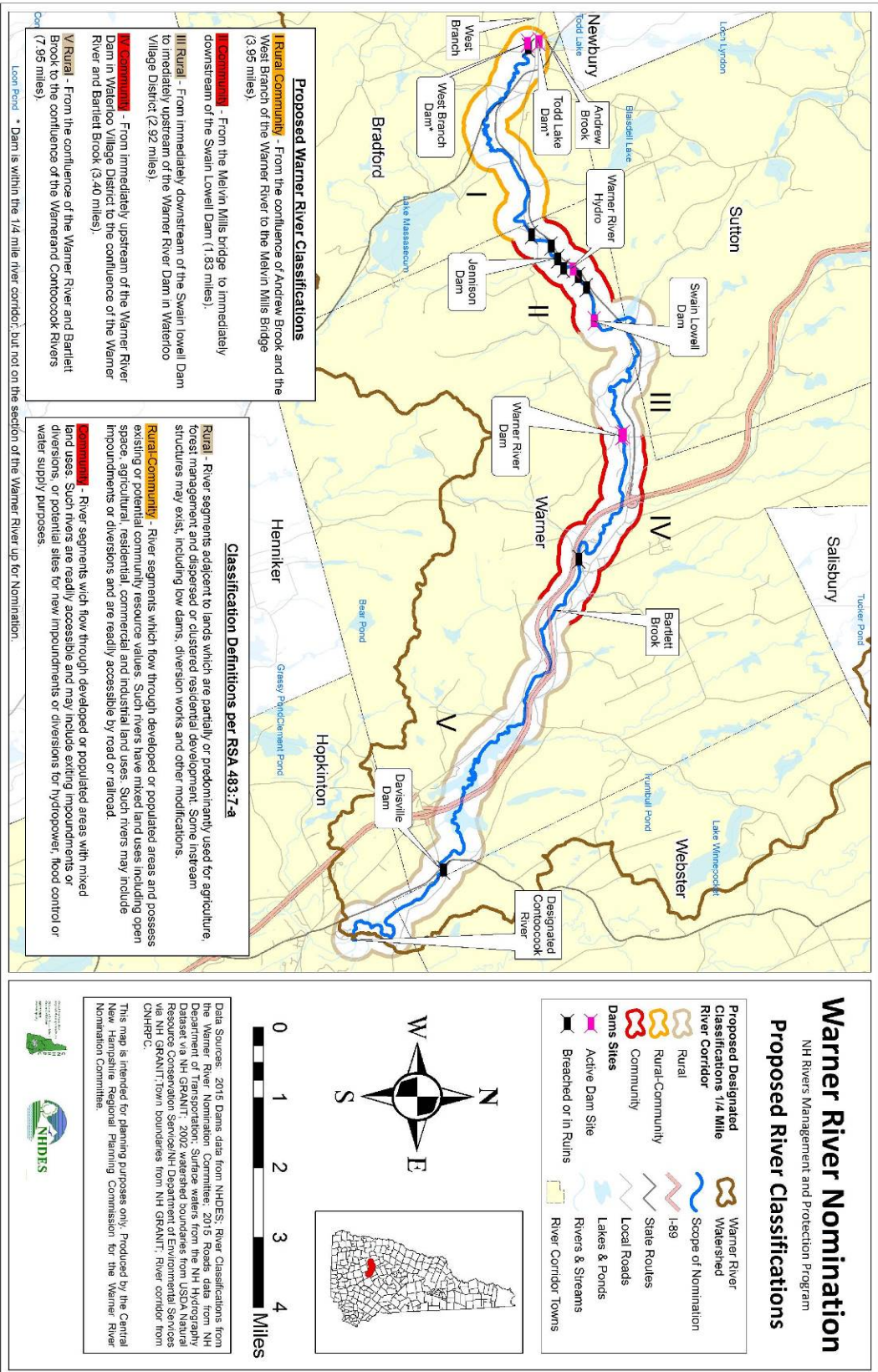
Map A depicts the proposed classifications along the length of the Warner River.

Rural River – 54.2% (of total river length): From immediately downstream of the Swain Lowell Dam to immediately upstream of the Warner River Dam in the Waterloo Village District (2.92 miles)*; and from the confluence of the Warner River and Bartlett Brook in Warner to the confluence of the Warner and Contocook Rivers (7.95 miles).

Rural-Community River – 19.7%: From the confluence of the West Branch of the Warner River and Andrew Brook in Bradford to the Melvin Mills bridge in Warner (3.95 miles).

Community River – 26.1%: From the Melvin Mills bridge to immediately downstream of the Swain Lowell Dam (1.83 miles); and from immediately upstream of the Warner River Dam at Waterloo to the confluence of the Warner River and Bartlett Brook (3.40 miles).

* While this section of Rural River does not meet the required length of three (3) miles, it could be argued that given the ever-changing nature of rivers and depending on how the river was measured the existing 2.92 miles should suffice.



Map A. Proposed Warner River Classifications

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.

The following maps of the nominated river or segment must be appended to this resource assessment. Additional maps may be included.

1. A map of the nominated river or segment 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.
2. A map of the nominated river or segment indicating stream order, as determined using the New Hampshire hydrography dataset archived by the geographically referenced analysis and information transfer system (GRANIT) at the complex research center of the University of New Hampshire. The map must also include municipal boundaries, major roads, and tributary streams.

By checking the appropriate box or boxes below, the sponsor acknowledges that the checked statement(s) apply to the nominated river or segment(s) based on the river's stream order(s) as depicted in the map:

- All fourth order and higher river segments are subject to RSA 483-B whether or not they are designated pursuant to RSA 483:15.
 - Not applicable. All nominated segments of the river are third order or lower.
- Any third order or lower river segments designated pursuant to RSA 483:15 prior to 2017, subject to the exceptions pursuant in RSA 483:15, are subject to RSA 483-B.
 - Not applicable. All nominated segments of the river are fourth order or higher, or were not designated prior to 2017.
- All third order or lower river segments approved for designation in 2017 or later shall be subject to the standards and requirements in RSA 483-B applicable to those protected shorelands within 50 feet of the reference line, as specified in RSA 483-B:4, XV.
 - Not applicable. All nominated segments of the river are fourth order or higher, or were designated prior to 2017.

All maps may be found in Appendix A

VII. RESOURCE ASSESSMENT

1. Natural Resources

(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 Warner River is located in the Eastern New England Uplands and contains primarily Paleozoic Era rock. Bedrock geology (below) in the region is associated with the Central New Hampshire Anticlinorium, which is a major fold in the geologic strata created during the Acadian orogeny (375 Mya). This is the same mountain building event which created the Appalachian Mountains. As such, the region contains primarily Devonian and Silurian metamorphic rock such as gneiss, schist, and some quartzite. The Warner River Valley consists primarily of the Kinsman Granodiorite Formation, Littleton Formation, Madrid Formation, and the Spaulding Tonalite. While the River does not cross any active faults, it does cross multiple formation contact lines and there is always the potential for blind and dormant faults yet to be identified.

There has historically been minor commercial extraction of metamorphic minerals along the Warner River. Deposits of Almandite ($\text{Fe}_3\text{Al}_2(\text{SiO}_4)_4$) have been found near the West Branch of the Warner River near its headwaters in Bradford, NH. Almandite is a common type of Garnet in New Hampshire, which is primarily found in schist and gneiss. While perfect un-fractured specimens have been used as gemstones in certain cases, it was primarily used as an industrial abrasive before the advent of cheaper synthetics. In Warner, NH, Soapstone ($\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$) was extracted for use in stoves and hearthstones. Soapstone is a soft metamorphosed-talc schist with heat resistant properties, making it ideal for carving and use in heating elements. Neither of these minerals are mined today.

Large sections of land along the entirety of the Warner River have the potential to be used for farmland due to favorable soil quality. Near the headwaters, the soil is primarily deposited till, or unsorted sediment from the Wisconsin glacial episode. It contains Monadnock Sandy Loam and the Tunbridge-Lyman-Becket Complex soil types. This is intermixed in places with stratified sand and gravelly outwash. This upper portion of the river primarily contains farm land of local importance. In the lower sections the soil becomes sandier, and is primarily outwash from metagranites and schists further upstream. Prime farmland in this downstream area, specifically near the junction of the Contoocook River, tends to be set back slightly from the channel to avoid seasonal flooding, but still makes use of the fertile areas across the greater flood plain and remnant fluvial terraces to great agricultural effect. Productive soil types in this region include Adams Loamy and the Champlain-Woodstock Complex, which are predominantly

fluvial in deposition. These lower portions of the river corridor contain farmland of both local and state importance.

Overall, the ¼ mile Warner River Corridor impacts over 9,700 acres of land suitable for agriculture. Of this land, over 9000 acres have been deemed farmland of significant *local importance*, and over 230 acres have been marked as farmland having greater *state importance*.

Glaciers were last present in the Warner River Valley during the Pleistocene Epoch (2.59 -0.012 million years ago (Ma)). When the continental glaciers of the Wisconsin Glacial Episode began to retreat, they left behind moraines of loose unsorted sediment known as till. However, as the ice continued to melt, and water runoff increased, stratified-drift deposits were also emplaced along streams, channels, and lakes. These deposits are different from till in that they are sorted into distinct gravel and sediment bands based on clast size. Where now saturated with water, these deposits form stratified-drift aquifers. The location and transmissivity of these aquifers in relation to the Warner River is displayed in **MAP 2: Stratified-Drift Aquifers**, in Appendix A of this nomination document. The most expansive aquifers are found near the termination of the Warner River, as this was once the site of a glacial lake. However, aquifers with relatively high transmissivity can be found along the entirety of the river channel. These Warner River aquifers play a vital role in supplying the municipal water supplies for the towns of Hopkinton and Warner, where over 20,000 gallons of water are drawn per day. To yield these large quantities of water without disruption the aquifer must constantly be recharged by infiltrating groundwater, and it is possible that the Warner River supplies a large portion of the groundwater to keep these wells from facing disruptions. The river itself could be a potential source of drinking water; however, the wells served by the aquifer are adequate for the time being.

[Sources:

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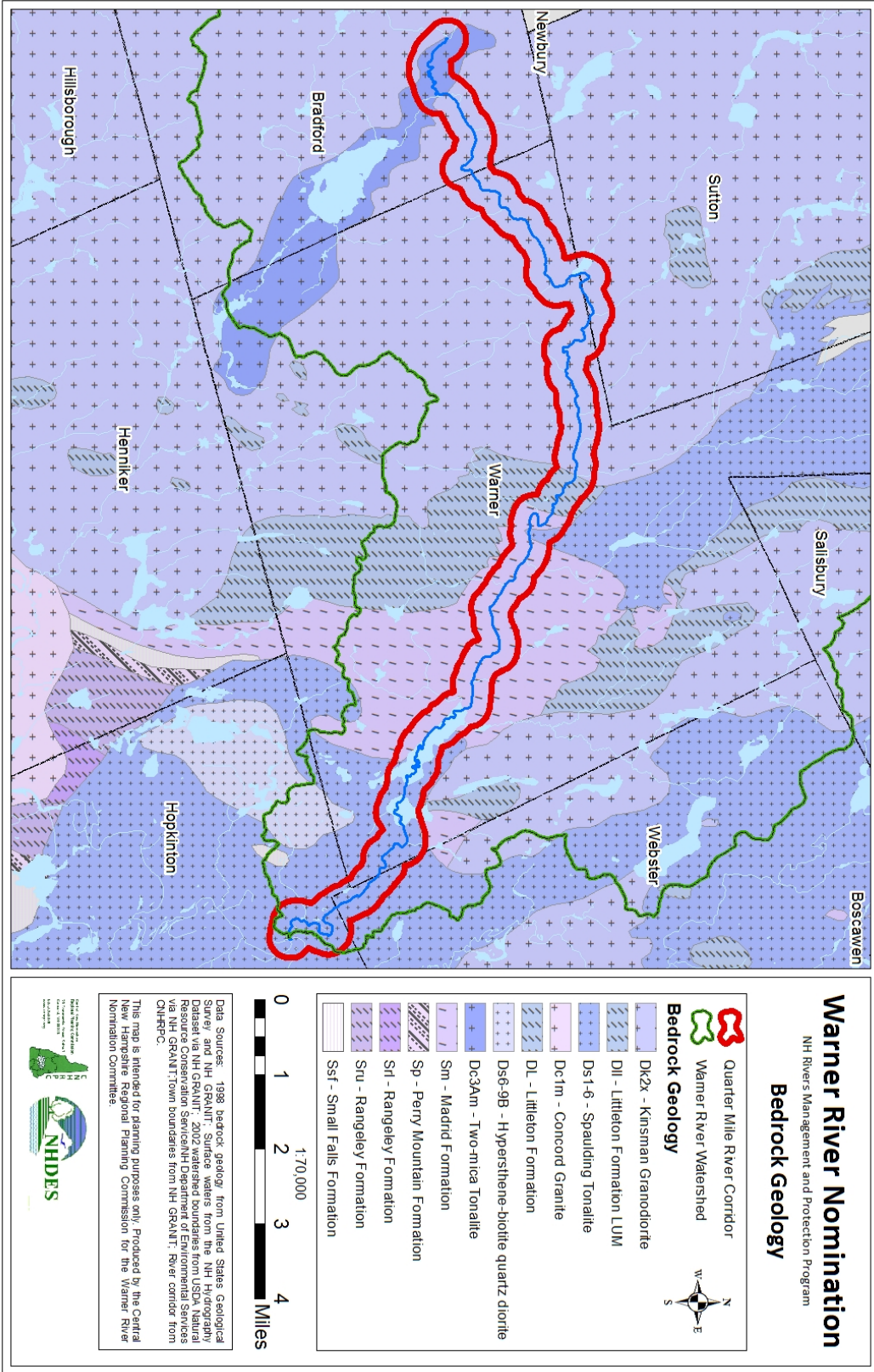
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Map B. Bedrock Geology of the Warner River

(b) Wildlife Resources

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

Table 1. Mammal Species Found or Expected within the Warner River Corridor

Common Species:		
Big Brown bat	Masked Shrew	Short-tailed Weasel (Ermine)
Little Brown Bat	Meadow Jumping Mouse	Snowshoe Hare
Beaver	Meadow Vole	Star-nosed Mole
Black Bear	Mink	Smokey Shrew
Bobcat	Moose	Striped Skunk
Coyote	Muskrat	Virginia Opossum
Deer Mouse	Northern Flying Squirrel	Water Shrew
Eastern Chipmunk	Norway Rat	White-footed Deer
Fisher	Porcupine	White-tailed Deer
Gray Fox	Raccoon	Woodland Jumping Mouse
Gray Squirrel	Red Fox	Woodchuck
Hairy-tailed Mole	Red Squirrel	Woodland Vole
House Mouse	River Otter	
Long-tailed Weasel	Short-tailed Shrew	

[Source: Jim Oehler, NH Fish and Game – Wildlife Habitat Biologist]

Table 2. Reptilian and Amphibian Species Found or Expected within the Warner River Floodplain

*Species have the potential to occur within Warner River Floodplain (based on species distribution maps)

Common Species:		
American Toad	Green Frog	Redbelly Snake
Brown Snake*	Jefferson X blue-spotted	Redback Salamander
Bullfrog	salamander hybrid	Ribbon Snake
Dusky Salamander	Milk Snake	Ringneck Snake*
Eastern Newt	Musk Turtle	Smooth Green Snake*
Four-toed Salamander*	Northern Water Snake	Snapping Turtle
Garter Snake	Painted Turtle	Spring Peeper
Gray Tree Frog	Pickerel Frog	Two-lined Salamander

[Source: Michael Marchand, NH Fish and Game – Wetland Biologist]

Table 3. Bird Species Found or Expected within the Warner River Corridor

Alder Flycatcher	Eastern Kingbird	Pileated Woodpecker
American Black Duck	Eastern Phoebe	Pine Siskin
American Crow	Eastern Towhee	Pine Warbler
American Goldfinch	Eastern Wood-Pewee	Purple Finch
American Robin	Eastern Bluebird	Red-bellied Woodpecker
American Tree Sparrow	Evening Grosbeak	Red-breasted Nuthatch
American Redstart	Field Sparrow	Red-eyed Vireo
American Woodcock	Fox Sparrow	Red-shouldered Hawk
Bald Eagle	Golden-crowned Kinglet	Red-tailed Hawk
Barn Swallow	Gray Catbird	Red-winged Blackbird
Baltimore Oriole	Great Crested Flycatcher	Rose-breasted Grosbeak
Barred Owl	Great Horned Owl	Ruby-crowned Kinglet
Belted Kingfisher	Green Heron	Ruby-throated Hummingbird
Black-and-white Warbler	Hairy Woodpecker	Ruffed Grouse
Black-billed Cuckoo	Hermit Thrush	Savannah Sparrow
Blackburnian Warbler	Hooded Merganser	Scarlet Tanager
Black-capped Chickadee	Horned Lark	Sharp-shinned Hawk
Blackpoll Warbler	House Finch	Song Sparrow
Black-throated Blue Warbler	House Wren	Spotted Sandpiper
Black-throated Green Warbler	Indigo Bunting	Swainson's Thrush
Blue Jay	Killdeer	Swamp Sparrow
Blue-headed Vireo	Least Flycatcher	Tree Swallow
Bobolink	Lincoln's Sparrow	Tufted Titmouse
Broad-winged Hawk	Louisiana Waterthrush	Turkey Vulture
Brown Creeper	Mallard Duck	Virginia Rail
Brown Thrasher	Magnolia Warbler	Warbling Vireo
Brown-headed Cowbird	Mourning Dove	White-breasted Nuthatch
Canada Goose	Mourning Warbler	White-crowned Sparrow
Canada Warbler	Nashville Warbler	White-throated Sparrow
Chestnut-sided Warbler	Northern Cardinal	Wild Turkey
Chimney Swift	Northern Flicker	Willow Flycatcher
Chipping Sparrow	Northern Goshawk	Wilson's Snipe
Common Grackle	Northern Harrier	Wilson's Warbler
Common Mergansaer	Northern Mockingbird	Winter Wren
Common Raven	Northern Saw-whet Owl	Wood Duck
Common Redpoll	Northern Shrike	Wood Thrush
Common Yellowthroat	Northern Waterthrush	Yellow-bellied Sapsucker
Cooper's Hawk	Northern Yellow Warbler	Yellow-billed Cuckoo
Dark-eyed Junco	Ovenbird	Yellow-rumped Warbler
Double-crested Cormorant	Palm Warbler	Yellow-throated Vireo
Downy Woodpecker		

[Source: Dr. Pam Hunt, NH Audubon – Senior Biologist, Avian Conservation]

Table 4. Odonata (carnivorous insects) Species Documented within the Warner River

Common Name	Species Name
Variable Dancer	<i>Argia fumipennis</i>
Powdered Dancer	<i>Argia moesta</i>
Springtime Darner	<i>Basiaeschna Janata</i>
Fawn Darner	<i>Boyeria vinosa</i>
River Jewelwing	<i>Calopteryx aequabilis</i>
Ebony Jewelwing	<i>Calopteryx maculata</i>
Twin-spotted Spiketail	<i>Cordulegaster maculate</i>
Stream Cruiser	<i>Didymops transversa</i>
Petite Emerald	<i>Dorocordulia lepida</i>
Black-shouldered Spinylegs	<i>Dromogomphus spinosus</i>
Stream Bluet	<i>Enallagma exsulans</i>
Common Baskettail	<i>Epitheca cynosure</i>
Mustached Clubtail	<i>Gomphus adelphus</i>
Spine-crowned Clubtail	<i>Gomphus appreviatus</i>
Lancet Clubtail	<i>Gomphus exilis</i>
Dragonhunter	<i>Hagenius brevistylus</i>
Uhler's Sundragon	<i>Helocordulia uhleri</i>
American Rubyspot	<i>Hetearina americana</i>
Swift River Cruiser	<i>Macromia illinoensis</i>
Umber Shadowdragon	<i>Neurocordulia obseleta</i>
Brook Snaketail	<i>Ophiogomphus aspersus</i>
Riffle Snaketail	<i>Ophiogomphus carolus</i>
Rusty Snaketail	<i>Ophiogomphus rupinsulensis</i>
Common Sanddragon	<i>Progomphus obscurus</i>
<i>Zebra Clubtail</i>	<i>Stylurus scudderi</i>

[Source: Dr. Pam Hunt, NH Audubon – Senior Biologist, Avian Conservation]

(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

The New Hampshire Natural Heritage Bureau has identified a number of animal species which are threatened, endangered, or of special concern. Specific Locations are not publicly released; however, the table below indicates whether recorded observations occurred within the Warner River corridor or within the wider watershed. The wood turtle is a state-listed species of special concern found within the Warner River corridor. Of particular note is the presence of Blanding’s Turtle, a state-listed endangered species found within the river watershed.

[Source: Amy Lamb, Ecological Information Specialist, New Hampshire Natural Heritage Bureau, personal communication, December 21, 2015.]

Table 5. Rare, Threatened, or Endangered Reptilian Species in the Warner River Corridor

Species	Location	Status	Level
Wood Turtle	River Corridor	SC	S
Pygmy Snaketail	River Corridor	--	S
Spotted Turtle	Warner Watershed	T	S
Norther Black Racer	Warner Watershed	T	S
Blanding’s Turtle	Warner Watershed	E	S
Smooth Green Snake	Warner Watershed	SC	S

Key: SC = Species of Special Concern, T = Threatened, E = Endangered; S = State

Table 6. Rare, Threatened, or Endangered Avian Species in the Warner River Corridor

Species	Location	Status	Level
Common Loon	Warner Watershed	T	S
Least Bittern	Warner Watershed	SC	S
Vesper Sparrow	Warner Watershed	SC	S

Key: SC = Species of Special Concern, T = Threatened, E = Endangered; S = State

[Source: Amy Lamb, Ecological Information Specialist, New Hampshire Natural Heritage Bureau, personal communication, December 21, 2015.]

There have been recent sightings of bald eagles over the Warner River with one or two individuals showing interest in Lake Massasecum. Chris Martin of NH Audubon has been tracking these individuals.

(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

The New Hampshire Fish and Game Department’s Wildlife Action Plan, most recently updated in 2015, indicates a number of significant wildlife habitat areas in and near the Warner River. **Map 3: Wildlife Resources, from the NH Fish and Game Wildlife Action Plan (2015)**, attached to this document, displays the top ranked habitat areas within the Warner River corridor and watershed.

Table 7. Significant Wildlife Habitat Supported by the Warner River Corridor and Watershed

Wildlife Action Plan (2015) Habitat Ranking	Warner River Corridor		Warner River Subwatershed	
	Acres	Percent of Corridor	Acres	Percent of Subwatershed
Tier 1 (Top-ranked habitat in NH)	1,081	19.8%	20,810	21.9%
Tier 2 (Top-ranked habitat in ecological region)	327	6.0%	15,010	15.8%
Tier 3 (Supporting Landscapes)	1,243	22.7%	26,861	28.3%
Total in Tiers 1 and 2	1,408	25.7%	35,820	37.7%
Total, All WAP Tiers	2,651	48.4%	62,681	66.0%

The Wildlife Action Plan identifies 1,081 acres of the Warner River corridor, or 20% of the entire corridor area, which is considered top ranked (Tier 1) wildlife habitat by ecological condition in the state. Four general areas are identified as Tier 1 habitat:

Table 8. Wildlife Action Plan Tier 1 Top-ranked Habitat Areas in the Warner River Corridor

	Tier 1 Habitat Area Description	Habitat Types Found or Expected
1	West Branch of Warner River to Jennison Dam	<ul style="list-style-type: none"> ● Hemlock-hardwood pine ● Grassland ● Marsh/shrub wetlands ● Floodplain Forest ● Temperate Swamp ● Appalachian oak-pine
2	Swain Lowell Dam to the Warner River Dam	<ul style="list-style-type: none"> ● Hemlock-hardwood pine ● Marsh/shrub wetlands ● Floodplain Forest

		<ul style="list-style-type: none"> • Appalachian oak-pine • Temperate swamp
3	Warner River Dam to crossing of NH 103	<ul style="list-style-type: none"> • Hemlock-hardwood pine • Appalachian oak-pine • Marsh/shrub wetlands • Temperate swamp • Floodplain forest
4	Crossing of NH 103 to Davisville Dam	<ul style="list-style-type: none"> • Floodplain forest • Hemlock-hardwood pine • Appalachian oak-pine • Grassland • Marsh/shrub wetlands • Temperate swamp
5	Davisville Dam to Contoocook River	<ul style="list-style-type: none"> • Appalachian oak-pine • Hemlock-hardwood pine • Grasslands • Floodplain forest • Temperate swamp • Marsh/shrub wetlands

Another 327 acres distributed throughout the corridor are classified as habitats of highest relative rank in their biological region (Tier 2) by the Wildlife Action Plan, and 1,243 acres identified as supporting habitats (Tier 3). Nearly 26% of the river corridor is classified as either Tier 1 or Tier 2 habitat. At the watershed level, 22% of the Warner River subwatershed is classified as Tier 1 top-ranked habitat; 16% is classified as Tier 2 habitat, and 28% is Tier 3. Altogether, a full 66% of the Warner River subwatershed is classified as significant wildlife habitat (Tiers 1, 2, and 3) by the Wildlife Action Plan.

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

The Warner River corridor has significant value as a wildlife corridor. Per members of the Nomination Committee as well as several town documents and studies, the river is used by waterfowl, songbirds, and raptors on their annual migrations. The river corridor contains several areas of unfragmented blocks of land which are used by wildlife for general habitat, breeding, and movement. **Map 4: Unfragmented Blocks** shows at least seven major unfragmented blocks of over 1,000 acres that encompass portions of the river corridor:

1. An area south of the Warner River bordered by NH 114 to the northeast in Bradford.

2. A block north of the river that spans Bradford, Warner and Sutton town boundaries.
3. A large block south of the river in Warner and Bradford bordered by North Village Rd. to the east.
4. An adjacent block bounded by North Village Rd. to the west and reaches into Hillsborough and Hopkinton.
5. A block north of Warner River in Sutton that is bordered by I-89 to the east.
6. A large block encompassing parts of Warner, Salisbury, and Sutton and is host to Kearsarge Mountain.
7. The eastern most block that intersects the river corridor stretches across the Warner town line into Webster and Hopkinton.

The Warner River watershed has many such blocks of unfragmented and undeveloped areas. The river corridor itself serves as a connection between the Chandler Reservation, the Warner Town Forest and Mount Kearsarge State Forest Park, just to name a few, creating a wildlife corridor reaching from just south of the Warner River into Sutton, Wilmot, Andover and Salisbury to the north totaling nearly 12,000 acres of conservation land. The Town of Warner's 2010 Master Plan cites the Warner River Corridor as already the most developed part of town, yet it also contains significant, highly productive aquifer zones and the town's current water supply wells, as well as the river, a conservation priority, and the largest number of residents, who benefit from close-to-home conservation lands and associated recreational opportunities

Bradford's 2004 Master Plan identifies the Warner River as the most notable riparian corridor in town. Several key waterbodies flow into the Warner River including Todd Lake and Lake Massasecum, the latter of which, hosts a rare Inland New England Acidic Pond Shore Community. The Master Plan recognizes the importance of preserving river corridors to mitigate the threats these corridors face, most often related to disruptive land-development activities. Large mammalian species observed in Bradford including moose, black bear, fisher, and bobcat, use corridors like the one provided by the Warner River to travel significant distances. In an economy that relies on wildlife observation, fishing and hunting, Bradford and other towns along the Warner River recognize the importance of maintaining these corridors in a condition suitable to host wildlife.

The 2009 Warner Natural Resources Inventory (NRI) specifically notes the importance of the stream networks and shoreline areas and their function as critical wildlife corridors used by most of Warner's terrestrial wildlife species. The diversity of the Warner River itself, from its rapids, riffles and backwaters to floodplain swamps and other wetlands, host a variety of aquatic organisms that rely on specific fluvial characteristics to create niche habitat. The Warner River has approximately 23 miles of shoreline within the town boasting both human and wildlife benefits. Land use and development within 250 feet of these shoreline areas is regulated by the Shoreland Water Quality Protection Act, NH RSA 483-B.

(c) Vegetation/Natural Communities

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

The Warner River watershed is split by the border between the VT-NH Upland and Lower New England ecological sub-regions. It also straddles two subsections known as the Hillsborough Inland Hills and Plains in the western portion of the watershed and the Gulf of Maine Coastal Plain in the eastern portion. Much of the river corridor, other than developed areas, is characterized by hemlock-hardwood pine forest, Appalachian oak-pine forest, floodplain forest, farm land (grassland or hay pastures as well as cultivated fields), with some marsh and shrub wetlands, and peatland areas distributed throughout. **Map 5: Natural Communities**, from the NH Fish and Game Wildlife Action Plan (2015) illustrates the location of the various ecological communities found in the Warner River corridor and watershed.

According to Sperduto and Nichols' *Natural Communities of New Hampshire*, these natural communities typically contain the following plant species:

Table 9. Natural Communities and Expected Plant Species in the Warner River Corridor

Hemlock Forest	
<i>Tsuga canadensis</i> (hemlock)	<i>Dryopteris</i> spp. (wood ferns)
<i>Oxalis acetosella</i> (northern wood sorrel)	<i>Mitchella repens</i> (partridge-berry)
<i>Monotropa uniflora</i> (Indian pipes)	<i>Acer rubrum</i> (red maple)
<i>Maianthemum canadense</i> (Canadian mayflower)	Mosses and liverworts such as <i>Bazzania trilobata</i> .
<i>Betula alleghaniensis</i> (yellow birch)	
Beech Forest	
<i>Fagus grandifolia</i> (American beech)	<i>Epifagus virginiana</i> (beech-drops)
<i>Lycopodium</i> spp. (clubmosses)	
Hemlock – White Pine Forest	
<i>Tsuga canadensis</i> (hemlock)	<i>Pinus strobus</i> (white pine)
<i>Betula lenta</i> (black birch)	<i>Quercus rubra</i> (red oak)
<i>Betula papyrifera</i> var. <i>papyrifera</i> (paper birch)	<i>Hamamelis virginiana</i> (witch hazel)
<i>Gaultheria procumbens</i> (wintergreen)	<i>Viburnum acerifolium</i> (maple-leaved viburnum)
<i>Dryopteris intermedia</i> (intermediate wood fern)	<i>Medeola virginiana</i> (Indian cucumber-root)
<i>Lycopodium</i> spp. (clubmosses, other than <i>Huperzia lucidula</i>)	<i>Thelypteris noveboracensis</i> (New York fern)
<i>Aralia nudicaulis</i> (wild sarsaparilla)	<i>Mitchella repens</i> (partridge-berry)
<i>Trientalis borealis</i> (starflower)	<i>Monotropa uniflora</i> (Indian pipes)
<i>Maianthemum canadense</i> (Canadian mayflower)	

Hemlock – Beech – Northern Hardwood Forest	
<i>Tsuga canadensis</i> (hemlock)	<i>Acer saccharum</i> (sugar maple)
<i>Betula alleghaniensis</i> (yellow birch)	<i>Fagus grandifolia</i> (American beech)
<i>Fraxinus americana</i> (white ash)	<i>Acer rubrum</i> (red maple)
<i>Picea rubens</i> (red spruce)	<i>Abies balsamea</i> (balsam fir)
<i>Acer pensylvanicum</i> (striped maple)	<i>Viburnum alnifolium</i> (hobblebush)
<i>Medeola virginiana</i> (Indian cucumber-root)	<i>Mitchella repens</i> (partridge-berry)
<i>Coptis trifolia</i> (goldthread)	<i>Dryopteris intermedia</i> (intermediate wood)
<i>Oxalis acetosella</i> (northern wood sorrel)	<i>Huperzia lucidula</i> (shining clubmoss)
Hemlock – Beech – Oak – Pine Forest	
<i>Tsuga canadensis</i> (hemlock)	<i>Fagus grandifolia</i> (American beech)
<i>Quercus rubra</i> (red oak)	<i>Pinus strobus</i> (white pine)
<i>Acer rubrum</i> (red maple)	<i>Acer pensylvanicum</i> (striped maple)
<i>Betula papyrifera</i> var. <i>papyrifera</i> (paper birch)	<i>Prunus serotina</i> (black cherry)
<i>Betula lenta</i> (black birch)	<i>Acer saccharum</i> (sugar maple)
<i>Fraxinus americana</i> (white ash)	<i>B. alleghaniensis</i> (yellow birch)
<i>B. populifolia</i> (gray birch)	<i>Hamamelis virginiana</i> (witch hazel)
<i>Gaultheria procumbens</i> (wintergreen)	<i>Oxalis acetosella</i> (northern wood sorrel)
<i>Huperzia lucidula</i> (shining clubmoss)	<i>Lonicera canadensis</i> (Canadian honeysuckle)
<i>Dryopteris campyloptera</i> (mountain wood fern)	<i>Clintonia borealis</i> (blue-bead lily)
<i>Streptopus</i> spp. (twisted stalks)	<i>Aralia nudicaulis</i> (wild sarsaparilla)
<i>Uvularia sessilifolia</i> (sessile-leaved bellwort)	<i>Dryopteris intermedia</i> (intermediate wood fern)
<i>Epifagus virginiana</i> (beech-drops)	<i>Mitchella repens</i> (partridge-berry)
<i>Trientalis borealis</i> (starflower)	<i>Monotropa uniflora</i> (Indian pipes)
<i>Maianthemum canadense</i> (Canada mayflower)	
Black Gum – Red Maple Basin Swamp	
<i>Nyssa sylvatica</i> (black gum)	<i>Acer rubrum</i> (red maple)
<i>Vaccinium corymbosum</i> (highbush blueberry)	<i>Ilex verticillata</i> (winterberry)
<i>Osmunda cinnamomea</i> (cinnamon fern)	<i>Picea rubens</i> (red spruce)
<i>Tsuga Canadensis</i> (hemlock)	<i>Pinus strobus</i> (White Pine)
<i>Sarracenia purpurea</i> (pitcher-plant)	<i>Betula alleghaniensis</i> (yellow birth)
<i>Osmunda regalis</i> (royal fern)	<i>Chelone glabra</i> (white turtlehead)
<i>Fraxinus nigra</i> (black ash)	

Inland Atlantic White Cedar Swamp	
<i>Chamaecyparis thoyoides</i> (Atlantic white cedar)	<i>Gaultheria canadensis</i> (creeping snowberry)
<i>Picea rubens</i> (red spruce)	<i>Clintonia borealis</i> (bluebead lily)
<i>Cornus canadensis</i> (bunchberry)	<i>Abies balsamea</i> (balsam fir)
<i>Larix laricina</i> (eastern larch)	<i>Picea mariana</i> (black spruce)
<i>Gaylussacia baccata</i> (black huckleberry)	<i>Kalmia angustifolia</i> (sheep laurel)
Northern Hardwood – Conifer Forest	
<i>Tsuga canadensis</i> (hemlock)	<i>Picea rubens</i> (red spruce)
<i>Pinus strobus</i> (white pine)	<i>Betula alleghaniensis</i> (yellow birch)
<i>Acer saccharum</i> (sugar maple)	<i>Abies balsamea</i> (balsam fir)
<i>Quercus ruba</i> (red oak)	<i>Ostrya virginiana</i> (ironwood)
<i>Fraxinus americana</i> (white ash)	<i>Tilia americana</i> (basswood)
<i>Aralia nudicaulis</i> (wild sarsaparilla)	<i>Trientalis borealis</i> (starflower)
<i>Dryopteris campyloptera</i> (mountain wood fern)	<i>Lonicera canadensis</i> (Canada honeysuckle)

[Source: Sperduto, D. and Nichols, W., 2004. *Natural Communities of New Hampshire*. Edited by Ben Kimball. The New Hampshire Natural Heritage Bureau and the Nature Conservancy. Available at http://extension.unh.edu/resources/files/Resource000425_Rep447.pdf.]

In addition to the forest types listed above, numerous plant species occupy the river channel and banks, including sedges, grasses, willows, rushes, ferns, wildflowers, aquatic and weedy native and non-native plants.

Bradford Pines Natural Area encompasses the confluence of the West Branch of the Warner River and Hoyt Brook which marks the beginning of the Warner River. This natural area is managed by the New Hampshire Division of Forests and Lands and is home to some of the oldest pines in the state.

Invasive Species

Emerald Ash Borer

Presence confirmed in Hopkinton in 2014, as a non-native insect the Emerald Ash borer has no predators to keep the population in check. Infected ash trees typically die within 3 to 5 years. Strategies in place to reduce the spread of the emerald ash borer include a quarantine of all hardwood firewood, as well as all ash nursery stock in Belknap, Hillsborough, Merrimack, and Rockingham counties.

Hemlock Woolly Adelgid (HWA)

This small, wingless insect, originally from Asia feeds on small hemlock twigs. Alone, if left untreated, it can kill a tree in 4 to 10 years. The hemlock Woolly Adelgid weakens trees and will leave them susceptible to damage from pest like elongate hemlock scale and hemlock borer. First discovered in Portsmouth in 2000, its presence has been noted in Warner and Hopkinton in 2014 as well as watershed neighbors Hillsborough and Henniker. The New Hampshire Division of Forests and Lands has released an action plan to deal with the growing spread of Hemlock Woolly Adelgid. Steps to counter the spread include cultural control meaning removing infested trees and burning on site, application of insecticides, or a mixture of both. A biological control measure can also be employed that utilizes predatory beetles to check the population. This is only a viable option in healthy forested sites with moderate infestations that can sustain a population of beetles.

Elongate Hemlock Scale (EHS)

Native to Japan, EHS was first observed in Queens, NY in 1908. EHS has been confirmed in Hopkinton as of 2014. Similar to HWA, this species feeds on the underside of the hemlock needle by draining tree fluids. Tree death often occurs 10 years after infections. EHS infection typically follows infestations of HMA, drought, or other stresses that weaken trees. Quarantine efforts, similar to those previously mention are currently the most effective means of mitigating the spread of EHS.

Variable Milfoil

As a common and aggressive aquatic invasive species, variable Milfoil has taken up residence in over seventy-five New Hampshire waterbodies as of 2015. Recent observations have not found milfoil within the Warner River; however, it has been documented In Lake Massasecum, which flows into the Warner River, as well as the Contoocook River, which the Warner River joins. Given there are documented occurrences of this invasive species bookending the Warner River, the chances are good that the weed is in the Warner River, just not documented yet.

Oriental Bittersweet & Japanese Knotweed

Oriental bittersweet along with Japanese knotweed have been observed in large quantities along the Warner River. Oriental bittersweet is a leaf deciduous, climbing vine that can smother trees, shrubs and other vegetation with its aggressive growth. Japanese Knotweed grows well in disturbed soils, making roadsides prime habitat for this invasive species. Given the proximity of NH 103 to the Warner River, the river is well acquainted with this visitor. Doug Cygan, Invasive Species Coordinator for New Hampshire Department of Agriculture, has been treating Japanese Knotweed along NH 103 from Warner to Bradford.

[Sources: NH Bugs, n.d. *Emerald Ash Borer, Hemlock Woolly Adelgid, Elongate Hemlock Scale*. <http://nhbugs.org/>. Doug Cygan, Invasive Species Coordinator, New Hampshire Department of Agriculture, personal communication, January 4, 2016.]

(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 Natural Heritage Bureau (NHB) has documented two state-endangered plants and one state and federal-endangered plant within the Warner River watershed. Due to resource protection concerns, exact locations are not released by the NHB.

Table 10. Rare, Threatened, or Endangered Plant Species in the Warner River Corridor

Species	Location	Status	Level
Small Whorled Pogonia (<i>Isotria medeoloides</i>)	Warner Watershed	E	S/N
Sclerolepis (<i>Sclerolepis uniflora</i>)	Warner Watershed	E	S
American water-awwort (<i>Subularia aquatic ssp. Americana</i>)	Warner Watershed	E	S

[Source: Amy Lamb, Natural Heritage Bureau, personal communication, December 21, 2015.]

(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

Per the Natural Heritage Bureau, temperate minor river floodplain system, a natural community of special concern in the NH Wildlife Action Plan, can be found in the river corridor. Four other exemplary natural communities exist within the Warner River watershed

Table 11. Exemplary Natural Communities in the Warner River Watershed

Ecological Community	Location
Temperate minor river floodplain system	River Corridor
Black gum – red maple basin swamp	Warner Watershed
Inland Atlantic white cedar swamp	Warner Watershed
Sandy pond shore system	Warner Watershed
Northern hardwood – conifer forest system	Warner Watershed

Exemplary Natural Ecological Communities

Within the Warner River corridor resides a temperate minor river floodplain system. This ecological community is considered rare or uncommon by the State and is home to the species listed in Table 10 above. The habitat is a large swath of floodplain mosaic with patch of closed canopy forest in a matrix of floodplain thicket and meadow. Silver maple (*Acer saccharinum*) and red maple (*Acer rubrum*) are the dominant trees with sensitive fern (*Onoclea sensibilis*), bluejoint (*Calamagrostis canadensis*), silky dogwood (*Cornus amomum*), speckled alder (*Alnus*

incana), willows (*Salix* spp.), and buttonbush (*Cephalanthus occidentalis*) common depending on landscape position and hydrology.

[Source: Amy Lamb, Ecological Information Specialist, New Hampshire Natural Heritage Bureau, personal communication, December 21, 2015.]

(D) Fish Resources

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

The Warner River is home to many fish species (Table 12). Most of the watershed contains a warmwater fish community comprised largely of native fish species and some introduced species such as largemouth bass, yellow perch, and bluegill.

Table 12. List of fish species known to occur in the Warner River
+ Fish Species of Greatest Conservation Need *Introduced Species

Common Name	Species Name
American Eel+	<i>Anguilla rostrata</i>
Blacknose Dace	<i>Rhinichthys atratulus</i>
Bluegill*	<i>Lepomis macrochirus</i>
Brown Bullhead	<i>Ameiurus nebulosus</i>
Brown Trout (Hatchery)*	<i>Salmo trutta</i>
Brook Trout (Hatchery)*	<i>Salvelinus fontinalis</i>
Brook Trout (Wild)+	<i>Salvelinus fontinalis</i>
Burbot+	<i>Lota lota</i>
Common shiner	<i>Luxilus cornutus</i>
Common sunfish	<i>Lepomis gibbosus</i>
Common white sucker	<i>Catostomus commersoni</i>
Creek chub	<i>Semotilus atromaculatus</i>
Creek Chubsucker	<i>Erimyzon oblongus</i>
Eastern Chain Pickerel	<i>Esox niger</i>
Fallfish	<i>Semotilus corporalis</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Largemouth Bass*	<i>Micropterus salmoides</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Margined Madtom*	<i>Noturus insignis</i>
Rainbow Trout (Hatchery)*	<i>Oncorhynchus mykiss</i>
Redbreast Sunfish	<i>Lepomis auritus</i>
Smallmouth Bass*	<i>Micropterus dolomieu</i>
Tessellated Darter	<i>Etheostoma olmstedii</i>
White Sucker	<i>Catostomus commersonii</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Yellow perch*	<i>Perca flavescens</i>

[Source: Ben Nugent, NH Fish and Game – Fisheries Biologist]

Contemporary Fish Research

Within the Warner River Watershed, New Hampshire Fish and Game, in conjunction with Trout Unlimited and local volunteers have been conducting on-going research on the trout populations of the Warner River and its tributaries. These groups cooperated to create the living document *Notes from Fish Community Assessments and a Plan to Protect Wild Brook Trout Populations and their Habitats within the Warner River Watershed*. This study can be found in Appendix F along with species profiles (Appendix F1)

Brook trout are the only native stream dwelling trout species in NH. It is believed that at one time, brook trout were once present throughout all watersheds in NH, but due to increased stream temperatures, changes in water chemistry, habitat fragmentation, predation and competition, loss of spawning location, and loss of stream habitat complexity populations of wild brook trout have been reduced and isolated.

The team used electrofishing methods to observe and record findings of brook trout and other species throughout the Warner River watershed. Of the 71 surveys taken throughout the watershed, 66.2% of them yielded finds of brook trout. The study cites loss of riparian buffers, bank stabilization (a result of lost riparian buffers), past human involvement (clearing land for agriculture, reconfiguration of rivers with dams for power, increased presence of impervious surfaces), and road stream crossings as reasons for the decline and fragmentation of brook trout populations.

Among several suggested local conservation strategies listed by the report, incorporation of the Warner River into the New Hampshire Rivers Management and Protection Program was listed to approach watershed scale planning and would open a dialogue of planning that goes beyond town borders.

[Source: *Notes from Fish Community Assessments and a Plan to Protect Wild Brook Trout Populations and their Habitats within the Warner River Watershed*. <http://www.wildlife.state.nh.us/fishing/documents/wild-brook-trout-2008-2013-warner-rvr.pdf>.]

(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

There are no endangered or threatened fish species within the Warner River. There are, as mentioned above in Table 12, Brook Trout which is a species of highest conservation need. As the Warner River corridor is further developed, the chance of threatening or endangering local fish species increase.

(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 aquatic habitats in the Warner River and its tributaries are rather diverse, with some areas of slow-moving waters with aquatic vegetation and others with very fast-moving water over large substrate such as cobbles and boulders. The fish communities respond directly to these habitats, with species such as chain pickerel and largemouth bass living in the quiescent areas, while species such as longnose dace, which have a long snout and flat bottom, are well adapted to living in fast, riffle areas.

There are several segments along the Warner River that are considered “Highest Ranked Habitat in New Hampshire” as ranked by the NH Wildlife Action Plan. These sections are present in all five towns through which the Warner River flows.

(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.

Based on the densities of wild brook trout, it seems like there’s suitable spawning and rearing habitat for wild brook trout to maintain populations in most of the tributaries. Indicating that most of the tributaries have suitable water quality, temperatures, and rates of erosion and aggradation (deposition/siltation). While land uses adjacent to several of these tributaries have likely impacted stream habitat and function, many the streams still provide opportunities for wild brook trout to complete their life cycles. Some tributaries are highly influenced by natural upland wetlands and ponds which can be influenced even more by the presence of dams increasing the surface area of lentic (ponded/non-flowing) habitats. These streams tend to exceed suitable temperatures for wild trout in the summer.

The stocked trout are intended to provide a seasonal fishing opportunity in the mainstem and some of the larger tributaries of the Warner River. Three water temperature loggers were deployed in the Warner River in 2015 and found that temperatures exceeded suitable levels for trout (~>72°F) during much of the summer. There are some cooler tributaries where stocked trout could potentially find summer thermal refuge but a hatchery trout has not been documented in a steam that is not on Fish and Game’s stocking list. The yearling trout stocked are likely not fully developed to successfully reproduce. In the hatchery, three and four year olds are used for spawning. Additionally, it is very rare to see hold over (fish stocked in previous years) in riverine habitats in New Hampshire.

Within the Town of Warner, the Warner River gets stocked with over 500 yearling brook trout and 1,700 yearling rainbow trout. A number of tributaries within the river corridor are stocked and these fish likely make their way down to the Warner River. The tributaries and their stocking numbers are as follows: Stevens Brook, with 420 yearling brook trout in Warner and 225 yearling brook trout in Sutton, the Lane River in Sutton receives 350 yearling brown trout, and Willow/Childs Brook with 220 yearling brook trout in Warner. The fish supplied to Willow Brook are stocked in conjunction with a children's fishing derby sponsored by the Warner Fish and Game Club.

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

As per the River Herring Management Plan for the Merrimack River Watershed, both Lake Massasecum and Lake Winnipocket are identified as potential stocking locations for adult river herring (primarily alewives). Essentially, adult herring are stocked in lakes and ponds, they spawn and produce juveniles. The adults and juveniles will leave throughout the summer and fall and attempt to reach the Atlantic Ocean. The overall goal for this plan is to increase the number of returning adult river herring to the Merrimack River Watershed, which will benefit several fish and wildlife species whom would utilize them as seasonal forage sources. In the spring, we collect returning adults in the lower parts of the Merrimack, Lamprey, Cocheco, Saco, Androscoggin, and Kennebec rivers. New Hampshire Fish and Game are currently focusing on stocking Lake Winnisquam but when/if this generates greater returns to the Merrimack River they intend to supply adults to other smaller waterbodies in the watershed. It typically takes 4 to 5 years for river herring to mature. 2016 will be the fifth-year Fish and Game has stocked adults into Lake Winnisquam and they anticipate a large return. 2015 exhibited the greatest number of returns to the Merrimack (128,000 adults) in modern times. Unfortunately, this program conflicts with dams and hydroelectricity operations. Obviously, dams without fish passage act as barriers for upstream adult movement to reach spawning areas but juveniles and adults can be killed in hydroelectric turbines during downstream migrations.

Additionally, there is an ongoing effort to determine the status of American eels in the Merrimack watershed. Eels are catadromous, meaning they spawn in saltwater but mature in freshwater habitats. Collectively, anadromous and catadromous species are referred to as diadromous species. NH Fish and Game is currently focusing on the Merrimack River itself and several lower tributaries to determine the status of eels. As the project moves forward, NH Fish and Game will work outward and upstream to evaluate the ability for juvenile eels to ascend rivers like the Contoocook to determine the rate of eels able to reach the Warner River. Similarly, eels can be impacted by dams during both upstream and downstream migrations. Juvenile eels (elvers) have the ability to climb up or around some dams but the rate of efficacy of this for the dams on the lower Contoocook is currently unknown. Adult eels (silver eels) can be killed in hydroelectric turbines during their downstream migration to sea.

[Sources: Ben Nugent, Fish Habitat Biologist, New Hampshire Fish and Game Department, personal communication, January 5, 2016.]

(e) Water Quality

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

Class A Class B

The Warner River is statutorily classified as a Class B water body.

The entire Warner River watershed is designated as Class B waters. These waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies.

Class B waters are defined under RSA 485-A:8, I-III

Class B waters shall be of the second highest quality and shall have no objectionable physical characteristics, shall contain a dissolved oxygen content of at least 75 percent of saturation, and shall contain not more than either a geometric mean based on at least 3 samples obtained over a 60-day period of 126 Escherichia coli per 100 milliliters, or greater than 406 Escherichia coli per 100 milliliters in any one sample; and for designated beach areas shall contain not more than a geometric mean based on at least 3 samples obtained over a 60-day period of 47 Escherichia coli per 100 milliliters, or 88 Escherichia coli per 100 milliliters in any one sample; unless naturally occurring. There shall be no disposal of sewage or waste into said waters except those which have received adequate treatment to prevent the lowering of the biological, physical, chemical or bacteriological characteristics below those given above, nor shall such disposal of sewage or waste be inimical to aquatic life or to the maintenance of aquatic life in said receiving waters. The pH range for said waters shall be 6.5 to 8.0 except when due to natural causes. Any stream temperature increase associated with the discharge of treated sewage, waste or cooling water, water diversions, or releases shall not be such as to appreciably interfere with the uses assigned to this class. The waters of this classification shall be considered as being acceptable for fishing, swimming and other recreational purposes and, after adequate treatment, for use as water supplies.

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

Class B

All segments of the Warner River are considered safe for boating and for use as a public water supply after adequate treatment. Along with all state waterbodies, the Warner River, tributaries, and impoundments carry an advisory for fish consumption due to elevated mercury levels.

Table 13. Water Quality Impairments of the Warner River

Water Body or Segment	Use	Impairment
Warner River in Bradford and Warner	Aquatic Life	pH
Warner River, full length	Fish Consumption	Mercury

Source: Final 2010 Section 303(d) Surface Water Quality Assessment

Aside from the impairments along the Warner River, there are several impairments associated with numerous lakes and ponds that drain into the Warner River. Lake Massasecum in Bradford has been impaired for swimming due to *E. coli*. The lake is also impaired for aquatic life due to pH, non-native aquatic plants, and dissolved oxygen saturation. The beach at the Silver Lake Reservoir in Warner has been occasionally impaired for swimming due to *E. coli*. Blaisdell Lake in Sutton is impaired for aquatic life due to Chlorophyll-a, pH, and total phosphorus. Tom Pond in Warner is impaired for aquatic life due to Chlorophyll-a, pH, and total phosphorus and an unnamed brook connecting Pleasant Pond to Tom Pond has been occasionally impaired for swimming due to *E. coli*.

Impairments on the lakes and river may be transitory events or very localized in nature. NHDES revises and updates the Section 303(d) Surface Water Quality assessment every two years.

[Source: New Hampshire Department of Environmental Services, October 2015. *Draft – 2014 List of Threatened or Impaired Waters That Require a TMDL* Available at <http://des.nh.gov/organization/divisions/water/wmb/swqa/2014/documents/2014-draft-303d.pdf>

(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.

Mercury contamination in New Hampshire water bodies causing the statewide fish consumption advisory is attributed to atmospheric deposition caused by emissions from coal-fired power plants. New Hampshire has recently passed several laws to reduce mercury emissions from power plants and garbage incinerators, as well as barring the sale and landfill/incinerator disposal of mercury-laden products. Additional regional and federal emissions regulations may be required to further reduce exposure to mercury in the environment.

Impairment for pH on the Warner River is the result of many years of acid rain deposition, in addition to soils which provide relatively poor filtration for runoff.

The Warner River through Warner is impaired for aquatic life due to low dissolved oxygen content. This can also be the result of several factors, such as excessive nutrients from

stormwater runoff, nonpoint source pollution, or pollution from failed septic systems around the lake.

In past years, there has been a Volunteer Rivers Assessment Program (VRAP) active in the Warner River. Samples taken each year by volunteers are recorded in a database and measurements are reported on an annual basis. VRAP provide raw data to assist biologists and lake associations to make science-based decisions for management of the State's water bodies. Sampling stations used by the VRAP on the Warner River are located at Riverside Park in Warner and Dustin Rd/NH 127 in Davisville. The last report filed for the Warner River was in 2007.

[Sources: New Hampshire Department of Environmental Services, *Warner River*, n.p., n.d., 2016 <http://des.nh.gov/organization/divisions/water/wmb/vrap/warner/index.htm>

New Hampshire Department of Environmental Services, 2009. *Fish Facts: A Guide to New Hampshire's Fish Advisory*. Available at http://des.nh.gov/organization/divisions/air/pehb/ehs/ehp/documents/fish_advisory.pdf.]

(f) Natural Flow Characteristics

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.

The Warner River begins in Bradford, drawing water from both Lake Todd in Newberry, and Lake Massasecum in Bradford. Flow near the headwaters is slow and meandering, with the channel winding its way through wetlands most of the way to the Warner town line. Once crossing into Warner, the channel becomes rock-lined and white water develops.

White water is confined to the Town of Warner and it is the only section of the River where dams and impoundments were built. The Warner River is controlled by three active dams with the first being the privately-owned Warner River Hydro dam, located about 1.5 miles downstream from the Bradford/Warner town line. Prior to passing through this operational dam, the river flows over the remains of four ruined dams and there is an impoundment immediately downstream from the first of these, just off Mill Pond Lane. After the River Hydro dam, the Warner River flows relatively unimpeded until reaching the Swain Lowell Dam. This dam creates an impoundment which is used as a swimming hole in the summer.

Just downstream from the Swain Lowell impoundment, Slaughter Brook and the Lane River both flow into the Warner River. The added sediment from Slaughter Brook and the Lane River creates a small break in the white water and a meander that takes the River briefly into Sutton. The Warner River flows past a wetland marsh at its junction with the Lane River. Following this junction, the river becomes rocky and shallow and moves quickly forming a brief patch of class

III rapids. After passing under the closed-bridge at the end of East Roby District Road the river becomes flat again and remains this way through Waterloo Village, with the exception of some brief class I rapids found only during high water. This section of the river is known for its debris, such as fallen logs and branches, as the river does not normally move fast enough to remove these impediments.

Following the covered bridge at Waterloo Village, the Warner River rushes over the class IV rapids of Waterloo Falls. Two active dams and the remains of multiple mill buildings indicate the importance of hydropower in this section of the River. From there, the River becomes shallow and flows past exposed sediment bars all the way to Warner Village. This is the location of a breached dam, and the second to last man-built impediment on the river. From Warner Village, the River flows slowly beside I-89 and provides the backdrop to Riverside and Bagley Parks. Prior to the Webster town line, the Warner River flows through one remaining patch of white water and over the remains of the last dam constructed in Davisville Village. From there the River meanders through sediment deposits and some large dramatic bends before emptying into the Contoocook River just south of Contoocook Village.

Seasonal high water occurs in the spring with snow melt, and tapers off through the summer and fall with highs reflected in periods of increased precipitation. Seasonal flooding can occur, but the lower river channel can accommodate most reasonable variation in water level. At the stream gauge, minor flooding occurs at 8ft, moderate flooding at 10ft, and major flooding at 12ft and above. Flooding usually occurs when obstructions block the channel, leading to increased water levels and velocity. Floodplain forests occur throughout most of the river corridor, indicating that annual flood conditions are present and contribute to some of the distinctive habitat areas in the corridor. Flood levels prior to the installation of the stream gauge are unknown, but historic flooding occurred 1826 in what was recorded as the "Great Freshet." This flood destroyed every bridge in the town of Warner and damaged many of the mills. The worst recorded flood was during the New England Hurricane in 1938, where the river crested at 12.8 ft. The second highest crest was in 2006 when Tropical Storm Tammy merged with incoming low pressure systems to create torrential downpours. The resulting flood reached 12.35ft and had a stream flow of 8,640cfs-- the recurrence level for a flood of this magnitude is 100-500 years. The following year the Warner River approached a similar flood stage, but crested out at 11.87ft and 7,730cfs.

Average flows and peak discharge for the Warner River have been recorded at the USGS Davisville Stream gage (#01086000) as follows:

Table 14. Average Flows and Peak Discharge for the Warner River

Station	Average Annual Flow	Average Annual Peak Flow	Highest Peak Flow & Year	Years of Record for Calculation
Davisville 01086000	253.6cfs	2,508cfs	8,640cfs – May 15, 2006	Avg. Annual Flow: 1940 - 2014 Highest Peak Flow: 1938 - 2014

NOTE: cfs = cubic feet per second.

[Source: USGS Surface-Water Annual Statistics for New Hampshire, historical data and annual summaries.

American Whitewater. *Warner – Melvin Mills to Warner*. Available at <https://www.americanwhitewater.org/content/River/detail/id/3603/>

(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.

Warner’s 2010 Master Plan identified the Warner River Corridor as one of six natural resource areas where conservation efforts should be focused. In the 2008 Master Plan survey, 56% of respondents “indicated the preservation of open space in Warner is ‘most important’” In regards to future conservation efforts by the town, “69% (of respondents) indicated a willingness to continue spending town money to protect natural resources and open space.” A goal of protecting “meaningful blocks of high quality conservation land and distinctive natural features in at least... 20% of the Warner River corridor” was articulated. Currently, of the 5,473 acres that make up the quarter mile buffered river corridor, 282 acres (5.15%) are under conservation. That is 813 acres shy of the 20% conservation goal.

One of the most significant conservation properties sharing space in the Warner River corridor is Bohanan Farm in Hopkinton, NH. Protected by a conservation easement passed in 2008 containing 410 acres, of which, 45 are within the Warner River Corridor. Its preservation is the product of hard work and collaboration between the Five Rivers Conservation Trust, the town of Hopkinton, the state of New Hampshire, and the United States Department of Agriculture. It has been a working dairy farm since the 1930s, and today is home to the Contoocook Creamery, which produces milk that can be purchased at stores across the state. Currently the farm boasts over 400 cows, and sustainably produces 50% of their feed on their conserved anchorage bordering the Warner River. Bohanan farm also plays an important recreational role for the

Town of Hopkinton, as the property hosts 7 miles of public walking trails. The land has been farmed since the 1760s when Enoch Eastman won two acres in a game of horseshoes who gave it to his son who started farming it. The property also hosted the location of the second ferry crossing of the Contoocook in 1772.

The Chandler Reservation is the largest tract of conserved land that comes in contact with the Warner River Corridor with over 1,414 protected acres. Starting as an 800-acre gift to the town of Warner in 1919 by the son of U.S. Senator William E. Chandler, it has been expanded over the years to reach its current size. In the 1930s, under President Franklin Roosevelt's *New Deal*, the Civilian Conservation Corps constructed several plantations and trails on the property, many of which are still used today. At many points throughout its history the Chandler Reservation has been used for commercial timber production, and in 1992 it became just the third Town Forest in Merrimack County to be recognized as a Tree Farm. The Reservation can be publicly accessed by a myriad of trails and is used for all recreational purposes, from hunting to skiing.

The Royce and Flanders well sites are protected as the town's drinking water supply areas. The former is active and meets Warner's current water needs. The Flanders Wellsite has the potential to provide the town with water, although it would be costlier to develop.

The Quabbin-to-Cardigan Partnership, launch in 2003, is a collaborative effort to conserve the Monadnock Highlands of north-central Massachusetts and western New Hampshire. Spanning one hundred miles, bounded by the Connecticut and Merrimack Rivers and by the Quabbin Reservoir and White Mountain National Forest, it encompasses approximately two million acres. This region is one of the largest remaining areas of intact, interconnected, ecologically significant forest in central New England, and is a key headwater of the Merrimack and Connecticut rivers. In the upper third of this region lies Bradford and Warner. There are only two major corridors in the area connecting southern portions to the WMNF in the north. One is Lake Sunapee, the other is the Warner River. As mentioned before, the Warner River serves as a corridor between the Chandler Reservation and the Warner Town Forest, and Mount Kearsarge State Forest Park. When taking a regional view of habitat conservation and preservation of wildlife corridors, the imperative role the Warner River plays become even more evident.

[Sources: Town of Warner Conservation Plan, Town of Warner, Town of Hopkinton, Five Rivers Conservation Trust, Quabbin-to-Cardigan Partnership.]

Table 15. Protected Open Spaces in the Warner River Corridor

Parcel Name	Location	Primary Protection Type*	Primary Agency*	Acres in Corridor	Total Acres
Bagley/Stillman Clark Parcel	Warner	Fee Ownership	Town of Warner	36	36
Bohanan Farm	Hopkinton	Conservation Easement	Five Rivers	45	279
Chandler Reservation	Warner	Fee ownership	Town of Warner	22	1414
Flanders Wellsite	Warner	Fee Ownership	Town of Warner	2	2
Gilmore State Forest	Warner	Fee Ownership	NH DRED	11	36
Hill Tract #1	Warner	Fee Ownership	Town of Warner	82	84
Hill Tract #2	Warner	Fee Ownership	Town of Warner	8	8
Hill Tract #3	Warner	Fee Ownership	Town of Warner	1	1
Hill Tract #4	Warner	Fee Ownership	Town of Warner	1	1
Jelleme Forest	Warner	Fee Ownership	SPNHF	25	49
Kumin	Warner	Conservation Easement	SPNHF	1	107
Ordway Woods	Warner	Fee Ownership	Town of Warner	4	4
Royce Well Site	Warner	Fee Ownership	Town of Warner	8	8
School Street Park	Warner	Fee Ownership	Town of Warner	6	13
Scott/Ballou	Warner	Deed Restriction	SPNHF	24	42
Warner River Parcel	Warner	Fee Ownership	Town of Warner	5	5
TOTALS:				281	2,089

*Note: Only the primary protecting agency and protection type are listed here. Parcels may have additional protection in the form of a deed restriction or conservation easement held by another entity.

[Source: NH GRANIT Conservation/Public Lands Layer, 2013, with updates from Nomination Committee.]

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

East of the confluence of the West Branch and Andrew Brook. There are three dams actively impounding water, but not used for hydropower generation. There are seven dams in ruins in the existing Warner River channel. There is one inactive dam that has been used for hydropower generation in the past. Dam locations are shown on **Map 9: Managed Resources**.

Table 16. Dams on the Warner River

STATE DAM CODE	NAME	TOWN	STATUS	PURPOSE	OWNERSHIP
243.03	WARNER RIVER BOX FACTORY	WARNER	BREACHED	Mill	Private
243.05	WARNER RIVER DAM	WARNER	PROPOSED	Hydropower	Private
243.06	WARNER RIVER	WARNER	PROPOSED	Hydropower	Private
243.07	SWAIN LOWELL DAM	WARENR	ACTIVE	Recreation	Private
243.29	WARNER RIVER HYDRO	WARNER	ACTIVE	Hydropower	Private
243.12	WARNER RIVER DAM	WARNER	RUINS	Recreation	Unknown
243.09	EXCELSIOR DAM	WARNER	RUINS	Mill	Private
243.10	PRETTY PENNY FARM POND DAM	WARNER	RUINS	Mill	Private
243.11	JENNISON DAM	WARNER	RUINS	Mill	Private
243.08	WARNER RIVER DAM (3 dams)	WARNER	RUINS	Mill	Private
243.13	BAGLEY DAM	WARNER	RUINS	Recreation	Private
243.01	DAVISVILLE DAM	WARNER	RUINS	Mill	Private

[Source: NHDES Dam Bureau, 2015.]

(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)

There are no active water withdrawals along the Warner River. The Warner Waste Water Treatment Facility is the only registered facility that discharges water to the river.

Three communities (Bradford, Warner, and Hopkinton) depend on public water supply wells in the river corridor; however, they are all groundwater sources which do not withdraw water directly from the Warner River. Bradford’s volunteer fire department; however, does draw from both the Hoyte and Warner Rivers. – Bradford, 2012 NRI

(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

Table 17. Registered Water Discharges to the Warner River

<u>Water User</u>	<u>Facility</u>	<u>Type</u>	<u>Permit</u>	<u>Town</u>	<u>Status</u>
WARNER WWTF	WASTE WATER TREAT PLANT	Sewage Treatment	Yes (NHDES)	Warner	Active

[Source: NHDES, 2015 data.]

(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

Table 18. Hydroelectric facilities on the Warner River

DAM	STATUS	NAME	TOWN	OWNER
243.29	INACTIVE	WARNER RIVER HYDRO	WARNER	PRIVATE

[Source: NHDES Dam Bureau, 2015 data.]

The Warner River Nomination Committee has met with the Warner Energy Committee to discuss the preservation of dam owners’ abilities to rebuild or construct new dams on the Warner River. In the spirit of balancing all needs and desires along the river, the WRNC have accommodated these desires by placing thirteen of the fourteen known dam sites under community classification.

The only dam not placed under community classification is the Davisville dam near the Warner/Webster town line. The WRNC has spoken with the land owners whose land hosts the dam (Warner) and the previous penstock and generator sites (Webster). Neither have any intention to develop the dam and wish for a rural classification along that section of the Warner River.

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

There are three sites and one historic district in the Warner River corridor listed in the National Register of Historic Places, as displayed in **Table 19**. Key historic and cultural sites along the Warner River are displayed in **Map 8: Cultural and Recreational Resources**.

Table 19. Warner River Corridor Listings in the National Register of Historic Places

Resource	Listing/Eligibility	Significance	Location	Town
Dalton Covered Bridge	NRHP	State	Joppa Rd.	Warner
Waterloo Historic District	NRHP	State	Waterloo St., Newmarket Rd.	Warner
Waterloo Covered Bridge	NRHP	State	Newmarket Rd.	Warner
Bement Covered Bridge	NRHP	State	Center Rd.	Bradford

Key: NRHP = National Register of Historic Places [Source: National Register of Historic Places www.nps.gov/nr/]

Overview of Mill Development along the Warner River

- Rebecca Courser, Executive Director, Warner Historical Society

The Warner River flows diagonally from west to east practically cutting the town of Warner in half. Native Americans travelled along its path while hunting and fishing. Fernanda Harrington, author of *Lost Davisville*, wrote, "Many paths cleared for roads by the proprietors, which continue to be roads today, were former Indian trails." Their artifacts have been found on the banks of the river in Waterloo and Davisville. Both of these locations had naturally occurring falls which were popular fishing spots for the Pennacooks. According to Harrington, "Projectile points, scraping tools, hearths, even human remains have been found in the area along the level flood plains and precipitous banks of the river." Lucretia Davis wrote, "A little above Gunner's Nose where now is a smooth field (where the river bends to the west) is another of the Indians' picnic grounds – when the tall pines were cut and the big stumps were removed there was found beneath them a layer of smooth stones, laid with care, and at first supposed to be a burial ground but on close inspection it was seen to be a hearth."

When the Amesbury Proprietors were trying to establish an early settlement in the 1740s their early log cabins and attempts at establishing a sawmill were burned one winter by the Pennacooks. Settlement of the town would not occur until the 1760s after the end of the French and Indian War. When settlers returned, Francis Davis established the first permanent sawmill in 1763. Various members of the Davis family were skilled in the mechanical arts and were proficient at creating a variety of mills in the Davisville, North Village, Schoodac and Roby districts of Warner.

Prior to the Flood of 1826 Davisville had a sawmill, gristmill, a mill for grinding lead, an iron foundry for producing hand-iron and clock weights, a tin yard, brickyard, plaster mill, blacksmith shop, a tanning yard, and woolen cloth mill. All of these mills were damaged or destroyed during the epic flood. The sawmill and gristmill were immediately rebuilt. Production continued of shingles, lathes, clapboards and shoe pegs. Later a paper mill and strawboard mill were established. By 1903, all of the mills had ceased operation. Henry and Horace Davis moved the manufacture of paper to West Hopkinton. The water power rights and buildings were acquired by the Contoocook Electric Company and most of the buildings were razed.

Davisville was one of the more productive sites along the river. Generations of Davis family members remained in the area and were occupied as farmers, teachers, and boarding house managers. Along the high banks were located the Davis Tavern, a store, the schoolhouse and eventually, boarding houses of the early 20th century. The downfall of the village was its distance to the nearest railhead, $\frac{3}{4}$ of a mile away at Dimond's Corner, which made it challenging to ship products and receive raw goods.

Dr. Moses Long wrote in 1823 that Warner had 16 sawmills and 8 gristmills. By 1832, according to Amanda Harris the town had 12 sawmills, 2 clothing mills, 1 paper mill, and 6 gristmills.

As we proceed upriver above Davisville the flow of the river flattens out and creates wide flood plains and intervalles before the next set of dams were erected in the Main Village of Warner. Many farmers took advantage of the seasonal flooding of the river which enriched their soils to raise bountiful crops of grain and hay.

Jacob Davis built the first gristmill and Nicholas Fowler and Nathan Colby built a carding mill and grist mill (after Davis's mill was destroyed by fire) in 1830. Warner farmers were taking advantage of the sheep craze and in 1831, the first year sheep were taxed, Warner had 2, 274 sheep. By 1884, the sawmill was manufacturing wooden box shooks. In 1891, the mill sawed 700,000 board feet of lumber and the majority went into making boxes. The grist mill ceased operation in 1907 and the box shop burned in 1964.

Two commodious 2 ½-story buildings were built nearby in 1873 to become shoe factories but the businesses never materialized due to an economic depression. Ten years later the buildings were used to manufacture leather goods for the Merrimack Glove Company. This set of buildings burned in 1890 and the one of the rebuilt buildings in 1897. Over the years the building was used to manufacture shoes, bobbins, toys, to store coal, a wood turning business, a saw mill to produce

lumber, baseball bats, crutches, transformers, and special power supplies. Grand Transformers, a portfolio company of Blackford Capital, acquired Warner Power in February, 2016.

Other businesses occurring near the river in the village were a creamery, an evaporating company, a wood-alcohol plant, a dye plant, blacksmith shops, a cooperage, a broom factory, a fuel & oil business, and a grain store.

About ¼ of a mile above the sawmill was the location of River Bow Park established in 1875 on a lovely intervale owned by Nehemiah Ordway. This site was used as a fairgrounds until the late 1890s. The fair commissioners built a racetrack, grandstand, several exhibit halls and dining pavilions. The railroad established a separate station for passengers to disembark right onto the grounds.

Nathaniel Bean purchased the mill privilege in Waterloo in 1798 to immediately build a saw and grist mill. Within a short period of time there was a tannery, a clothing and carding mill, a trip hammer, a blacksmith shop, a paper mill for fine and coarse paper, and a book bindery. Later Daniel Bean operated a bakery for several years. R.C. Brayshaw & Company operated a printing shop in the former railroad depot. A few years ago, it built a new facility a mile east of the above location.

A section of Sutton dips down to the Warner River between Waterloo and Roby. On this stretch of the river in the early 1820s-30s was located a cotton mill and Enoch Gould, son-in-law of Aquilla Davis of Davisville, operated a sawmill from 1839-1858 when the business was operated by his son-in-law, Charles Morse, during the Civil War years.

In the early 1800s, Benjamin Evans built a sawmill next to his farm in Roby and it was in operation for several years and was operated by Daniel Wheeler and Noah Andrews. Just upstream the Redington family moved from Sutton to the Roby district to manufacture clothespins and hubs. They used 100 carloads of elm in 1890 to manufacture all sizes of hubs. It was considered one of the largest hub factories in New England with over 80,000 hubs sold by 1894. The mill buildings burned several times and were rebuilt. In 1906, the mill owners were cited for breaking the law by dumping sawdust into the river. The hub factory was out of business by 1932 and clothespins were made here by the Mitchell family. Then it was sold to become the N.E. Crutch factory. The mill buildings succumbed to fire in 1937.

Up the river from the Redington mill pond is a fast drop in the river through a small gorge. This section of the river was home to at least four different mills used for several different operations. There was a woolen mill, chair manufacturing, pail and churn factory, a shoe shop, a carriage shop, an excelsior mill, and a box factory, along with a couple of blacksmith shops.

Lt. Stephen K. Hoyt built a sawmill and gristmill in 1798 in Melvin Mills. Both mills were later purchased by members of the Melvin family which added the manufacture of shingles. John Rogers manufactured chairs, bedsteads, and milk can stopples. Robert Thompson operated an evaporator for drying apples in the late 1880s. Carl Cutting made baseball bats in the 1920s.

Dowling School Supply took over the Sawtelle Grange building to convert huge rolls of paper shipped from the Brown Paper Company to make various school supplies.

Various tributaries to the Warner River also had mills. Below Bagley Pond on Frazier brook the Sargent brothers operated a sawmill which is located on an 1805 map of Warner. David Foster made wooden hay rakes on Bartlett brook. Brickyards were located in Davisville, along Schoodac brook, and near the old fairgrounds. Potter Dimond operated the manufacture of earthenware in Joppa. Wells Davis ran a saw and gristmill and distillery on Silver Brook. Benjamin Harriman operated his carriage shop just downstream from Wells. John Morgan turned out bowls and mortars on Davis brook on Newmarket road. An up-and-down saw mill and gristmill were located on Schoodac Brook in 1805. Isaac Connor operated a mill there that was equipped with a circular saw, planer, shingle mill, clapboard machinery and cider mill. Willow brook also had a saw and gristmill along with a clothing mill, a tannery, the manufacture of scythe-snaths, a shingle mill, a threshing mill, a cider mill, the manufacture of wooden bottles, a glove company, a laundry, and the mill pond was used for cutting ice. Ice was also cut on the Warner River on Redington's mill pond.

A 27-mile road bed was established by the Concord & Claremont railroad in 1848-50 that operated from Concord to Bradford. Warner had seven stops along this route: Dimond's in Davisville, Bagley, Lower Warner, the Main Depot in Warner village, Waterloo, Roby and Melvin Mills. Dimond's, Bagley and Lower Warner were just flag stations meaning one had to pull a signal for the train to stop. Farmers brought their milk cans every morning for the milk run. Mondays were designated to pick up farm animals being shipped to market. Many of the larger mill operations had sidings designated for rail cars to be dropped off to deliver raw products or to haul finished products away. In the summer visitors disembarked to stay for a week or a month at the various hotels and boarding houses. Mail was delivered daily at post offices established at the depots. Many station masters operated small stores selling newspapers, cigars, basic staples and candy.

Due to the establishment of mills and railroad depots along the river small clusters of houses were built as well. Davisville, Bagley, Lower Warner, Waterloo, Roby, and Melvin Mills were considered little districts within the township of Warner. With the exception of Bagley, the districts all had one-room schoolhouses located within a short walking distance from the depot. Melvin Mills was home to the Sawtelle Grange. Bagley had a large general store and feed supply business. Warner was the location of several businesses, various hotels, retail stores, the town library, the town hall, churches, private organizations, and the village grade school and high school.

The Dalton, Waterloo and Bement covered bridges and the Lower Warner Meeting House are listed on the National Historic Register. The Waterloo Historic District with its 24 houses, cemetery, school house, railroad depot and mill building are also listed on the National Historic Register.

Oral Histories or General Historical Knowledge

Contained in the narrative above.

(b) Community Resources

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.

The Warner River is recognized by the five towns through which it flows as a valuable resource. The recreation and natural habitat values are recognized in master plans and natural resource inventories (NRIs). Downtown Warner is situated along the river and NH 103 parallels the river for nearly its full length, providing scenic views for drivers.

Master Plan Language in Support of the Warner River's ecological and community services

Bradford

Excerpts from the 2006 Master Plan and 2012 NRI recommendations include:

- The Warner River, and a number of brooks and streams, which not only provide resources for water recreation, but also provide additional habitat for the unique natural communities in the Town.
- Hold discussion about watershed and aquifer protection on a regional scale and seek partnership opportunities to enhance the quality of those resources.
- Seek easement on contiguous open-space areas to protect them from development and preserve wildlife corridors.
- Bradford's NRI recognizes the town's role in maintaining the water quality of the Warner River, highlighting flood control, erosion, and nutrient runoff as the most important aspects.
- The 2012 NRI concludes that consideration should be given to protection of the watershed of the largest lake and river, Lake Massasecum and the Warner River.

Warner

Excerpts from the 2009 NRI Recommendation and 2011 Master Plan Goals:

- Investigate opportunities to enhance connectivity among key natural areas and along riparian and shoreland corridors.
- Strengthen local regulatory tools to protect natural resource such as floodplains, riparian areas, scenic views, aquifers, and wildlife habitat areas.
- Protect at least 20% of the Warner River corridor.
- Connect conservation blocks of > 250 acres, particularly along stream and wetland corridors, to enhance wildlife movement.

Sutton

Excerpts from the 2004 Master Plan recommendations include:

- The Town should provide for comprehensive protection of shoreland and surface waterbodies through regulatory, educational, and voluntary efforts.
- Ensure that the water resources in Sutton are protected through voluntary and regulatory efforts.

Webster

Excerpts from the 2005 Master Plan suggestions include:

- Future consideration of a zoning ordinance that requires a buffer, a naturally vegetated upland adjacent to a wetland or surface water, with setbacks between buildings and the mean high water mark.
- A plan for compliance with NH's Comprehensive Shoreland Protection Act (RSA 483-b) should be a required part of a building permit application for land within the Act's protection zone.
- Webster's aquifers, open space, healthy forests, wetlands and lakes, ponds, rivers and streams are its most valuable elements.

Hopkinton

Excerpts from the 2002 Master Plan recommendations include:

- The Town should provide for comprehensive protection of the wetlands and shoreland through regulatory, educational, and voluntary efforts.
- Realtors and Town staff should encourage new landowners to understand the importance of protecting their shoreland, setting houses back from water bodies, retaining vegetative screening, and preserving natural buffers along the water for wildlife.
- Educate landowners as to where wildlife corridors exist and conservation and land maintenance that they can employ to help preserve and protect these areas.

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 Warner River serves as an excellent freshwater fishery (see Table 12 for species list) with varied habitat that offers anglers good access to the river and ample opportunity. As NH Route 103 parallels the Warner River, there are many unofficial access points which may be utilized for fishing.

(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.

The opportunity for motorized boating on the Warner River is limited due to its size and depth; however, the river offers canoe and kayak paddling for thrill seekers as well as the less adventurous.

American Whitewater rates the Warner River from Melvin Mills to downtown Warner as class IV for normal flows. This rafting section is 3.7 miles long and is considered a unique paddling experience for New England. Due to the size of the watershed, the paddling season is longer than normal and the local wetlands also lend to the extended season. The river consists of flatwater paddling between the major whitewater sections. The upper two thirds of the run are mostly class III with some class II mixed in. Pinball Rapid is rated class IV with a three-foot sluice dam. The Warner Gorge is considered the main event with a series of tight drops one after another creating an intense quarter mile. A typical run of the gorge takes about an hour and a half with two additional take-outs further downstream which would add thirty minutes each. At medium or high levels, the lower sections are well worth the extra flat water paddling.

[Sources: American Whitewater. *Warner – Melvin Mills to Warner*. Available at <https://www.americanwhitewater.org/content/River/detail/id/3603/>.]

It is also worth mentioning, there is an access point near Bohanan Farm's off the Contoocook in Hopkinton, downstream of the Warner River. The water is calm in this area and it is possible to paddle upstream to the Warner River. There is a ramp for canoe/kayak access. There is another access point in Contoocook Village upstream of the Warner River where canoes and kayaks can put in.

(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

The Warner River corridor offers a wide variety of recreation opportunities. From the Bradford Pines Natural Area offering wildlife observation and walking trails to the Town of Warner's Riverside Park, a popular spot for its recreational fields and courts opportunities are available for many interests.

Table 20 lists other recreational sites and opportunities in the corridor and they are displayed in **Map 8: Cultural and Recreational Recourses**.

Table 20. Other Recreational Opportunities in the Warner River Corridor

Site	Ownership	Location	Activities
Bradford Pines Natural Area	Municipal	Bradford	Walking, Picnicking, Wildlife Observation
Kearsarge Elementary School	Municipal	Bradford	Field Sports
Concord – Lake Sunapee Rail Trail	Various	Warner and Hopkinton	Biking, Walking, Scenic Views
Chandler Reservation	Municipal – Fee ownership	Warner	Hiking trails, Wildlife Observation
Snowmobile Trail # 345	Various	Crosses on Dalton Covered Bridge, Joppa Rd. Warner	Snowmobiling
Riverside park	Municipal	Warner	Tennis Courts, Basketball Courts, Baseball, Softball, Soccer, and Football Fields, Skate Park, Bathroom facilities, and a Snack Bar
Bagley Fields	Municipal	Warner	Soccer Fields, Seasonal Ice Skating Rink, Bathroom Facilities, Rail Trail.
Class 6 roads (North Rd along brook, Couchtown Rd., others)	Municipal	Warner	Equestrian Trails, walking, biking
Tom Pond	Municipal	Warner	Swimming, fishing, winter motorcycle races

Source: NH GRANIT; Nomination Committee Input

The Concord – Lake Sunapee Rail Trail is a vision of a trail to follow the Warner River beginning just north of Tom Pond all the way out to Bradford. If this trail becomes a reality, several historical assets may be seen along the trail. A ribbon cutting ceremony on September 27th, 2014 opened a portion of the trail beginning at Bagley Field in Warner. See the effort’s website for progress and updates: <http://concordlakesunapeerailtrail.com/>

(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

Public access for fishing, kayaking, canoeing, and swimming can be found almost anywhere along the Warner River where there is not an existing private residence. NHDOT's Route 103 right of way extends to the river's edge along many portions of the river. There are several informal pull offs along the river which provide potential fishing, boating and other recreation.

Table 21. Public Access Sites on the Warner River

Site	Location	Type	Activities
Swain Lowell Dam	W. Roby District Rd.	Foot Access	Swimming, Whitewater
Melvin Mills	Melvin Rd	Cartop	Whitewater
Paddlers Gage	Lane Bridge	Cartop	Whitewater
Upper Take-Out	Below Gorge	Cartop	Whitewater
Middle Take-Out	E. Roby District Rd.	Cartop	Whitewater
Waterloo Take-Out	Covered Bridge	Cartop	Whitewater
Bottom Take-Out	0.3mi E. of Covered Bridge	Cartop	Whitewater
Bagley Fields	NH 103, Warner	Parking lot	Soccer Fields, Swimming

Source: NH GRANIT; Nomination Committee Input




5. Other Resources



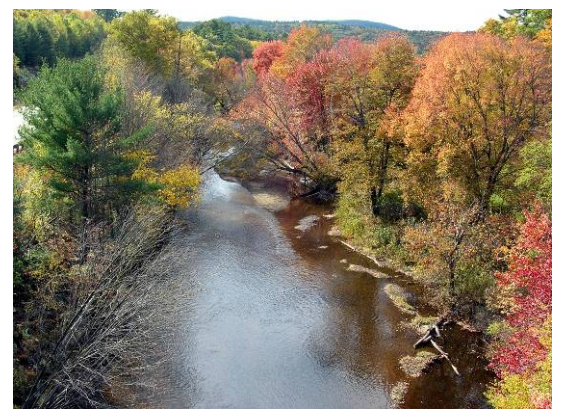

(a) Scenic Resources

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.

The Warner River is visible at a number of road crossings and from adjacent roads at many points along its length. Scenic views can be found on bridges and access points throughout the corridor. The landscape surrounding the river is generally forested, with some open agricultural fields or residential development clearings. The topography from Bradford to about the crossing of I-89 is varied and offers some spectacular views. As the land evens out through downtown Warner and through Webster and Hopkinton, the river calms and becomes wider, offering a stark contrast from the upstream rapids. Bridge crossings throughout the river provide points where passersby may take in scenic views of the river. **Map 7: Cultural and Recreational Resources** water access and recreation sites as well as scenic points along the river. **Table 22** provides photos of the Warner River beginning at Melvin Mills in Warner and down to the confluence of the Warner and Contoocook Rivers.

Table 22. Scenic Views of the Warner River

	<p>Autumn on the Warner River, looking upstream from Melvin's Mills bridge toward the Warner and Bradford town line. This bridge marks the beginning of the first Warner RMPP Community Segment, where a series of historic mills once existed. Josiah Melvin purchased the former gristmill and sawmill of Lieutenant Hoyt in 1798.¹ Many of the historic homes still remain today.</p>
	<p>The downstream view of the Warner River from the Melvin's Mills bridge, just before the river plunged over the dam that once harvested the river's waterpower. Five of Josiah's sons also became millers or mechanics, and the village was named in their honor.² At the base of the dam is Mill Pond that still exists as a swimming hole today. The old railroad passed through the village, river-left, and boxcars carried out many mills' finished lumber.</p>
	<p>Farther downstream, looking upstream from Laing Lane bridge toward a set of old railway bridge abutments and Warner River Hydro's pump house (river-right).</p>
	<p>View from Laing Bridge looking downstream. On the abutments of Laing Lane bridge, white water kayakers have painted their own river gage to know how to run the Class IV rapids beyond. Kayakers have long ushered in spring for loving to run the Warner's whitewater at higher flows. The USGS gage at Bradford's Lake Todd dam has been removed, so this informal gage and the USGS gage in Davisville are the only gages that remain along the Warner River.</p>

	<p>A downstream view from the Roby district with another set of old stone railroad bridge abutments in the background. This calm, pond-like segment (another swimming area for local residents) is the backwater of the Swain Lowell dam. In the early 1900's, prior to refrigeration, this pond and others along the river corridor were important for harvesting ice. Blocks were floated and stored in ice houses for summer use.³</p>
	<p>At the northern part of Roby district the river slows to meander beneath Rte. 103 to Sutton and back for the confluence of the Lane River, a major tributary. Here is a view looking upstream from the covered bridge in Waterloo, the next historic village district. The historic Waterloo railroad station, immediately northwest of this bridge, serviced eight passenger trains and two freight trains a day! By May 1941, service was discontinued due to the invention of the automobile.⁴</p>
	<p>From Waterloo, the Warner River travels beneath I-89, through downtown Warner where it then widens and slows to create a series of extensive wetland complexes and floodplains. This is an upstream view from the NH 103 bridge in Lower Warner that traverses over I-89. Prior to leaving Warner, the river takes one final steep fall at Davisville Falls, another former dam site just south of the NH 127 bridge.</p>
	<p>After passing briefly into Webster, the river again slows to meander through Hopkinton where it joins the Contoocook River just northeast of the downtown Contoocook. This is a kayaker's view of the two rivers' confluence, an area of floodplains, long dominated by farming.⁵</p>

¹Buchar, L and Courser, R. Images of America, Bradford and Warner, Charleston, South Carolina: Acadia Publishing, 2012, p10. ²ibid, p10. ³ibid, p32. ⁴ibid, p66. Photo credit to Chris Connors and Doug Giles⁵

(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.

Over half of the Warner River corridor is forested, together with the next most prominent land cover (wetlands) the two make up over 70% of the total area within the corridor. Light development, consisting primarily of residential use accounts for almost 10% of the river corridor and highly developed land maintained only 0.3% of the river corridor. **Table 23** displays the existing land cover and acreages within the corridor. **Map 7: Existing Land Use** displays land cover types along the river.

Table 23. Land Cover by Type in the Warner River Corridor

Land Use	Acres	Percent of Corridor
Forest Land	3116	56.9%
Wetlands	850	15.6%
Lightly Developed Land	542	9.9%
Agricultural Land	313	5.7%
Scrub/Shrub Transition Land	221	4.1%
Developed Open Space	170	3.1%
Moderately Developed Land	160	2.9%
Barren/Idle Land	55	1.0%
Open Water	29	0.5%
Highly Developed Land	17	0.3%
TOTAL	5,473	100.0%

Source: GIS land cover classification (generalized by CNHRPC) from NOAA Coastal Change Analysis Program, based on satellite imagery from 2010.

The Warner River flows by or through six distinct settlements, villages, or town centers with a mix of land uses, surrounded by residential and rural development:

- Melvin Mills
- Roby
- Waterloo Village
- Downtown Warner
- Schoodac
- Davisville

Two primary commercial areas exist within the river corridor. Both reside in Warner, one being the commercial area around Exit 9 of I-89 and the other being downtown Warner.

O & E Repair is a relatively large truck repair shop in Bradford and is the closest resemblance of any industrial facility along the Warner River. The facility's grounds run along the river.

Waste facilities within the river corridor include the Warner Transfer station which is off NH Route 103, and the Warner Wastewater Treatment Plant on West Joppa Road. As mentioned above, the wastewater facility is permitted by NHDES to discharge into the Warner River.

Utility Crossings

There are multiple utility line crossings throughout the river corridor:

- Todd Pond outlet at NH Route 103
- Bradford Village at bridge below old water-powered mill
- Route 114 towards Henniker after junction with NH Route 103
- At the Roby District near the Sutton town line, crossing at both bridges
- Junction of Roby Road and NH Route 103
- Newmarket Road at the Waterloo covered bridge
- Chemical Lane near downtown Warner
- At the old bridge (now a footbridge) next to the Warner Power Company
- At the covered bridge on West Joppa Road
- Lower Warner, where NH Route 103 crosses I-89
- At the Davisville bridge on NH Route 127

Future Development

NH Route 103 is the major road running roughly parallel to the Warner River from Bradford to Hopkinton. It is located on the northern side of the river until it crosses at exit 8 on I-89. It continues to travel along the southern/western bank of the river to where it merges with the Contoocook. Also notable is the several crossings of I-89 over the Warner River. Beginning north of exit 7 in Warner. The interstate crosses the river again at exit 8 and again at exit nine before headed north and away from the river. The section length of the Warner River between exits 7 and 9 is six and a half miles. Local roads also cross the river at 21 locations. Bridges over the Warner River are listed in Table 24.

Table 24. Bridges Crossing the Warner River

Bridge ID	Location	Town	Ownership
146/160	NH 114	Bradford	NHDOT
161/145	Breezy Hill Rd	Bradford	Municipality
170/024	Morse Loop	Sutton	Municipality
166/103	I-89 SB	Warner	NHDOT
166/104	I-89 NB	Warner	NHDOT
183/114	North Village Rd	Warner	Municipality
204/136	NH 103	Warner	NHDOT
206/141	I-89 SB	Warner	NHDOT
206/141	I-89 SB	Warner	NHDOT
181/112	Chemical Rd	Warner	Municipality
191/122	Joppa Road West	Warner	Municipality
166/103	I-89 SB	Warner	NHDOT
244/167	I-89 NB	Warner	NHDOT
199/128	I-89 NB	Warner	NHDOT
160/022	Bible Hill Lane	Warner	Municipality
144/056	NH 103	Warner	NHDOT
254/180	NH 127	Warner	NHDOT
145/053	NH 103	Warner	NHDOT
151/037	Laing Rd	Warner	Municipality
157/087	New Market Rd	Warner	Municipality
243/166	I-89 SB	Warner	NHDOT

Source: NH Department of Transportation

There is an abandoned and overgrown railroad trestle crossing the Warner River. It is not safe for motorized travel; however, as of October 2013, Warner Town Administrator, Jim Bingham, has submitted a grant application to the New Hampshire Bicycle and Pedestrian Grant Program to make safety improvements to the trestle to allow for bicycle and pedestrian traffic as this trestle is part of a proposed rail-trail along the river.

(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).

Warner River Nomination Regulatory Summary

The five communities along the Warner River are highly conscious about water resource protection and careful land management as it relates to water quality as illustrated in their municipal planning and zoning regulations. Bradford, Warner, Sutton, Webster, and Hopkinton have relatively current Master Plans and the effective regulatory mechanisms of up to date Zoning Ordinances, Zoning Districts, and Subdivision and Site Plan Review Regulations which

protect the Warner and manage activities which would affect the towns' waters. Current Zoning districts in the five communities are displayed in **Map 10: Zoning Districts**.

Master Plans

Master Plans are the basis upon which the Zoning Ordinance, Subdivision Regulations, and Site Plan Review Regulations are written. Master Plans should be updated every five to 10 years to ensure priorities are reevaluated and land management issues are adequately addressed.

Master Plans for the communities contain recommendations on controlling stormwater, protecting Warner River riparian lands, adding or amending regulations on open space subdivisions, river access for recreational use, rezoning for Lake and wetlands protection, agricultural land management, developing a Water Resource Management and Protection Plan, and many more. These recommendations set the stage for many of the present regulations and ordinances that regulate the communities. Recommendations from Master Plans are contained in Section 3(b) above.

Zoning Ordinances

From the Master Plan findings arise the backbone of community regulation, the Zoning Ordinance. Further commitment to water resource protection is shown in the Town-resident adoption of zoning ordinances and districts. Ordinances such as steep slopes, open space subdivision, floodplain development, and shoreland protection, and zoning provisions such as impervious surface restrictions and buffers and setbacks from water bodies and water courses protect the water resources of the five Warner River communities on a town-wide level.

Zoning Districts

Zoning districts provide restrictions for certain geographical areas of a community. Districts from each of the five communities are detailed in the following tables for each Town. Those districts across the five-town region that directly or indirectly protect water resources include variations of Open Space, Agricultural, Rural, Residential, and Commercial (by having impervious surface limitations). Overlay districts of Wetland Conservation and Warner Intervale provide more distinct restrictions to development in addition to the requirements of the underlying zoning district.

Subdivision and Site Plan Review Regulations

Subdivision and site plan review regulation provisions of the communities have a direct impact on how new developments will interact with the surrounding landscape. Protections include those for surface water and wetlands, septic system provisions, and land management activities such as erosion and sedimentation control and stormwater management regulations. Most communities regulate the inspections of improvements. Some support recreational access to waters. These essential regulations are the first line of on-the-ground control of how land uses are restricted from affecting water bodies, streams, and the Warner River.

Together, the recommendations, ordinances, districts, and regulations of Bradford, Warner, Sutton, Webster, and Hopkinton display an elevated level of awareness of the need to protect and enjoy the Warner River and the water resources that feed into its channel.

Community Protections

Bradford, Warner, Sutton, Webster, and Hopkinton have Planning Board-adopted Master Plans and Subdivision and Site Plan Review Regulations of varying ages which can be modified at any time to ensure further water resource protection. Zoning Ordinances and Districts must be adopted at typically annual Town Meetings by residents.

Bradford

Zoning Ordinances (2011) and zoning provisions of Bradford include:

- Septic systems in wetland and buffer areas must be in accordance with DES requirements.
- Minimum distance from shoreline, as determined by high water mark, to any building shall be 75'
- Erosion and Sedimentation Control Provisions
- Shoreland Protection Act (RSA 483-B)
- Wetlands ordinance
- Floodplain Development overlay zone regulations
- Cluster Development Provisions

Bradford's Zoning Districts and Requirements are summarized:

Zoning District	Minimum Lot Area or Dimensions	Front / Side / Rear Setbacks	Max. Building Coverage / Height	Open Space Provisions?
Residential Business District - Applies to most of the Center of Town	One dwelling or business per two buildable acres. 250' of road frontage	50' from right of way of 75' from center of public road / 30' / 30'	n/a / 35'	No
Conservation District - Applies to areas over 1,200' in elevation.	Minimum of five acres (ten acres for a cluster development), 400' of road frontage	50' from right of way of 75' from center of public road / 30' / 30'	n/a / 35'	Intended to minimize development density for land preservation purposes.
Residential Rural District - All areas outside of downtown lower than 1,200'	One dwelling or business per two buildable acres. 250' of road frontage.	50' from right of way of 75' from center of public road / 30' / 30'	n/a / 35'	No

The 2015 Bradford Subdivision Regulations include:

- Stream and Surface Water Provisions
- Erosion and Sedimentation Control Provisions
- Stormwater Management Provisions
- Design Review
- Septic System Provisions
- Topographic Provisions (5' contours)
- Inspection Provisions
- Performance Bond
- Minimum Buildable Lot Area

Site Plan Review Regulations (2014) for Bradford include:

- Stream and Surface Water Provisions
- Erosion and Sedimentation Control Provisions
- Stormwater Management Provisions
- Septic System Provisions
- Topographic Provisions
- Inspection Provisions
- Performance Bond
- Floodplain and Wetland Protection Provisions
- Steep Slopes Protection Provisions
- Open Space Lands Provisions

Warner

Zoning Ordinances (2015) and zoning provisions of Warner include:

- Steep Slope Protection Provisions
- Stream, Wetlands, and Surface Water Provisions
- Soils Assessment
- Septic System Provisions
- Floodplain Protection Provisions
- Environmental Protection Provisions
- Landscape Regulations
- Open Space Development Provisions

Warner's Zoning Districts and requirements are summarized:

Zoning District	Minimum Lot Area or Dimensions	Front / Side / Rear Setbacks	Max. Building Coverage / Height	Open Space Provisions?
Village Residential District R-1	20,000sqft, 100' of frontage. Unless not served by a municipal sewer system in which case - 40,000sqft and 150' of frontage	30' / 15' / 15'	n/a / 35'	n/a
Medium Residential District R-2	Two acres, 200' of frontage. Unless served by municipal sewer, in which case - 40,000sqft, 120' of frontage	40' / 25' / 25'	n/a / 35'	Open Space Development Article XIV applies
Low Density Residential District R-3	Three acres, 250' of frontage. If bordering shoreline of public lake or pond - 100' of frontage.	50' / 40' / 40'	n/a / 35'	Open Space Development Article XIV applies with exceptions.
Open Conservation District OC-1	Five acres, 300' of frontage. If bordering shoreline of public lake or pond - 200' of frontage.	50' / 50' / 50'	n/a / 35'	Open Space Development Article XIV applies with exceptions.
Open Recreation District OR-1	Five acres, 500' of frontage. If bordering shoreline of public lake or pond - 200' of frontage.		n/a / 35'	Open Space Development Article XIV applies with exceptions.
Business District B-1	10,000sqft, 100' of frontage.	30' / 15' / 15'	4,000sqft, 45'	n/a
Commercial District C-1	40,000sqft, 200' of frontage.	40' / 25' / 25'	40,000sqft. No more than 70% of lot may be covered by impermeable surfaces. Special exceptions apply. 45'.	Where abutting a parcel of residential or open space zoning, a natural vegetative buffer of 25' is required. Additional provisions exist.
Warner Intervale Overlay District INT	The overlay district encompasses a portion of the commercial district and serves as a framework for development to reflect the historic character of the town and serve as a social hub for the community. Provisions are identical to those of the C-1 district with additional permitted use provisions.			

The 2015 Warner Subdivision Regulations include:

- Stream, Wetlands, and Surface Water Provisions
- Erosion and Sedimentation Control Regulations
- Stormwater Management Regulations
- Septic System Provisions
- Soils Assessment
- Environmental Impact Assessment
- Topographic Provisions (2' or 5' contours depending on grade)
- Floodplain Protection Provisions
- Open Space Lands Provisions

Site Plan Review Regulations (2015) for Warner include:

- Stream and Surface Water Provisions
- Groundwater Protection Provisions
- Steep Slope Protection Provisions
- Erosion and Sedimentation Control Regulations
- Stormwater Management Regulations
- Open Space Provisions
- Septic System Provisions
- Topographic Provisions (2' contour minimum)
- Performance Bond/Surety Provisions
- Inspection Provisions
- Water Zoning District Locations
- Design Review Provisions
- Floodplain Protection Provisions
- Landscape Regulations

Sutton

Zoning Ordinances (2014) and zoning provisions of Sutton include:

- Septic Setbacks
- Stream/River, Surface Water, and Wetland Setbacks
- Floodplain Development Ordinance
- Steep Slope Provisions
- Open Space Provisions
- Erosion and Sediment Control Provisions
- Wildlife Habitat Protection Provisions

Sutton's Zoning Districts and requirements are summarized:

Zoning District	Minimum Lot Area or Dimensions	Front / Side / Rear Setbacks	Max. Building Coverage / Height	Open Space Provisions?
Residential District	Two acres, 250' of road frontage. If bordering shoreline 150' of frontage	46.5' from center line of any road 2 rods wide, 55' from centerline of any road 3 rods wide, 63' from centerline of any road 4 rods wide / 15' / 15'	n/a / 35', special exceptions exist.	Applicable to cluster developments.
Rural - Agriculture	Two acres, 200' of road frontage. If bordering shoreline 150' of frontage	66.5' from center line of any road 2 rods wide, 75' from centerline of any road 3 rods wide, 83' from centerline of any road 4 rods wide / 25' / 25'	n/a / 35', special exceptions exist.	Applicable to cluster developments.

The 2015 Sutton Subdivision & Site Plan Review Regulations include:

- Stream and Surface Water Provisions (shown on the plan)
- Wetland Protection Provisions
- Septic System Provisions
- Soils Assessment Requirements
- Stormwater Management Provisions
- Erosion and Sediment Control Provisions
- Topographic Provisions (5' contours for slopes 10% or greater)
- Steep Slope Provisions
- Open Space Provisions
- Environmental Impact Study Requirement
- Performance Bond/Surety Provisions
- Design Review Provisions
- Inspection Provisions

Webster

Zoning Ordinances (2014) and zoning provisions of Webster include:

- Septic System Provisions
- Waterbody Setback (50')
- Planned Commercial Development
- Planned Commercial Business Ordinance
- Floodplain Development Ordinance
- Groundwater Protection Ordinance
- Non-point Source Pollution Reduction Provision

Webster's Zoning Districts and requirements are summarized:

Zoning District	Minimum Lot Area or Dimensions	Front / Side / Rear Setbacks	Max. Building Coverage / Height	Open Space Provisions?
Pillsbury Lake District	No lots in the Pillsbury Lake District may be subdivided.	20' / 12' / 20'	At the discretion of the Board of Adjustment	No
Residential/ Agricultural District	Five acres, 250' of road frontage	100' / 50' / 50'	At the discretion of the Board of Adjustment	No

The 2009 Webster Subdivision Regulations include:

- Stream and Surface Water Provisions
- Wetlands Protection Provisions
- Protection of Natural Features Provision
- Steep Slope Protection Provisions
- Soil Assessment Provision

- Stormwater Management Provisions
- Septic System Provisions
- Topographic Provisions (10' contours)
- Erosion and Sediment Control Provision
- Landscape Provision
- Inspection Provisions
- Performance Bond/Surety Provisions
- Floodplain Protection Regulations and Provisions
- Open Space Provisions

Site Plan Review Regulations (2009) for Webster include:

- Stream and Surface Water Provisions
- Erosion and Sedimentation Control Provisions
- Septic System Provisions
- Topographic Provisions (2' contours)
- Performance Bond/Surety Provisions
- Floodplain Provisions
- Open Space Lands Provisions
- Landscape Regulations

Hopkinton

Zoning Ordinances (2010) and zoning provisions of Hopkinton include:

- Septic Setbacks
- Stream, Surface Water, and Wetland Protection Provisions
- Aquifer Protection Provisions
- Erosion and Sedimentation Control Provisions
- Stormwater Management Provisions
- Floodplain Development Ordinance
- Environmental Protection Provisions
- Wildlife Protection Provisions
- Steep Slope Ordinance (15%)
- Open Space Subdivision Ordinance
- Shoreland Development Ordinance

Hopkinton's Zoning Districts and requirements are summarized:

Zoning District	Minimum Lot Area or Dimensions	Front / Side / Rear Setbacks	Max. Building Coverage % / Height	Minimum % Open Space/Lot
Residential/ Agricultural R-4	120,000sqft, 300' of road frontage.	60' / 30' / 60'	20 / 35'	70
Low Density Residential R-3	120,000sqft, 300' of road frontage.	60' / 30' / 60'	20 / 35'	70
Medium Density Residential R-2	80,000sqft, 250' of road frontage.	40' / 20' / 40'	30 / 35'	30
High Density Residential R-1	60,000sqft, 160' of road frontage. Other than residential - 15,000sqft, 100'	30' / 15' / 40' Other than residential - 25' / 15' / 40'	30 / 35'	30
Commercial B-1	15,000sqft, 100' of road frontage.	30' / 15' / 40'	40 / 35'	50
Industrial M-1	110,000sqft, 250' of road frontage.	50' / 40' / 50'	40 / 45'	30
Wetlands Conservation (Overlay) W-1	The intent of this overlay district is to provide protection for an appropriate use of lands as delineated in Section XII of the Zoning Ordinance.			
Village High Density Residential VR-1	15,000sqft, 80' of road frontage.	30' / 15' / 40'	40 / 35'	30
Village Commercial VB-1	7,500sqft, 50' of road frontage.	0' / 10' / 10'	60 / 35'	20
Village Industrial VM-1	55,000sqft, 150' of road frontage.	25' / 25' / 25'	50 / 35'	30

The 2014 Hopkinton Subdivision Regulations include:

- Stream and Surface Water Provisions
- Wetlands Protection Provisions
- Aquifer Inventory Provision
- Steep Slopes Protection Provisions (>25%)
- Erosion and Sedimentation Control Regulations
- Stormwater Management Regulations
- Septic System Provisions
- Topographic Provisions (2' contours)
- Inspection Provisions
- Performance Bond/Surety Provisions
- Floodplain Inventory Provisions
- Open Space Lands Provisions

Site Plan Review Regulations (2012) for Hopkinton include:

- Stream and Surface Water Provisions
- Wetlands Protection Provisions
- Aquifer Protection Provisions
- Floodplain Protection Provisions
- Erosion and Sedimentation Control Regulations
- Stormwater Management Regulations
- Septic System Provisions
- Topographic Provisions
- Inspection Provisions
- Performance Bond/Surety Provisions
- Open Space Provisions
- Landscape Regulations

Summary

These five Warner River communities have demonstrated their commitment to protecting streams, the Warner River, water bodies, wetlands, and groundwater by the regulations and ordinances they have implemented. The degree of water resource protection stated, both implicitly and explicitly, in Town ordinances and regulations means the designation of the Warner River into the Rivers Management and Protection Program (RMPP) fits in perfectly with municipal goals and implementation strategies. The municipal Master Plans state even more clearly the necessity of preserving water resources and the Warner River.

Within the Zoning Ordinances, all five communities have water course, water body, and/or wetland setbacks or protection regulations. All five have some degree of Floodplain Development Ordinances. All towns have erosion and sedimentation control and stormwater management regulations for their Subdivision and/or Site Plan Review Regulations, but three have also adopted erosion and sediment control provisions into their Zoning Ordinance. Four of the five have the equivalent of an Open Space Development Ordinance although the name varies. Webster has explicitly mentioned a provision to identify and reduce non-point source pollution. This planning tool allows prime natural features, including water features, to be preserved instead of developed.

Bradford, Warner, Sutton, Webster, and Hopkinton, the Warner River communities, have shown the promise of managing their own riparian resources. With designation into the RMPP, the towns will have further support available to them and the new ability to share the management of this regional resource. A partnership in the form of a Local Advisory Committee would enable the five communities to enhance their existing River resource management tool box and to take advantage of the expertise of the other communities along the Warner River, augmenting individual local regulatory powers.

(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.

Table 25. Stream Gauge Locations on the Warner River

Gage Location	Years of Record	Partial or Full Record Station
01086000 Warner River at Davisville Lat 43°15'03", Long 71°43'58" Drainage area 146.00 sq. mi. Gage datum 379.96 ft above NGVD29	1938 - present	Full Record Station

(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.

Flowage rights for dams and riparian interests for landowners exist historically but are not documented other than the creation of the Warner Village Water District and its ability to appropriate any springs, streams, rivers, or ponds.

(f) Scientific Resources

Describe any scientific studies or research occurring in the river corridor, including water quality monitoring, aquatic species inventories, geologic studies or similar research. Also describe if the river is used for environmental studies programs in local schools or colleges.

A new NHDES Volunteer River Assessment Program (VRAP) will begin in June 2017 and the volunteers will be testing sites along the Warner River in Bradford, Sutton, Warner and Hopkinton. NHDES is loaning water quality monitoring equipment this year and provides technical support and facilitates educational programs to volunteer groups. This will aid in providing up-to-date water quality data for Hoyt Brook and the West Branch, Warner and Lane Rivers.

The Bradford Kearsarge Elementary School fifth grade students, Kearsarge Regional Middle School and High School students incorporate NH Fish & Game's *Project WEP* (Watershed Education Program) and Trout Unlimited's *Trout in the Classroom* programs into their curriculum. While raising Brook Trout from hatchery eggs, students study the watershed to find an appropriate habitat release site. Bradford Elementary students release their trout into the Warner River at the Bradford Pines Natural Area. Upon learning that Trout Unlimited once found sixty young-of-the-year Brook Trout in a stream on the KRHS campus, students were so inspired they built a rain garden in autumn of 2016 to help protect the trout stream. See the project's lead inland fisheries biologist, Ben Nugent's Watershed study (Appendix F & F1).

In 2016, students from Colby-Sawyer College and New England College interviewed with Trout Unlimited to serve as a Warner River Watershed Conservation Project intern. In 2016, the intern trained with the NH Geologic survey to learn proper culvert assessment protocol and conducted culvert crossing assessments for aquatic organism passage, hydraulic capacity and geomorphic compatibility. This data was submitted to NHGS and NHDOT, the intern assisted with the State review of the data. Interns for 2016 and 2017 have engaged with riparian landowners to survey streams for trout populations, collect macroinvertebrates to determine water quality and to educate landowners on habitat preservation.

Ben Nugent, lead Warner River Watershed Conservation Project fisheries biologist, George Embley, Conservation Chair of Basil Woods Trout Unlimited, and Chris Connors, board member of Basil Woods Trout Unlimited, are members of the Warner River Nomination Committee and make up the steering committee of an ongoing cooperative study of the Warner River watershed. The goal of the study is to protect wild brook trout populations, their habitats and ensure the high water quality of the Warner River Watershed. A document summarizing the project's efforts from 2008 to 2013 can be found in Appendix F as well as specific fish species profiles (Appendix F1).

Having completed all the watershed culvert assessments in the fall of 2016, in July 2017, Trout Unlimited (national) with a grant from the NH Charitable Foundation, joined NH Fish & Game, Basil Woods Trout Unlimited, CNHRPC and many others from federal and state agencies and local organizations to conduct two Flood Resiliency Workshops for the watershed communities. Culvert Survey data was put through an engineering model to assess incremental floods, aquatic organism passage, and geomorphic compatibility. Town teams made up of conservation commission, planning and select board members, road agents and hazard mitigation personnel were taught basic principles of fluvial geomorphology and Wild Brook Trout habitat requirements. The results will be reviewed in order to find potential projects that NH Fish & Game and Trout Unlimited could help facilitate culvert replacements that ensure long-term flood resiliency, improve aquatic organism passage and thereby improve Warner River watershed quality. See Appendix I for the stream crossing assessment summary report.

Nomination Checklist

The following checklist is required information for each river nomination, as described in [RSA 483:6](#).

- (a) Name of the river;
- (b) Location & length of the river or segment;
- (c) Sponsor's name, address, e-mail address and daytime telephone;
- (d) Description of significant resources contained in the river or segment and its corridor;
- (e) Description of community and public support for the nomination, including copies of any letters of support from elected and appointed local officials;
- (f) Documentation of notification of the nomination to elected public officials of all municipalities through which each nominated river or segment flows;
- (g) Recommendation on the classification(s) for the river or segment, including starting and ending points for each segment and the length in miles of each segment;
- (h) USGS map or equivalent of the river or segment and its corridor, & inset or locator map showing location of river or segment within the state;
- (h) Stream order map as determined using the New Hampshire hydrography dataset, including municipal boundaries, major roads, and tributary streams;
- (i) Assessment of river or segment's resources including, but not limited to, the following:
 - (1) Geologic resources;
 - (2) Wildlife resources;
 - (3) Vegetation and natural communities;
 - (4) Fish resources;
 - (5) Water quality;
 - (6) Hydrologic resources, including natural flow characteristics;
 - (7) Open space;
 - (8) Dams/Impoundments;
 - (9) Existing and potential hydroelectric resources;
 - (10) Existing and potential withdrawals; existing and potential discharges;
 - (11) Historical or archaeological resources;
 - (12) Community river resources;
 - (13) Existing and potential recreational resources (fishing, boating, public access, other);
 - (14) Public access;

- (15) Scenic characteristics;
- (16) Current land use and controls;
- (17) Water quantity/Stream gauges;
- (18) Riparian interests/Flowage rights;
- (19) Scientific resources;

Please be sure your river nomination includes at least all of the above information. Include 1 hard copy and 1 electronic copy of the nomination when submitting nomination to NHDES. Thank you for participating in the New Hampshire Rivers Management and Protection Program.