

A Nomination of the
Lower Exeter/Squamscott River
to the
New Hampshire Rivers Management and
Protection Program



Photo Credit – Ralph Morang

Submitted by the
Exeter River Local Advisory Committee

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Landowner Meeting agenda

Exeter News Letter Article, April 20, 2010

ERLAC – State of the River *Report*, December 2009

The Exeter-Squamscott , River of Many Uses, by Olive Tardiff, reprinted 2004

Letters in support of the nomination, which are included with this nomination:

- Town of Exeter Conservation Commission
- Town of Exeter Planning Board
- Town of Exeter Board of Selectmen
- Town of Stratham Board of Selectmen
- Town of Newfields Conservation Commission
- Piscataqua Region Estuaries Partnership
- Great Bay Trout Unlimited
- Great Bay Stewards
- Rockingham Planning Commission
- Southeast Land Trust of New Hampshire
- John A. O'Brien, resident of Newfields

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) 271-8801.

SECTION I. NOMINATION INFORMATION

1. Name of River: Lower Exeter/Squamscott

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

Exeter River from the junction of Great Brook in Exeter, past the Great Dam and the falls to the head of the tide in Exeter (2.19 miles), and then the Squamscott River to the boundary of Great bay as defined by upstream side of the railroad bridge in Stratham and Newfields (6.29 miles). A total of 8.48 miles.

3. (a) Sponsoring Organization or Individual: Exeter River Local Advisory Committee

(b) Contact Person: Don Clement, Chair

(c) Address: c/o Theresa Walker, Rockingham Planning Commission, 156 Water Street, Exeter, NH 03833, twalker@rpc-nh.org

(d) Daytime Telephone Number: 603-778-0885

SECTION II. SUMMARY: RESOURCES OF STATEWIDE OR LOCAL SIGNIFICANCE

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

Instructions: 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/ Statewide Significance
Geologic or Hydrologic Resources	X	X
Wildlife Resources	X	X
Vegetation/Natural Communities	X	X
Fish Resources	X	X
Rare Species or Habitat	X	X
Water Quality	X	X
Open Space	X	X
Natural Flow Characteristics	X	X

Managed Resources

Impoundments	X	X
Water Withdrawals/Discharges	X	
Hydroelectric Resources		

Cultural Resources

	Value Present/Local Significance	Value Present/Statewide Significance
Historical/Archaeological Resources	X	X
Community River Resources	X	X

Recreational Resources

	Value Present/ Local Significance	Value Present/ Statewide Significance
Fishery Resources	X	X
Boating Resources	X	X
Other Recreational Resources	X	X
Public Access	X	X

Other Resources

Scenic Resources	X	X
Land Use	X	X
Land Use Controls	X	X
Water Quantity	X	X
Riparian/Flowage Rights	X	
Scientific Resources	X	X

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 most important resource values associated with the Lower Exeter/Squamscott River are:

- **Water quality** – The Lower Exeter River contains the intake pipe for the Town of Exeter's municipal drinking water system, which provides drinking water to over 11,000 people. In addition to the need for drinking water quality protection, the Lower Exeter/Squamscott River is a primary tributary to Great Bay and as such is a contributor to water quality in the Bay.
- **Wildlife habitat** – The Lower Exeter/Squamscott River corridor provides critical wildlife habitat to a wide variety of species that depend on the habitat connectivity provided by the river and forested shoreland along the Lower Exeter and tidal marshes of the Squamscott. Diadromous fish species migrate between the salt water of the Squamscott River and fresh water of the Exeter River through the fish ladder located alongside Great Dam in downtown Exeter.
- **Recreation and Scenic Beauty** – Fishing, boating, and birdwatching opportunities abound along the river corridor. Scenic viewsheds and places to observe nature are treasured by residents and visitors.

Water quality in the Lower Exeter/Squamscott River is a priority issue for the municipalities along the river. The Town of Exeter's municipal drinking water system draws water off the river during the summer months from a pipe located along the Lower Exeter. Numerous other stakeholders, including the NH Department of Environmental Services, NH Fish and Game Department, and the Piscataqua Region Estuaries Partnership, have all identified improving and protecting water quality in the Lower Exeter/Squamscott River as priorities as improved water quality benefits Great Bay, fisheries, and public health.

The Towns of Exeter, Stratham, and Newfields have adopted land use regulations and policies designed to protect water quality, including shoreland and buffer ordinances, stormwater regulations, land conservation programs, storm drain stenciling projects, and educating residents about properly disposing of pet waste and the proper application of lawn fertilizers.

However, these local initiatives are not enough to offset the impacts of ongoing land development and population growth in the region. The Exeter/Squamscott River is listed on the April 2010 List of Impaired Waters submitted to the US Environmental Protection Agency by the New Hampshire Department of Environmental Services.

The 2009 *State of the Estuaries Report* produced by the Piscataqua Region Estuaries Partnership highlights that population growth in the region, including communities along the Exeter/Squamscott River, has resulted in impervious surface cover of greater than 10%, which indicates the potential for degraded water quality and altered stormwater flow. Stormwater runoff and non-point source pollution have led to an increase in the total nitrogen load to the Great Bay by 42% in the past five years. The negative effects of this increasing nutrient load are evident. Water quality has declined as shown by increasing concentrations of suspended solids and chlorophyll-a. Eelgrass habitat in the Squamscott River has disappeared. Dissolved oxygen concentrations consistently fail to meet water quality standards in the Squamscott and other tidal rivers. Toxic contaminants in shellfish tissue and sediments continue to rise. The number of adult oysters in the Great Bay fell by 95% in the 1990s, a time of rapid development along the Lower Exeter/Squamscott River and other tributaries.

Wildlife habitat along the Lower Exeter/Squamscott River corridor is so critical that the *Land Conservation Plan for New Hampshire's Coastal Watersheds* (2007) by The Nature Conservancy and other partners identified the entire Squamscott River corridor as a Conservation Focus Area. The Plan describes the focus area as containing 410 acres of saltmarsh, two plants of conservation concern, five animals of conservation concern, significant floodplain forest, grassland, marsh and peatland habitats, and five exemplary natural communities and systems. These plants, animals and systems are described in greater detail under Wildlife Resources.

The New Hampshire *Wildlife Action Plan* (2006) by the New Hampshire Fish and Game Department reports that the river corridor contains over 1,000 acres of Tier 1 wildlife habitat in New Hampshire, the highest quality level.

The Great Bay Resource Protection Partnerships, *Habitat Protection Plan of the Great Bay NH Focus Area* identified the river corridor as a conservation focus area containing high value habitat based a series of detailed scientific assessments including field inventories, data integration, and GIS modeling.

In addition, protection of the critical wildlife habitat provided by the Lower Exeter/Squamscott River corridor are goals stated in the Master Plans of the Town of Exeter, Town of Stratham, and Town of Newfields.

Recreation alongside and on the Lower Exeter/Squamscott River takes a wide variety of forms. On any given day, Phillips Exeter Academy students can be seen rowing along the Squamscott, fishermen are casting for striped bass from Swasey Parkway in Exeter, and kayakers are launching from town landings in Exeter, Stratham and Newfields. In the winter months, when the river is frozen, several communities of ice fishermen appear on the river, a nostalgic site treasured by those who are not brave enough to sit out in the cold. Bird watchers with scopes and binoculars can be found all along the shoreline. The *2008-2013 NH Statewide Comprehensive Outdoor Recreation Plan* by the New Hampshire Office of Energy and Planning states, “New Hampshire needs local, close-to-home recreational opportunities.” The plan also states, “the adoption and increased support for the development of designated river corridor and watershed management plans.” As a primary tributary to Great Bay, the river provides critical access to the estuary and beyond.

Scenic beauty can be found all along the Lower Exeter/Squamscott River corridor. Views of saltmarsh and abutting forested uplands are available to travelers along NH Routes 101 and 108. From the High Street and String Bridges in downtown Exeter, views of the fresh and saltwater systems provide residents and visitors with views of the land use history of the region, from manufacturing to village centers.

SECTION 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.

Notification to Corridor Communities – Members of the Exeter River Local Advisory Committee, staff from the Rockingham Planning Commission, and staff from the NH Department of Environmental Services attended the following meetings to explain and discuss the nomination to local officials, the general public, and other stakeholders:

- Town of Newfields Conservation Commission – September 21, 2009
- Town of Stratham Conservation Commission – October 14, 2009
- Town of Newfields Planning Board – October 15, 2009
- Town of Newfields Board of Selectmen – October 20, 2009
- Town of Stratham Planning Board – October 21, 2009
- Town of Stratham Board of Selectmen – October 26, 2009
- Town of Exeter Conservation Commission – November 10, 2009
- Phillips Exeter Academy, Facilities Manager – January 8, 2010
- Town of Exeter Planning Board – January 28, 2010
- Town of Exeter Board of Selectmen – March 8, 2010
- Town of Exeter – Exeter River Study Committee – March 18, 2010

In addition, a letter was sent via first class mail to all landowners and within the quarter-mile river corridor and local officials inviting them to attend public information meetings held on the following dates:

- April 28, 2010 – Stratham Public Library
- May 4, 2010 – Exeter Public Library
- May 6, 2010 – Newfields Town Hall

Media Coverage – Press releases announcing the public information meetings were sent to the Seacoast Media Group (Exeter News Letter, Portsmouth Herald, Hampton Union), the Union Leader, and Carriage Towne News.

The three municipalities along the Lower Exeter/Squamscott River corridor, Exeter, Newfields, and Stratham, express strong support for the nomination of the river to the RMPP. Letters of support for the nomination have been provided by municipal boards and commissions, including the Town of Exeter Board of Selectmen, the Town of Exeter Planning Board, the Town of Exeter Conservation Commission, and the Stratham Board of Selectmen. Additional letters of support from boards and commission may have been provided directly to the NH Department of Environmental Services.

In addition, several stakeholder organizations have written to express their support for the nomination. Letters included with this nomination are from the Piscataqua Region Estuaries Partnership and the Rockingham Planning Commission. Letters of support have been pledged from the following organizations but are not included with this nomination: Southeast Land Trust of New Hampshire, Great Bay Resource Protection Partnership, Great Bay Stewards, Great Bay National Estuarine Research Reserve, Great Bay Trout Unlimited, The Gundalow Company

The Towns of Exeter, Stratham, and Newfields have also expressed strong support for the protection of the river's ecological functions and services in their Master Plans, Open Space Plans, Zoning Ordinances and Land Use Regulations. Further information on this form of support for the river is discussed in the Community Resources and Land Use Control sections.

SECTION IV. OTHER SUPPORTING INFORMATION

Explanation: In addition to the information provided on this nomination form, sponsors are encouraged to submit any other information which 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 materials are provided to support the nomination of the Lower Exeter/Squamscott River to the NH Rivers Management and Protection Program:

- A copy of the Exeter River Local Advisory Committee's second edition of the *State of the River* report. A copy of the report may be found at ERLAC's website, www.exeterriver.org;
- A copy of the definitive history of the river, *The Exeter-Squamscott, River of Many Uses*, written by Exeter native Olive Tardiff and reprinted by the Exeter River Local Advisory Committee.

In addition, the following materials support the nomination, and include critical information about resources associated with the river:

- The locally produced movie, *The Squamscott River*, available for viewing at: www.rivermovie.org
- The Exeter River Local Advisory Committee website, www.exeterriver.org
- NH Fish and Game Wildlife Action Plan (2006), by NH Fish and Game Department
http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm
- *Land Conservation Plan for New Hampshire's Coastal Watersheds* (2006), by The Nature Conservancy, NH Estuaries Project, Society for the Protection of New Hampshire's Forests, Rockingham Planning Commission, Strafford Regional Planning Commission
<http://www.nature.org/wherework/northamerica/states/newhampshire/projects/art19061.html>
- *NH Volunteer River Assessment Program 2009 Exeter River Watershed Water Quality Report* by the NH Department of Environmental Services
<http://des.nh.gov/organization/divisions/water/wmb/vrap/exeter/index.htm>
- *Great Bay Resource Protection Partnership Habitat Protection Plan*, (2007) by the Great Bay Resource Protection Partnership
<http://www.greatbaypartnership.org/planning.html>

- *Great Bay National Estuarine Research Reserve Management Plan*, 2006 - 2010
<http://www.wildlife.state.nh.us/marine/GBNERR.html>
- *Great Bay Restoration Compendium* (2006), by the NH Estuaries Project, The Nature Conservancy, NH Coastal Program, and University of New Hampshire
<http://www.nature.org/wherewework/northamerica/states/newhampshire/projects/art19160.html>
- *Town of Exeter, New Hampshire, Water Supply Alternative Study*, 2010, by Weston and Sampson
<http://town.exeter.nh.us/river%20study/RIVER%20STUDY%202010.pdf>
- *Exeter River Geomorphic Assessment and Watershed Based Plan*, 2009, by NH Department of Environmental Services
http://des.nh.gov/organization/divisions/water/wmb/was/documents/wbp_exeter_main.pdf
- NH DES Watershed 305(b) Assessment Summary Report, 2008
<http://www2.des.nh.gov/SWQA/SWQAList.aspx>

SECTION 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. 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.

Table 1: Proposed River Designation by Location for the Lower Exeter/Squamscott River

From	To	Segment Length (miles)	Water Quality Classification	Distance to Nearest Road (minimum)	Designation	Description
Lower Exeter River from confluence with Great Brook in Exeter	Great Dam in Exeter	2.19	B	Bridge crossing	Community	Undeveloped forest land (Phillips Exeter Academy woods); athletic fields; residential; commercial downtown
Great Dam in Exeter	Great Bay at railroad trestle in Stratham and Newfields	8.48	B Tidal	Bridge crossing	Rural	Residential; commercial; conservation land; agricultural; municipal wastewater treatment

SECTION 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 are attached to this nomination:

Map 1 – Lower Exeter/Squamscott River Corridor and Watershed, including public access locations

Map 2 – Geologic Resources including aquifers

Map 3 – Wildlife Resources, from the NH Fish and Game Wildlife Action Plan (2005)

Map 4 – Conservation Focus Areas, from the Land Conservation Plan for New Hampshire's Coastal Watershed (2006)

Map 5 – Groundwater hazards

Map 6 – Conservation lands and unfragmented lands

Map 7 – Impoundments, water withdrawals and discharges

Map 8 – Existing land use and zoning

SECTION 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 geology of the Lower Exeter/Squamscott River corridor ranges from freshwater wetlands, vernal pools, and slow moving freshwater in the Lower Exeter, to the waterfall created by Great Dam and rock ledges just underneath and below the dam, and on to the tidal river and tidal marshes in the Squamscott.

Bedrock Geology - In southeastern New Hampshire, the predominant bedrock was formed from layers of sea bottom sediments deposited and compacted over millions of years into formations of sedimentary rock. These formations were transformed through uplifting, folding, and tremendous heat and pressure into metamorphic rock.

According to the “Geologic Map of New Hampshire”, prepared by the US Geologic Survey (USGS) and the NH State Geologist in 1986, there are three major bedrock types along the Lower Exeter/Squamscott River corridor. These types include the Ordovician Plutons Formation (igneous), the Kittery Formation (metamorphic), and the Elliot Formation (metamorphic).

Surficial Geology – The information presented is based on the surficial geology mapping efforts of the USGA prepared as part of their reports, “*Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire*” (1990), and “*Geologic and Groundwater Quality Data for Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire*”.

The upper layers of geologic materials above the bedrock formations are known as surficial deposits. In southeastern New Hampshire, these geologic materials were deposited by a glacier more than 10,000 years ago. Within the Lower Exeter/Squamscott River corridor, there are five types of surficial materials: till, marine silt and clay deposits, contact deposits, freshwater swamp and marsh deposits, and alluvium deposits.

The New Hampshire Geologic Survey provided the following information on the Lower Exeter/Squamscott River:

The Lower Exeter River begins at the confluence of the Exeter River and Great Meadows Brook in the town of Exeter. From this confluence, the river flows through a low-gradient, swampy area comprised of glaciomarine deposits which were deposited as the Pleistocene's Laurentide ice sheet retreated. These comprise a typical riverine setting in southeast New Hampshire. The river then flows into the center of Exeter, past Gilman Park, Phillips Exeter Academy, and an athletic field, all of which abut the river. After flowing through the center of Exeter, the river flows past the dam in quick succession, followed by passage through a natural valley constriction. The river separates into two channels at the constriction, which flow around an island, comprised of bedrock. A road and building structures are located atop this island.

Downstream of this area, the Squamscott River widens significantly, and flows past former sewage and industrial waste ponds. Also, in this vicinity, ramps are available for boaters to launch into the tidal Squamscott. Past this area, a steep embankment can be found along the east bank, and the channel is slightly constricted as it flows past Powells Point. The river channel then narrows as it flows past a second set of sewage disposal ponds on the floodplain to the west of the river, before passing under Route 101. For the remainder of the journey to Great Bay, the Squamscott flows past tidal wetland marshes as it straddles the Newfields-Stratham town line. The marshes are typical of the lower reaches of New Hampshire's coastal rivers and provide important habitat for plant and animal life.

The entire course of the Squamscott is underlain by the metamorphic Berwick Formation. This calcite-silicate rich biotite-quartz-feldspar granofels is of Silurian age.

Aquifers – Aquifers are found where land surfaces are permeable and the storage and transmission of water can take place. Aquifers having medium to high potential to yield groundwater occur in the seacoast area as alluvial deposits of sand and gravel or in bedrock fractures.

Stratified drift aquifers lying within the Lower Exeter/Squamscott River corridor include a large aquifer encompassing the entire corridor of the Lower Exeter River in Exeter. The transmissivity of this aquifer ranges from less than 1000 and up to 2000 square feet per day. There is no aquifer present in the corridor in the Town of Stratham. In the Town of Newfields, there is a 482 acre, low-yield aquifer in the river corridor adjacent to the center of town. The transmissivity of this aquifer is calculated at less than 500 square feet per day.

(b) Wildlife Resources

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

the river and river corridor.

The information provided in this section reflects data from the following sources:

- *NH Wildlife Action Plan* (2006), produced by the NH Fish and Game Department;
- *Great Bay Estuary Restoration Compendium* (2006), produced by The Nature Conservancy and Piscataqua Region Estuaries Partnership;
- *Land Conservation Plan for New Hampshire's Coastal Watersheds* (2006), developed by the Piscataqua Region Estuaries Partnership, The Nature Conservancy, Society for the Protection of New Hampshire's Forests, Rockingham Planning Commission, and Strafford Regional Planning Commission;
- *Great Bay National Estuarine Research Reserve Management Plan, 2006-2010*, prepared by the NH Fish and Game Department;
- *Great Bay Resource Protection Partnership Habitat Protection Plan (2007)*
- NH Natural Heritage Bureau lists of species for municipalities, 2010
- The Master Plans and other planning documents for the Towns of Exeter (2003), Stratham (1998), and Newfields (2001).

The NH Wildlife Action Plan identifies three distinct wildlife habitat types along the Lower Exeter/Squamscott River corridor:

- *Floodplain Forest* – Floodplain forests occur in valleys adjacent to river channels and are prone to periodic flooding. Also referred to as riparian forests, they support diverse natural communities, protect and enhance water quality by filtering and sequestering pollution, and control erosion and sediment. Many wildlife species use these forests at some point in their life cycle. It would not be uncommon to find red-shouldered hawks, veery, or chestnut-sided warblers breeding in floodplain forests. Evidence of beaver, mink, or otter can usually be found along the water's edge. Other wetlands, like swamps and vernal pools, can be found in floodplain forests and these areas are particularly important for Jefferson salamanders, northern leopard frog, wood turtles, and state endangered Blanding's turtles. Since these species, like most wildlife species, use a variety of habitats, not only is a floodplain forest important but the adjacent upland is also crucial for these species. Floodplain forests with their rich soils have been converted to open farmland for centuries, so many floodplains are no longer forested wildlife habitat. Other human activities have threatened these habitats including residential and commercial development along rivers and the installation of dams which have altered the natural flooding regime. Floodplain habitats are particularly vulnerable to invasive plants because the frequent

disturbances from flooding give aliens opportunities to establish, and because these species tend to thrive in the nutrient rich soils characteristic of floodplains.

- *Grassland* - Grasslands are comprised of grasses, sedges, and wildflowers with little to no shrubs and trees. The most common grassland habitats are airports, capped landfills, wet meadows, and agricultural fields such as hayfields, pastures and fallow fields. Pre-colonial grasslands in New Hampshire were probably only maintained by beaver and fires started by lightning and Native Americans. The numerous agricultural lands maintained by early European settlers provided ideal habitat for some wildlife species that need grassland habitat. As these agricultural lands were abandoned, these populations began to decline and are now on the state endangered list such as the eastern hognose snake, northern harrier, upland sandpiper and on the state threatened list such as the grasshopper sparrow. Other species also benefit from these open grass fields such as wood turtles and numerous species of butterflies. Development and natural forest succession have reduced grassland habitat in the state. Grasslands require maintenance and must be mowed to prevent them from becoming shrublands or forests. Significant grassland habitat along the river corridor includes the Raynes Farm, conserved by the Town of Exeter.
- *Salt Marsh* - Salt marshes are grass-dominated tidal wetlands existing in the transition zone between ocean and upland. They are among the most productive ecosystems in the world and provide great habitat for many bird species including American bittern, Nelson's sharp-tailed sparrow, salt marsh sharp-tailed sparrow, seaside sparrow, and semipalmated sandpiper. Salt marsh plants are salt-tolerant and adapted to fluctuating water levels. Nutrients that stimulate marsh plant growth are carried in with the tides, and organic matter that feeds fish and other organisms is carried out by the tides. Over time, organic matter accumulates on the marsh and forms peat. By building up more peat, salt marsh elevation can keep pace with rising sea level, unless the rate of sea-level rise becomes too great, such as is predicted from climate change. Salt marshes help protect coastal areas from storm surges, but an estimated 30-50% of New Hampshire's original salt marsh habitat has been lost to development. In addition, the list of ecological services provided by saltmarsh is long, and likely still being discovered, and includes protection from shoreline erosion, nutrient and sediment trapping, and pollution filtration.

Table 2: Mammals Observed in the Lower Exeter/Squamscott River corridor

Source: Town Master Plan, Natural Resource Inventories, and Open Space Plans, NH Fish and Game

Whitetail Deer	Fisher	Moose	Eastern Gray Squirrel	Northern Flying Squirrel
Beaver	Mink	Deer Mouse	Hairy-tailed mole	Porcupine
Muskrat	Otter	Eastern Chipmunk	Meadow Mole	Raccoon
Red Fox	Red Squirrel	Shorttail Shrew	Shorttail Weasel	Star nosed Mole
Grey Fox	Striped Skunk	Woodchuck	Eastern Coyote	Bobcat

Table 3: Macroinvertebrates Observed in the Lower Exeter/Squamcote River Corridor

Source: NH DES Volunteer Biologic Assessment Program, UNH Jackson Estuarine Laboratory

Common Name	Latin Name
Alderfly	Megaloptera- Sialidea
Caddisfly	Tricoptera -Coenagrionidae
Cranefly	Diptera - Tipulidae
Damselfly	Zygoptera - Coenagrionidae
Dragonfly	Anisoptera - Gomphidae
Leech	Anelida - Hirudinea
Mayfly	Ephemeroptera - Heptageniidae
Pillbug	Isopoda
Snail	Gastropoda
Water Boatmen	Hemiptera - Corixidae
Ribbon Worms	Rhynchocoela Nemertea
Bristle Worms	Annelida Polychaeta
Aquatic Worms	Oligochaeta
Snails and Slugs	Mollusca Gastropods
Clams, Oysters, Scallops, Mussels	Mollusca Bivalvia
Crabs, Lobsters, Barnacles, Shrimp, Krill	Mollusca Arthropoda

Table 4: Bird Species Observed in the Lower Exeter/Squamscott River Corridor

Source: Seacoast Chapter of the NH Audubon Society

Black Duck, American	Catbird, Gray	Finch, House
Bald Eagle	Chickadee, Black capped	Finch, Purple
Blackbird, Red winged	Common golden eye	Flicker, Northern

Bluebird, Eastern	Common Moorhen	Flycatcher, Great Crested
Bobolink	Cowbird, bronze headed	Flycatcher, Least
Bunting, Indigo	Creeper, brown	Flycatcher, Olive sided
Canada goose	Crow, American	Goldfinch, American
Canada warbler	Dove, Mourning	Crackle, Common
Cardinal, Northern	Dove, Rock	Great blue heron
Greater yellowlegs	Owl, Barred	Thrasher, Brown
Green heron	Parula, Northern	Thrush, Hermit
Green-winged teal	Peregrine falcon	Titmouse, Tufted
Grosbeak, Evening	Phoebe, Eastern	Towhee, Rufous-sided
Grosbeak, Rose-breasted	Redstart, American	Tree Sparrow, American
Gull, Great Black-backed	Robin, American	Turkey Vulture
Gull, Herring	Sandpiper, Upland	Turkey, wild
Hawk, Broad-winged	Siskin, Pine	Veery
Hawk, Red-tailed	Snow bunting	Vireo, Red-eyed
Jay, Blue	Sparrow, American Tree	Vireo, Solitary
Junco, Dark-eyed	Sparrow, Chipping	Warbler, Bay-breasted
Kestrel, American	Sparrow, Field	Warbler, Black-and-white
Killdeer	Sparrow, House	Warbler, Blackburnian
Kingbird, Eastern	Sparrow, Lincoln's	Warbler, Black-throated
Kingfisher, Belted	Sparrow, Savannah	Warbler, Blue-winged
Kinglet, Ruby-crowned	Sparrow, Song	Warbler, Pine
Mallard	Sparrow, Swamp	Warbler, Prarie
Meadowlark, Eastern	Sparrow, White-throated	Warbler, Yellow
Mockingbird, Northern	Starling	Waxwing, Bohemian
Nuthatch, White breasted	Starling, European	Waxwing, Cedar
Oriole, Northern	Swallow, Barn	Wood thrush
Osprey	Swallow, Tree	Woodcock, American
Ovenbird	Swift, Chimney	Wood-Pewee, Eastern
Woodpecker, Downy	Woodpecker, Pileated	Wren, House
	Yellowthroat, Common	

Table 5 Reptiles and Amphibians in the Lower Exeter/Squamscott River Corridor

Source – NH Fish and Game

Frogs	Snakes	Salamanders	Turtles
Bull	Garter	Blue-spotted	Blanding's
Green	Ribbon	Easter/Red-spotted Newt	Eastern Box
Northern Leopard	Brown	Marbled	Common Musk
Pickerel	Northern Red-	Northern Redback	Eastern Painted

	bellied		
Wood	Ringneck	Spotted	Snapping
Gray Tree	Smooth green	Northern Two-lined	Spotted
Spring Peeper	Milk		
American Toad	Eastern hognose		
	Northern Black Racer		
	Northern Water		

(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.

Table 6: Rare and Endangered Animal Species in the Lower Exeter/Squamscott River Corridor

Source: NH Natural Heritage Inventory, NH Fish and Game, and the Land Conservation Plan for NH's Coastal Watersheds

Scientific Name	Common Name	State Rank	Federal/Global Rank
<i>Ammodramus caudacutus</i>	Saltmarsh Sharp-tailed Sparrow	S3	G4
<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	S3	G5
<i>Ardea herodias</i>	Great Blue Heron – Rookery	S4	G5
<i>Circus cyaneus</i>	Northern Harrier	E	
<i>Gavia immer</i>	Common Loon	T	
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	
<i>Gallinula Chloropus</i>	Common Moorhen	S1	G5
<i>Ixobrychus exilis</i>	Least Bittern	S1	G5
<i>Pandion haliaetus</i>	Osprey	S2	G5
<i>Porzana carolina</i>	Sora	S3	G5
<i>Podilymbus podiceps</i>	Pied-billed Grebe	T	
<i>Chordeiles minor</i>	Common Nighthawk	E	
<i>Clemmys guttata</i>	Spotted Turtle	T	
<i>Emydoidea blandingii</i>	Blanding's Turtle	E	

Heterodon platyhinus	Eastern hognose	E	
Coluber constrictor constrictor	Northern Black Racer	T	
Sylvilagus transitionalis	New England cottontail	E	
Ambystoma opacum	Marbled salamander	E	

S1 = Critically imperiled in state because of extreme rarity

S2 = Imperiled in state because of rarity

S3 = Rare in state

G4 = Apparently secure globally, though it may be quite rare in parts of its range

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range

E = Endangered in NH

T = Threatened in NH

(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.

The NH Wildlife Action Plan and the Land Conservation Plan for New Hampshire's Coastal Watersheds have identified significant wildlife habitat in the Lower Exeter/Squamscott River Corridor. These significant wildlife habitats have been determined to be exceptionally diverse by the NH Fish and Game Department. The US Fish and Wildlife Service have identified the Atlantic Coastal System and New England Streams as Habitats of Special Concern. The Lower Exeter/Squamscott River corridor provides both these habitats.

Table 7: Significant wildlife habitat supported by the Lower Exeter/Squamscott River Corridor

Source: NH Wildlife Action Plan and Land Conservation Plan for NH's Coastal Watersheds

Significant Wildlife Habitat	Data Source
Tier 1 – Highest ranked habitat in NH: includes saltmarsh, floodplain forest, wet meadow/shrub wetlands	<i>NH Wildlife Action Plan</i>
Tier 2 – Highest ranked habitat in biological region: includes peatland and grasslands	<i>NH Wildlife Action Plan</i>

Conservation Focus Area – Squamscott River: includes 410 acres of saltmarsh, floodplain forest, grassland, and peatland. High habitat connectivity along watercourse	<i>Land Conservation Plan for NH’s Coastal Watersheds</i>
Conservation Focus Area – Great Meadows: includes connectivity between conservation lands and forest blocks, floodplain forest, grassland, marsh, and peatland	<i>Land Conservation Plan for NH’s Coastal Watersheds</i>

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

The *Great Bay Resource Protection Partnership Habitat Protection Plan*, the *Great Bay Estuary Restoration Compendium*, the *Land Conservation Plan for New Hampshire’s Coastal Watersheds*, and the *Great Bay National Estuary Research Reserve Management Plan* have all identified the Lower Exeter/Squamscott River corridor as a critical conservation focus area because the river corridor enables movement of wildlife between large habitat areas.

The river corridor is critical for the migration of diadromous fish species between salt and fresh water. The fish ladder located alongside the Great Dam in downtown Exeter, and managed by NH Fish and Game, enables several fish species to migrate between fresh and salt water in their life cycle. Anadromous fish, such as the alewife, blueback herring, American shad, rainbow smelt, Atlantic salmon, Atlantic sturgeon, and sea lamprey, live predominantly in saltwater and move to freshwater to reproduce. Catadromous species, such as the American eel, spend the majority of life in freshwater and migrate seaward to spawn. Other fish species using the fish ladder at Great Dam include rainbow trout, brook trout, and brown trout.

Habitat in the Lower Exeter/Squamscott River corridor has also been identified as important for the movement of waterfowl and migratory birds. The river corridor and Great Bay provide a variety of food options to help birds build energy for reproduction and long migratory flights.

(c) Vegetation/Natural Communities

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

Table 8: Common Plant Species in the Lower Exeter/Squamscott River Corridor

Source: Town Master Plans, Open Space Plans, and the Great Bay National Estuarine

Research Reserve Management Plan

Trees	Shrubs	Other plants
American Basswood/Linden	Arrow-wood	Cinnamon Ferns
American Beech	Buttonbush	Sensitive Ferns
American Hornbeam	Elderberry	Bittersweet - Invasive
Black Cherry	Glossy Buckthorn - Invasive	Poison Ivy
Black Gum	Highbush Blueberry	Riverbank Grape
Eastern Hemlock	Honeysuckle	Virginia Creeper
Eastern White Pine	Meadowsweet	Milfoil - Invasive
Red Maple	Multiflora Rose - Invasive	Bladderwort
Red Oak	Shadbush	Hornwort
Shagbark Hickory	Sheep Laurel	Arrowhead
Silver Maple	Speckled Alder	Blue Flag Iris
Sugar Maple	Steeplebush	Blue Vervain
Yellow Birch	Viburnum	Autumn olive - Invasive
White Ash	Winterberry	Japanese knotweed - Invasive
White Oak	Witch Hazel	Boneset
White Birch	Wild Sasparilla	Bur-reed
White Pine	Other plants	Cardinal Flower
	Marsh Elder	Cattail
	Quack Grass	Jewelweed
	Purple Loosestrife - Invasive	Joe Pye Weed
	Salt Meadow Grass	Pickerelweed
	Salt Grass	Phragmites - Invasive
	Cordgrass	Red Fescue
	Saltmarsh Goldenrod	Sweet Grass
	Stout Bulrush	Small Spike-rush
	Bushy Knotweed	Samphire
	Necklace Sedge	Saltmarsh Sand Spurrey

(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.

Table 9: Rare and Endangered Plant Species in the Lower Exeter/Squamscott River Corridor

Source: NH Natural Heritage Inventory and Land Conservation Plan for NH's Coastal Watersheds

Scientific Name	Common Name	Town	State Rank	Global Rank
<i>Eleocharis parvula</i>	Small Spike-rush	Exeter/Stratham	S2/T	G5
<i>Iris prismatica</i>	Slender Blue Flag	Exeter	S2/T	G4
<i>Mikania scandens</i>	Climbing Hempweed	Exeter/Newfields	S2/T	G5
<i>Polygonum robustius</i>	Robust Knotweed	Exeter	S2/E	G5
<i>Puccinellia tenella</i> ssp. <i>Langeana</i>	Tundra Alkali Grass	Stratham	S1/E	T4
<i>Scirpus robustus</i>	Stout Bulrush	Stratham	S2/T	G5
<i>Ranunculus ambigens</i>	Water Plantain Spearwort	Exeter	S1/E	G4
<i>Sparganium eurycarpum</i>	Large Bur-reed	Exeter/Stratham/Newfields	S2/T	G5

S1 = Critically imperiled in state because of extreme rarity

S2 = Imperiled in state because of rarity

S3 = Rare in state

G4 = Apparently secure globally, though it may be quite rare in parts of its range

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range

E = Endangered

T = Threatened

(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.

Table 10: Exemplary Natural Ecological Communities in the Lower Exeter/Squamscott River Corridor

Source: NH Natural Heritage Inventory and Land Conservation Plan for NH's Coastal Watersheds

Exemplary Natural Ecological Community	Location
Brackish marsh	Squamscott River - Exeter, Stratham and Newfields
Low brackish tidal riverbank marsh	Squamscott River - Exeter, Stratham and Newfields

High brackish tidal riverbank marsh	Squamscott River – Exeter, Stratham and Newfields
Saline/brackish subtidal channel bottom	Squamscott River – Exeter, Stratham and Newfields
Mesic Appalachian oak – hickory forest	Squamscott River – Exeter, Stratham and Newfields
Tall graminoid emergent marsh	Lower Exeter River - Exeter
Swamp white oak floodplain forest	Lower Exeter River - Exeter
Hemlock – cinnamon fern forest	Lower Exeter River - Exeter

(d) Fish Resources

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

Table 11: Fish Species in the Lower Exeter/Squamscott River Corridor

Source: NH Fish and Game Department

Rainbow Trout	White Perch	Shiner
Brook Trout	Rainbow Smelt	Sea Lamprey
Eastern Brook Trout	American Shad	Brown Bullhead
Brown Trout	Yellow Perch	Alewife
Common White Sucker	Fallfish	Eastern Chain Pickerel
Largemouth Bass	Striped Bass	Blueback Herring
Smallmouth Bass	American Eel	Pumpkinseed
Bluegill		

(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.

Table 12: Endangered or Threatened Fish Species in the Lower Exeter/Squamscott River Corridor

Source: NH Fish and Game Department

Shortnose sturgeon – federally endangered	Rainbow Smelt – State species of concern
Alewife – State species of concern	Blueback Herring – State species of concern

(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.

The Lower Exeter/Squamscott River provides critical and diverse habitat for spawning and juvenile fish. Both anadromous and freshwater fish species use the significant spawning habitat in the freshwater and saltwater.

Significant Habitat Diversity Rating

(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.

The Lower Exeter/Squamscott River is a statewide fishery resource and as a result NH Fish and Game has maintained stocking programs for several species. Beginning in 1982, the NH Fish and Game Department began stocking the Exeter River with American shad. In 2009, NH Fish and Game stocked the Exeter River with Brook trout, Eastern brook trout, and Rainbow trout. In 2008 and 2009, the Exeter River Local Advisory Committee stocked the river with Brook trout and Rainbow trout.

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

The Lower Exeter/Squamscott River is a viable anadromous fish resource, significant on the statewide level. The NH Fish and Game Department monitors the fish ladder at Great Dam in downtown Exeter throughout the year. Alewives and Blueback herring migrate up the ladder from April through June, spawning in the Lower Exeter, and migrating downstream from July through October. American shad migrate upstream from May through July, and migrate downstream July through October. Sea Lamprey migrate upstream from April through July and migrate downstream from April through December. Rainbow smelt migrate to Great Bay and its tributaries from December through March, spawning at the head of tide in the Squamscott from March through April. American eel migrate upstream from March through August. Downstream migration of adults occurs from August through November and sometimes through the winter months.

The NH Fish and Game Department had maintained a fish restoration program for river herring and shad since the fish ladder was built alongside Great Dam in the early 1970's. The fish return numbers collected by NH Fish and Game at the ladder at Great Dam are far below average, indicating a restoration problem. The number of returning fish has decreased steadily since 2000. For example, 513 adult river herring passed through the fish ladder in Exeter in 2009, as compared to 42,425 at the Lamprey River fish ladder in Newmarket.

The fish ladder at Great Dam and water quality in the Lower Exeter River, above the impoundment, do not provide optimal conditions for anadromous fish. There are many variables impacting successful fish migration upstream and downstream, as well as spawning. Water levels in and around the fish ladder, dissolved oxygen levels above

Great Dam, water flow during downstream migration all contribute to fish passage. NH Fish and Game Department records show a decline in River herring, American shad, Rainbow smelt and American eel in the past decade in the river corridor.

(e) Water Quality

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

The state's water quality classification for the Lower Exeter/Squamscott River is Class B.

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

According to readily available information, the actual water quality of the Lower Exeter/Squamscott River is listed by the NH Department of Environmental Services as Impaired.

(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.

Data about the water quality in the Lower Exeter/Squamscott River corridor is, or has been, collected by a number of organizations, including the Town of Exeter, NH Department of Environmental Services, volunteers in Exeter as part of the state's Volunteer River Assessment Program, the Great Bay National Estuarine Research Reserve, the Piscataqua Region Estuaries Partnership, and the University of New Hampshire.

Table 13: 2008 Section 305(b) Report and 303(d) List developed using the 2008 Consolidated Assessment and Listing Methodology (CALM) Water Quality Data

Sampling Sites Along the Lower Exeter/Squamscott River Corridor

Source: NH Department of Environmental Services

Assessment Unit ID	Assessment Unit Name	Aquatic Life	Swimming	Boating	Fish Consumption
NHEST600030801-01	Squamscott River	5P	5P	5P	5M
NH IMP600030806-01	Lower Exeter/ Mill Brook	3PAS	3ND	3ND	4A-M
NHRIV600030806-02	Norris Brook	3ND	3PAS	3PAS	4 A-M

5P – Severe, Not Supporting Activity, TMDL Needed

5M – Marginal, Not Supporting Activity, TMDL Needed

4A-M – Poor, Not Supporting Activity

3PAS – Likely Good, Insufficient Information, Potentially Fully Supporting

3ND – No Data

The NH Department of Environmental Services identified several issues impacting water quality in the Lower Exeter/Squamscott River, including:

- Low dissolved oxygen levels
- Mercury from atmospheric deposition and unknown sources
- Polychlorinated biphenyls from unknown sources
- Chlorophyll-a from unknown sources
- Enterococcus from combined sewer overflows, nonpoint sources, and wet weather discharges from point sources
- Nitrogen from unknown sources
- Dioxin from unknown sources

The Towns of Exeter, Stratham, and Newfields continue to work on land use regulations designed to increase protection of shoreland buffers, control stormwater runoff and limit impervious surfaces.

The Town of Exeter has been actively engaged with public education programs regarding water quality and stormwater management as part of the MS4 regulation requirements. Programs include pet waste management, fertilizer and pesticide application, and the planting of vegetated buffers along shorelands using native vegetation.

In addition, all three communities are actively engaged in land conservation and have established protection of shoreland along the river corridor as a high priority.

(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 Lower Exeter/Squamscott River is one river with two names. There is one impoundment along the river, Great Dam in Exeter. The dam is the visual divider for the two rivers; the Exeter River is the freshwater portion above the dam, and the Squamscott is the tidal river below the dam.

The Lower Exeter River is free flowing from the intersection with Great Brook to the

Great Dam, a distance of 2.19 miles. From Great Brook, the Lower Exeter River flows in a meandering fashion through forested woodlands and residential neighborhoods, past the athletic fields of Phillips Exeter Academy and into downtown Exeter. In downtown, the abutting land uses are a mix of residential and commercial.

The longest record of daily streamflow in the Exeter River is derived from USGS gage 01073587, located on Haigh Road in Brentwood, above the confluence of the Exeter River and Great Brook. Installed in the summer of 1996, the gage provides over 14 years of continuous streamflow measurements that can be used to assess the hydrology of the Exeter River. The average daily discharge measured at the gage between 1999 and 2009 was 125 cubic feet per second. The annual peak discharge for the same period ranged 462 cubic feet per second in March 1999 to 3,520 cubic feet per second in May of 2006.

Flooding from storm events has been significant along the Lower Exeter, with storm events in October 1996, April 2007, May 2006, and two events in March 2010.

Variations in the Lower Exeter River's flow velocity can have a profound effect on water quality, with low flow typical in August and September. Low flows result in low levels of dissolved oxygen in the Lower Exeter and insufficient water flow over the Great Dam, both of which impact fish species.

The Squamscott River is free flowing from the Great Dam to Great Bay, a distance of 8.48 miles. This tidal river begins flowing over rock cobble riffles just below the dam, past forest, fields, two wastewater treatment plants, low density residential neighborhoods, and on to Great Bay.

A geomorphic fluvial assessment of the Lower Exeter River channel was completed in 2009 by the NH Department of Environmental Services. The *Exeter River Geomorphic Assessment and Watershed Based Plan* provides information to help watershed managers understand how the river responds to land over which it flows. The Plan provides information on biotic conditions, identifies projects that will protect or restore important river reaches, makes recommendations on how to address and mitigate stressors leading to impairments, and assists towns in the river corridor with the development of fluvial erosion hazard zones and planning tools.

The Plan identifies three projects in the Lower Exeter River corridor, ranging from bank stabilization, stormwater management originating from abutting residential neighborhoods, to streamside plantings. The goal of all these projects is to improve biotic habitat and water quality.

(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.

Protection of open space along the Lower Exeter/Squamscott River corridor is a high priority of the Towns of Exeter, Stratham, and Newfields, and a high priority for several land conservation organization working in the region, including the Southeast Land Trust of New Hampshire and the Great Bay Resource Protection Partnership.

Table 14: Conserved Open Space in the Lower Exeter/Squamscott River Corridor
Source: Master Plans and Open Space Plans, Towns of Exeter, Stratham and Newfields; Southeast Land Trust of New Hampshire, and Great Bay Resource Protection Partnership

Parcel Name	Location	Land Type	Acres	Owner/Easement Holder
Gilman Park	Exeter	Shoreland/Forest/Floodplain	11	Town of Exeter
Academy Forest	Exeter	Shoreland/Forest/Floodplain	570	Phillips Exeter Academy
Swasey Parkway	Exeter	Shoreland/Floodplain	6	Town of Exeter
Exeter Country Club	Exeter	Shoreland/Forest	55	Conservation Easement held by Town of Exeter
Vaughn/Cusick	Exeter	Forest/Floodplain	2	Conservation Easement held by Town of Exeter
Oxbow/Malloy	Exeter	Shoreland/Floodplain/saltmarsh	12	Town of Exeter
Raynes Farm	Exeter	Forest/fields	48	Town of Exeter
Callahan	Exeter	Forest/fields	33	Conservation Easement held by Southeast Land Trust of NH
Harrington	Exeter	Forest/fields	27	Conservation Easement held by Southeast Land Trust of NH and NH Fish and Game
Newlin/Sellers	Newfields	Forest/fields	21	Conservation Easement held by Southeast Land Trust of NH
Chapman's	Stratham	Shoreland/Floodplain/	7	State of NH

Landing		Saltmarsh		Fish and Game
Stuart Farm	Stratham	Floodplain/open fields/forest	173	Conservation Easement held by the NH Dept. of Agriculture
Wiggin	Stratham	Shoreland/Tidal wetlands/Saltmarsh	37	Conservation easement held by State of NH
Scullers Boat Club	Stratham	Shoreland/Floodplain/forest	5	Conservation Easement held by Town of Stratham
Hill	Stratham	Shoreland/Floodplain/Forest	16	Conservation Easement held by Southeast Land Trust of NH
Town Landing	Stratham	Shoreland/Floodplain	2	Town of Stratham
Cabernet	Stratham	Shoreland/Forest	19	NH Fish and Game
Strathlorne	Stratham	Shoreland/Forest	89	Society for the Protection of NH Forests
TOTAL			1,133	

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.

Table 15: Impoundments on the Lower Exeter/Squamscott River Corridor

Name of Dam	Location	Ownership	Purpose	Height	Drainage Area
Great Dam	Exeter	Town of Exeter	Public Water Supply Storage	6 feet	107 square miles

The Town of Exeter acquired the Great Dam from the abutting Exeter Mills in 1981. The dam was originally built in 1828 to provide water power for the Exeter Manufacturing Company's cotton mill. According to *The Exeter-Squamscott, River of Many Uses*, by Exeter native Olive Tardiff, at the turn of the 20th century, the Exeter Manufacturing Company employed 300 people and produced 7,000,000 yards of cloth a year. In 1966, Exeter Manufacturing Company sold the mill and the dam to Milliken Industrials, Inc., which produced synthetic materials. In 1980, the mill was purchased by Nike for the manufacturing of athletic shoes. This activity stopped in 1984. Today, the mill is a large residential complex.

The dam does not presently comply with the NH DES Dam Bureau rules that require Class A dams to be able to pass the 50-year storm event with at least one foot of freeboard above the water surface and the top of the dam abutments. As a result, the Town of Exeter is currently researching and reviewing options for redesigning or removing the dam.

The upstream limit of the Great Dam impoundment will vary depending on the flow of the river. In addition, the definition of the upstream limit of the impoundment is subject to interpretation. One impoundment definition is to define the "level pool", the area that is defined by extending the Great Dam crest elevation (22.53') to where the bottom of the river is 22.53 feet. Based on this definition, the impoundment would extend approximately 31,000 feet upstream. In another impoundment definition, bathymetric data completed for the Town of Exeter indicates the natural high point on the bottom of the river is located approximately 8,500 feet upstream of Great Dam.

NH Fish and Game works with the Town of Exeter to manage minimum flows over the Great Dam and through the abutting fish ladder. Water levels in the fish ladder are managed for migration upstream and water levels over the dam are managed for downstream migration and dissolved oxygen levels in the impoundment. Migrating fish are generally attracted towards the fish ladder at Great Dam because greater flows pass through the ladder than over the dam's spillway and downstream fish weir. However, the Town's operation of the dam's low level sluice gate, particularly during lower flow periods, may disrupt migration patterns and reduce the effectiveness of the fish ladder.

The Town, as owner of the Great Dam, is responsible for the management and operations of the dam. As such the Town developed an Operation and Maintenance Plan in 2006 which developed guidance for maintaining the water level of the Great Dam impoundment during different times of the year. For example, the water level is maintained at approximately six inches above the crest of the spillway between April 1 and June 30, the primary migration period for anadromous fish. From July 1 through October 30, the water level is maintained at approximately two inches above the spillway crest to enable downstream fish passage.

(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.

Table 16: Water Withdrawals from the Lower Exeter/Squamscott River Corridor
Source: NH DES 2010 and Town of Exeter Water Supply Alternatives Study, 2010, Weston and Sampson

Withdrawal	Purpose	Location	Status
Town of Exeter	Water supply	Lower Exeter River	Active
Phillips Exeter Academy	Irrigation, heating and cooling, ice rink condenser	Lower Exeter River	Active
Exeter Mills Apartments	Irrigation, fire suppression, cooling	Lower Exeter River	Active
Town of Exeter	Dry hydrant	Lower Exeter River	Active

The Town of Exeter’s typical daily pumping volume from the intake pipe on the Lower Exeter River is 1.5M gallons per day. The water is pumped to the treatment plant on Portsmouth Avenue for distribution through the municipal water system. The system services approximately 3,300 accounts.

Phillips Exeter Academy pumps up to 18,500 gallons per day in the winter from the Lower Exeter River for boiler makeup water. An additional 25,000 to 30,000 gallons per day is used during the summer months by the Academy for irrigation, approximately four days per week.

The Exeter Mills apartment complex includes 13 different buildings ranging from one bedroom apartments to townhouses, for a total of 152 housing units. The complex obtains water from the Lower Exeter River via the penstock at Great Dam. This water is used for the cooling system for four of the main buildings. It is estimated that the Mills use 50,000 to 150,000 gallons per day from the Lower Exeter River during the summer months for cooling. The Mills can also use the river water for their irrigation system and fire suppression.

The dry hydrant on the Lower Exeter River is located in Founder’s Park, adjacent to the Great Dam. This hydrant can be accessed by the Fire Department and hooked to a fire truck to be used as a supplemental source of fire fighting water.

The Town of Exeter has conducted several assessments of the Exeter River as part of the town’s ongoing efforts to plan for future water supply. The most recent study, *Water Supply Alternative Study*, was completed in January 2010 by Weston and Sampson. The study identified the reactivation of three municipally owned wells along the Lower Exeter River corridor as additional sources of water for the municipal system. These wells had been taken out of service due to arsenic levels exceeding standards and other maintenance issues.

(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).

Table 17: Surface Water Discharges to the Lower Exeter/Squamscott River Corridor

Source: NHDES 2010 and Town of Exeter Water Supply Alternatives Study, 2010, Weston and Sampson

Discharge	Purpose	Location	Permitted by NHDES
Town of Exeter	Wastewater treatment	Squamscott River	Yes
Exeter Mills	Cooling system	Squamscott River	Yes
Town of Newfields	Wasterwater treatment	Squamscott River	Yes

The Town of Exeter wastewater treatment system processes approximately 4M gallons per day of wastewater. The wastewater is processed and released into a lagoon aeration system. The treatment plant is located along the Squamscott River.

The Exeter Mills apartment complex takes in water from the Lower Exeter River for cooling, fire suppression and irrigation. The water used by the cooling system is discharged into the Squamscott River via a heat exchanger system.

The Town of Newfields wastewater treatment plant and three holding ponds are also located along the Squamscott River. The system process approximately 50,000 gallons per day and has a design capacity for 117,000 gallons per day.

(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).

There are no known or potential sites of hydroelectric power production along the Lower Exeter/Squamscott River corridor.

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.

As the site of one of the first settlements in New Hampshire, the Lower Exeter/Squamscott River corridor has historic resources spanning four centuries. The Town of Exeter was settled along the banks of the river in 1638 by the Reverend John Wheelwright and several exiles from Massachusetts, who purchased the land in the area from the Squamscott Indians, a sub-tribe of the southern NH Penacooks and the Algonquin people. The original town of Exeter was a thirty-square mile tract of land with a significant waterfall in the center, now the site of the Great Dam in downtown Exeter. The tract included the current towns of Stratham, Newfields, Newmarket and Epping. Exeter became the capital of the new state of New Hampshire in 1774, and remained so until 1788.

There are several historic structures remaining along the Lower Exeter/Squamscott River. The largest is the Exeter Mill complex, built in 1828 to manufacture textiles and now converted to residential apartments and condominiums.

In addition to textile manufacturing, several other manufacturing sites were located all along the river corridor. According to Olive Tardiff, historian of the Exeter/Squamscott River, it was natural that the tributaries to Great Bay should foster shipbuilding. With the nearby woodlands, it was easier and cheaper to build near a supply of white oak than to float the lumber all the way to Portsmouth. Other industries sprang up along the river corridor to meet the needs of shipbuilders, including iron works and canvas shops. The height of shipbuilding along the river was between 1750-1775, with as many as 22 ships being built in a single season. These ships were commonly headed for ports in the West Indies with cargoes of lumber, bricks, dried cod, and salted alewives.

According to files located at the Phillips Exeter Academy, there are 32 reported prehistoric sites located in Exeter. It is unknown how many of these sites are within the Lower Exeter/Squamscott River corridor.

Stratham was established primarily as an agriculturally-based community. The first settlement occurred in the vicinity of Sandy Point, along Great Bay. Residents petitioned to establish the Town of Stratham, separate from Exeter, in 1716.

There are no historic districts in Stratham. The Town has identified over 80 historically significant buildings, two of which are located in the river corridor at the end of River Road. The Stratham Historical Society notes there are two significant prehistoric sites in the Squamscott River corridor; one in the vicinity of the Squamscott River and Jewett Hill Brook, and the other in the vicinity of the Squamscott River and Mill Brook. According to the State Archaeologist, these sites were used as semi-permanent villages or seasonal camps by Native Americans about 1,000 years ago.

One other historical resource of note along the river corridor in Stratham is the old mechanical piece that made the NH Route 108 bridge over the Squamscott River swing open for boat access up and down river. The swinging bridge was replaced in 2000 and the mechanical piece was placed in the parking lot at the abutting Chapman’s Landing. There has been a bridge over the Squamscott River in this location since 1775, replacing a ferry that began operating across the river in 1721.

Newfields was originally part of Exeter. In 1727 it became a parish of Newmarket, and in 1895 became the Town of Newfields. Located at the mouth of the Squamscott River, various industries thrived in Newfields, including shipbuilding, ship masts, tanning and lumber. There are no historic districts in Newfields. Although few signs of the original industries still exist, the center of Newfields remains a tightly clustered village composed of antique colonial and federal homes on the side of a hill overlooking the Squamscott River.

Table 18: Historical and Archaeological Resource in the Lower Exeter/Squamscott River Corridor

Source: National Register of Historic Places; Master Plans for the Towns of Exeter, Stratham and Newfields

Historical/Archaeological Resource	Listing/Eligibility	Town
First Congregational Church	NRHP*	Exeter
Dudley House	NRHP	Exeter
Exeter Waterfront Commercial District 79 structures	NRHP	Exeter
Front Street Historic District Over 40 structures	NRHP	Exeter

Major John Gilman House	NRHP	Exeter
Gilman Garrison House	NRHP	Exeter
Moses Kent House	NRHP	Exeter
Ladd Gilman House	NRHP	Exeter
Cannons at Gilman Park	Local significance	Exeter
Powder House	State significance	Exeter
Archaeological sites along the river	unknown	Exeter
House at end of River Road	Local significance	Stratham
House at end of River Road	Local significance	Stratham
Archaeological site at confluence of Jewett Hill Brook & Squamscott River	unknown	Stratham
Archaeological site at Mill Brook and Squamscott River	unknown	Stratham
Swinging/singing bridge structure	unknown	Stratham
Houses along Main Street	Local significance	Newfields

**NRHP stands for the National Register of Historic Places, an official list of the Nation's historic places worthy of preservation as identified by the National Park Service.*

(b) Community Resource

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

The Master Plans for the Towns of Exeter, Stratham, and Newfields provide the following language in recognition of the Lower Exeter/Squamscott River's importance:

Town of Exeter Master Plan, Conservation and Preservation Chapter, 2003:

2.0 Goals and Objectives:

- Remain actively involved in efforts to maintain the quality of the Exeter and Squamscott River (ERLAC, State Rivers Management and Protection Program).
- Ensure that water withdrawals from the Exeter River are sustainable and do not exceed that which will cause significant or lasting damage to the natural environment.
- Support zoning and land use regulations, including environmental overlay districts, to mandate protection of critical natural resources.
- Monitor the status of important natural resource assets of the town, including the Exeter /Squamscott River.
- Establish conservation land criteria that includes land that protects water quality, wildlife habitat, recreational opportunities, scenic and historic landscapes.

Because the Town of Exeter draws water off the Exeter River to supply the municipal

water system, the Town has produced several reports regarding the importance of the Exeter River to the community. The reports are noted under the Other Supporting Information section. The Town of Exeter has also recognized the river's importance by participating fully on the Exeter River Local Advisory Committee.

The Town of Stratham Master Plan, Resource Conservation and Preservation Chapter, 1998:

- The Planning Board should continue to review and carefully consider natural resource information pertaining to soil, slope, wetlands, floodplains, shorelands, and other natural resource information as part of its planning and development review.
- The Town should maintain its commitment to protect saltmarshes, rivers, vernal pools, other important wetlands, ponds, streams, and any rare and threatened species habitats.
- The Town should increase public holdings, easements, and restrictions on wetlands with specific concentration on the Squamscott River corridor.
- Work with appropriate agencies to secure funding for saltmarsh restoration along the Squamscott River.
- Continue reviewing the Town's zoning ordinance, including wetlands, floodplain and shoreland protection ordinances, for effectiveness and consistency with legislation.
- Develop public education programs on wetlands, shorelands, and their critical habitats.
- The Town should support and participate in regional efforts to identify open space and trail networks and wildlife corridors along the Squamscott River.
- Open space protection priorities should address shoreland areas, wildlife corridors, scenic areas, habitats, and recreational trail networks.

The Town of Stratham Open Space and Recreation Plan, 1989:

- The Squamscott River is a prime asset for Stratham and the region. It is the Town's largest river and critical for wildlife and recreation.

The Town of Newfields Master Plan, Wildlife Chapter (2004):

- Minimize the fragmentation of undeveloped habitat along river corridors.
- Where intensive development is planned, obtain detailed information about the impact to wildlife habitat.

The Town of Newfields Open Space Plan, 2001:

- The Squamscott River corridor is an extremely important ecological resource to protect and one of the most significant protection priorities of the Town of Newfields.
- Raise public awareness of the sensitivity of our waters and associated ecosystems, and of the importance of careful land management of the riparian

buffered area.

- Riparian shorelands serve critical ecological functions in Newfields, including wildlife habitat, floodwaters storage pollution abatement and filtration.
- Develop a town-wide habitat protection program.

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.

Recreational fishing is a very popular activity along the Lower Exeter/Squamscott River corridor. Popular fishing spots in Exeter along the Lower Exeter River can be found at Gilman Park and from the shoreland alongside the Phillips Exeter Academy forest and athletic fields. Gilman Park is identified as an access site for quiet paddling by the NH chapter of the Appalachian Mountain Club's NH Quiet Water Paddling Guide (2009). Fishing along the Squamscott River takes place from String Bridge in downtown Exeter and Swasey Parkway.

The Exeter River Local Advisory Committee partners with the Great Bay Chapter of Trout Unlimited to hold a day of fly-fishing instruction on the Exeter River for youth.

NH Fish and Game consider the Lower Exeter/Squamscott River a significant fishery, as described under the Fish Resources section.

(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.

Boating is a popular pastime along the Lower Exeter/Squamscott River. The Town of Exeter's Gilman Park provides access for canoes and kayaks along the Lower Exeter. The Town of Exeter maintains a boat ramp on the Squamscott River along Water Street, which provides public boat access, motorized and non-motorized. The Phillips Exeter Academy boathouse abuts the Town's ramp. The Exeter Elms Campground rents canoes and kayaks for use along the Exeter River.

Access to the Squamscott River is available from two locations in Stratham, the Town landing on River Road and the boat ramp maintained by the New Hampshire Fish and Game Department at Chapman’s Landing, adjacent to NH Route 108.

Access to the Squamscott River is available in Newfields from the Town Landing off River Road. Great Bay Campground, located at the mouth of the Squamscott River, provide access to the Squamscott and Great Bay.

(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.

The Town of Exeter’s Gilman Park along the Lower Exeter River is a popular spot for walking, fishing, birdwatching, and picnicking. On the opposite side of the river, the Phillips Exeter Academy forest offers an extensive trail network along the river corridor. The Town of Exeter’s Founders Park provides benches from which people can view the falls at Great Dam and the NH Fish and Game fish ladder. The Town of Exeter’s Swasey Parkway is also popular for walking, fishing, picnicking and birdwatching. The Parkway has a pavilion which is used for open air concerts and other performances. There is also a popular walking trail along the Squamscott River besides the Exeter Mills complex.

Birdwatchers from near and far travel to the Town of Exeter’s sewage lagoons for birdwatching. The lagoons often appear on birding alert lists in the region.

There is one campground located along the Lower Exeter/Squamscott River corridor, Great Bay camping in Newfields, which is located along the mouth of the Squamscott River. The Exeter Elms campground in Exeter is located south of the river corridor being discussed in this nomination.

(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.

Table 19: Public Access to the Lower Exeter/Squamscott River
Source: Master Plans, Towns of Exeter, Stratham, and Newfields

Location	River	Type of Access	Related Facilities	Ownership
Gilman Park -	Lower	Canoe/kayak launch,	Parking,	Town of Exeter

Exeter	Exeter	fishing, scenic views	picnic facilities, recreational field	
Phillips Exeter Academy Forest - Exeter	Lower Exeter	Trails, fishing, scenic views	Limited parking	Phillips Exeter Academy
Town Landing - Exeter	Squamscott	Boat ramp, fishing, scenic views	Parking, benches	Town of Exeter
Town Landing - Stratham	Squamscott	Boat ramp, fishing, scenic views	Parking	Town of Stratham
Town Landing - Newfields	Squamscott	Boat ramp, fishing, scenic views	Parking	Town of Newfields
Chapman's Landing	Squamscott	Boat ramp, fishing, scenic views, parking	Parking	NH Fish and Game Department

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.

There are several scenic vistas along the Lower Exeter/Squamscott River corridor. Most notable are the views of the Lower Exeter River from Exeter's Gilman Park, which include a forested canopy along the river and several backwater eddies. The views of the falls over Great Dam from the Town of Exeter's Founder's Park and from String Bridge are a unique viewshed, providing a glimpse into the Town's history and development from early settlement along the river in the 1600's, through the ship building of the 1700 and 1800's and into the mills and manufacturing period of the 1800 and 1900's. Swasey Parkway, which lies along the Squamscott River, provides beautiful views of the historical streetscape of downtown Exeter.

Drivers travelling along NH Route 101 are afforded a beautiful view of the tidal Squamscott and its salt marshes. Scenic views are also available from the bridge crossing on NH Route 108 and the abutting boat ramp known as Chapman's Landing.

(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.

Table 20: Population in the Lower Exeter River/Squamscott River Communities

Town	2008 Population Estimate NH Office of Energy and Planning	2020 Population Projection NH Office of Energy and Planning
Exeter	14,497	16,040
Stratham	7,225	8,020
Newfields	1,657	1,810
Total	23,379	25,870

Table 21: Land Use Zones and Acres in Zones in the Lower Exeter/Squamscott River Corridor

Source: GRANIT, Rockingham Planning Commission

Land Use Type	Acres
Forested	1109.8
Open Wetlands	795.9
Residential	419.0
Water	300.1
Agricultural	227.3
Transportation	175.2
Recreational/Fields	156.9
Industrial/Commercial	120.2
Brush/Transitional	102.9
Mixed Urban	26.6
Railroads	2.7
Disturbed	1.5
TOTAL	3438.1

The general pattern of current land use in the river corridor can be described as follows:

Lower Exeter River, Exeter – Low density residential development and conservation land (Phillips Exeter Academy forest), with significant forest canopy. Town owned conservation land (Gilman Park), recreation fields (Phillips Exeter Academy). Downtown commercial district with bridge crossing.

Squamscott River, Exeter – Downtown commercial district, including residential units in Exeter Mills, and Town boat ramp. Town owned park (Swasey Parkway), conservation land abutting golf course, Town of Exeter Wastewater Treatment Plant, NH Route 101

bridge crossing, salt marsh and extensive conservation land. Railroad track parallels river.

Squamscott River, Stratham – Low density residential, Town boat ramp, salt marsh, significant conservation land, and one large agricultural operation (Stuart dairy farm). NH Route 108 bridge crossing.

Squamscott River, Newfields – Low density residential and one parcel of light industrial (Hutchinson Sealing Systems). Railroad tracks parallel river. Town of Newfields Wastewater Treatment Plant, and town boat ramp. One large campground at mouth of 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).

The following is a description of local land use controls in the Lower Exeter/Squamscott River corridor communities of Exeter, Stratham, and Newfields.

Town of Exeter
<i>Wetlands Protection</i> – Exeter has a Wetlands Conservation District Ordinance, which includes regulatory provisions for assessing and addressing indirect impacts to wetlands and vernal pools associated with development projects. The Town has designated prime wetlands and adopted regulations to protect prime wetlands.
<i>Shoreland Buffers</i> – Exeter has a Shoreland Protection District Ordinance, which restricts development along 1 st , 2 nd , 3 rd and 4 th order streams (and above), and tidal rivers. The ordinance has setback requirements for septic systems and structures, and prohibits alteration within 75’ of surface waters.
<i>Impervious Surface Limits</i> – The Town of Exeter limits impervious surfaces to 10% in the Shoreland Protection District and to 60% in the Rural District.
<i>Open Space Conservation</i> – Exeter has an Open Space Development Ordinance to encourage flexibility in design and development in order to promote conservation of open space.
<i>Stormwater Management</i> – Exeter’s stormwater management requirements are included in the Town’s subdivision and site plan regulations, and require best management practices.
<i>Erosion and Sediment Control</i> - Exeter has adopted erosion and sediment control regulations as part of the Town’s subdivision and site plan regulations.
<i>Aquifer Protection</i> – Exeter has an Aquifer Protection District Ordinance.

<i>Floodplain Development</i> – Exeter has adopted a Floodplain Development Ordinance.
<i>Wildlife Habitat</i> – Exeter requires pre-application meetings for development sites to address wildlife issues of concern (i.e. vernal pools, rare plants and animals).
<i>Subdivision and Site Plan Regulations</i> – Exeter had adopted Subdivision regulations and Site Plan regulations. Both regulations require developers to provide an Environmental Impact Assessment.
<i>Master Plan</i> – Exeter’s Master Plan includes a Conservation and Preservation chapter, Open Space Plan, and a Water Resource Management and Protection Plan chapter.
In addition, the Town of Exeter is active in land conservation, has full representation on the Exeter River Local Advisory Committee, and is reviewing the adoption of a Fluvial Erosion Hazard Ordinance.

Town of Stratham
<i>Wetlands Protection</i> – Stratham has a Wetlands Conservation District Ordinance, which restricts development along the shores of the Squamscott River and other water bodies.
<i>Shoreland Buffers</i> – Stratham has a Shoreland Protection District which restricts development within 150 feet of the Squamscott River and requires a 75 foot vegetated buffer along the river.
<i>Impervious Surface Limits</i> – Stratham limits impervious surfaces to 20% in the Aquifer Protection District, 40% in the Commercial/Industrial District, 20% in the Rural/Residential District, and 60% in the Urban District.
<i>Open Space Conservation</i> – Stratham had adopted a Residential Open Space Cluster Development Ordinance to encourage land development patterns designed to protect open space and water resources.
<i>Stormwater Management</i> – Stratham’s stormwater management requirements are included in the Town’s subdivision and site plan regulations.
<i>Erosion and Sediment Control</i> – Stratham has incorporated erosion and sediment control regulations into their subdivision regulations and requires best management practices.
<i>Aquifer Protection</i> – Stratham has an Aquifer Protection District Ordinance.
<i>Floodplain Development</i> – Stratham has a Floodplain Management District Ordinance.
<i>Wildlife Habitat</i> – Stratham requires pre-application meetings of development sites to address wildlife issues of concern.
<i>Subdivision and Site Plan Regulations</i> – Stratham has adopted Subdivision and Site Plan Regulations.
<i>Master Plan</i> – Stratham’s Master Plan has a Natural Resource Chapter and an Open Space and Recreation Chapter.
In addition, the Town of Stratham is active in land conservation.

Town of Newfields
<i>Wetlands Protection</i> – Newfields has a Wetlands Ordinance. The Town has identified Prime Wetlands and is working to adopt regulations to protect prime wetlands.

<i>Shoreland Buffers</i> – Newfields has a Shoreland Protection District Ordinance which restricts development within 150 feet of the Squamscott River.
<i>Impervious Surface Limits</i> – Newfields limits impervious surfaces to 25% in the Aquifer Protection District.
<i>Open Space Conservation</i> – Newfields has adopted a Conservation Subdivision Ordinance and Land Conservation Zones. The Town also has an Open Space Plan and an Inventory of Natural Resources.
<i>Stormwater Management</i> – Newfields has adopted stormwater management requirements as part of their subdivision regulations.
<i>Erosion and Sediment Control</i> – Newfields has incorporated erosion and sediment control requirements into their site plan regulations and requires best management practices.
<i>Aquifer Protection</i> – Newfields has adopted an Aquifer Protection District Ordinance.
<i>Floodplain Development</i> – Newfields has a Floodplain Development District Ordinance.
<i>Wildlife Habitat</i> – Newfields requires pre-application meetings of development sites to address wildlife issues of concern.
<i>Subdivision and Site Plan Regulations</i> – Newfields has adopted Subdivision and Site Plan regulations.
<i>Master Plan</i> – Newfields’s Master Plan has a Natural Resources Chapter, and a Water Resource Management and Protection Plan Chapter. The Town has also adopted an Open Space Plan.
In addition, Newfields is active in land conservation.

(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.

USGS Gage Station #01073587 Exeter River at Haigh Road, Brentwood NH, Rockingham County NH

Latitude 42°59’04”, Longitude 71°02’20”; NAD27

Gage Datum: 60.27 feet above sea level NGVD29

Hydrologic Unit: 016060003; Drainage Area: 63.5 square miles

Full Record Station, Data from 6/27/1996 to present

(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.

The Exeter Mills Apartment complex has water rights reserved and conveyed in the deed of the Great Dam to the Town of Exeter in 1981. The Town acquired the Great Dam and other land, and the water rights, in a quitclaim deed dated October 7, 1981. The current owner of the Exeter Mill apartments, as successor in title, claims a right to a flow of water through the penstock that ensures the apartment complex's fire protection needs; it currently exercises a right to water from the penstock for its fire protection system and also for cooling and irrigation purposes.

There are not other significant flowage rights along the proposed designated reach.

SECTION VIII. RIVER POINT EVALUATION SUGGESTION AND JUSTIFICATION

Explanation: By law, the rivers coordinator must evaluate the nomination using a system that has been designed to both identify significant resources and to ensure consistency in the manner in which each river nomination is evaluated. The system consists of a general evaluation and the awarding of points for the presence of significant resources within each resource category. Sponsors of the nomination are requested to suggest the number of points they feel should be awarded for the significant resources contained within each resource category and a brief justification regarding why those points should be awarded.

Instructions: Complete the table below. Please note that if a resource is present that all points for that resource should be awarded, however, only these points may not exceed the maximum points in each resource category.

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
NATURAL RESOURCE CATEGORY		205		
(a) Geologic Resources		30		
(1) national or regional significance	30		30	Primary tributary to Great Bay, an estuary of national significance
(2) statewide significance	20			
(3) local significance	10			
(b) Wildlife Resources		30		
(1) endangered or threatened species		15	15	Several reports identify endangered and threatened species, as well as threatened ecosystems and habitats, including diadromous fish passage.
a. national significance	15		15	
b. statewide significance	10			
(2) significant wildlife habitat		10		
a. Habitat that is within a conservation focus area or that is known to have contained or currently contains state or federally listed endangered or threatened species	10		10	River corridor identified as Conservation Focus Area in Land Conservation Plan for NH's Coastal Watersheds, NH Fish and Game Wildlife Action Plan, and in Great Bay Resource Protection Partnership Habitat Protection Plan due

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
				to presence of endangered or threatened species
b. Habitat that is within an area of highest quality habitat statewide or highest quality in the biological region and/or is a habitat for a species of special concern	5			
c. Habitat that is within an area of supporting landscapes or that contains other species of greatest conservation moderately diverse	3			
d. Adjacent habitat	1			
(3) wildlife travel corridor		5	5	Critical wildlife corridor for migratory waterfowl
(c) Vegetation/Natural Communities		20		
(1) endangered or threatened plant		15	15	River corridor contains 9 endangered and threatened plant species
a. national significance	15			
b. statewide significance	10			
(2) exemplary natural ecological community		5	5	River corridor provides 8 exemplary natural ecological communities

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
(d) Fish Resources		35		
(1) endangered or threatened fish		15		
a. national significance	15		15	River corridor provides habitat to fish listed as threatened by the National Fish and Wildlife Service, as well as Species of Concern for the NH Fish and Game Department, NOAA and the NFWS, and provides critical migratory habitat for diadromous fish species
b. statewide significance	10			
(2) significant aquatic habitat		10		
a. Habitat that is within a conservation focus area or is known to have contained or currently contains state or federally listed endangered or threatened species.	10		10	Corridor provides critical fish spawning and migration habitat for state listed endangered and threatened species and species of concern
b. Habitat that is within an area of highest quality habitat statewide or highest quality in the biological region and/or is a habitat for a species of special concern	5			
c. Habitat that is within an area of supporting landscapes or contains other species of greatest conservation need.	3			

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
d. Adjacent habitat not located within any of the above.	1			
(3) fish reproduction		5		
a. natural reproduction	5		5	River corridor provides natural reproduction for river herring and sea lamprey, American shad
b. some stocking	3			
c. stocking	1			
(4) anadromous fish		5		
a. reproducing populations of diadromous fish	5		5	River provides habitat for reproducing populations of river herring, sea lamprey, American shad
b. restoration begun	3			
c. documented restoration plan	1			
(e) Water Quality		30		
(1) Class A	30			
(2) Class B	15		15	River meets Class B standards
(f) Open Space	10 per occurrence	30	30	Approximately 1,133 acres of protected land

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
(g) Natural Flow Characteristics		30		
(1) 100 percent free-flowing	30			
(2) largely free-flowing	15		15	Lower Exeter River is free-flowing until Great Dam; Squamscott River is free-flowing after Great Dam
SUBTOTAL NATURAL RESOURCES		205	190	
MANAGED RESOURCE CATEGORY		90		
(a) Impoundments		30	30	River corridor is impounded by Great Dam in downtown Exeter
(b) Water Withdrawals and Discharges		30		
(1) water withdrawals		20		
a. existing public drinking water supply	10		10	Lower Exeter River includes intake for Town of Exeter municipal water system
b. potential public drinking water supply	5			
c. existing industrial water supply	5		5	Lower Exeter River includes intake for Phillips Exeter Academy heating system, and the cooling system at the Exeter Mills complex

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
d. potential industrial water supply	3			
e. existing agricultural water supply	5		5	Lower Exeter River includes intake for Phillips Exeter Academy recreational field irrigation system and for irrigation of lawns at Exeter Mills complex
f. potential agricultural water supply	3			
(2) wastewater discharges		10		
a. wastewater treatment facility discharge	10		10	The Towns of Exeter and Newfields discharge into the Squamscott River
b. industrial wastewater discharge	5			
(c) Hydroelectric Resources		30		
(1) existing hydroelectric power production	30			
(2) potential hydroelectric power site	15		15	Feasibility studies are being considered by private entities for hydro power from Great Dam
SUBTOTAL MANAGED RESOURCES		90	75	
CULTURAL RESOURCE CATEGORY		60		
(a) Historical or Archeological Resource		30		

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
(1) national significance	30		30	River corridor contains hundreds over 150 structures structures dating back to the early colonial period, and archeological resources dating back 1,000 years
(2) regional significance	15			
(3) statewide significance	10			
(b) Community River Resource	10 per occurrence	30	30	All three river corridor communities have invested significant resources in protecting the river corridor in the form of land conservation, land use regulations, and establishment and maintenance of public access sites
SUBTOTAL CULTURAL RESOURCES		60	60	
RECREATIONAL RESOURCE CATEGORY		120		
(a) Fishery		30		
(1) Year-round coldwater, warmwater, and saltwater fish species fish habitat.	30		30	River provides habitat for coldwater and warmwater species and for diadromous fish species and is a critical migratory path for diadromous fish species
(2) Year-round habitat for 2 or more	20			

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
coldwater, warmwater or saltwater fish species.				
(2) Year-round habitat for wither coldwater, warmwater or saltwater fish species.	10			
(b) Boating		30	30	The river is used extensively for recreational boating, motorized and non-motorized, and is also used for competitive rowing by Phillips Exeter Academy
(c) Other Recreation	10 per occurrence	30	30	The river corridor is a national destination for birdwatchers as the river and Great Bay provide critical migratory bird habitat. There are miles of walking trails in the river corridor, located in the Phillips Exeter Academy forest, and Gilman and Swasey Parks in Exeter
(d) Public Access		30		
(1) on publicly-owned land	30		30	Each of the three towns in the river corridor provides public access to the river by boat ramp. In addition, public access to the Squamscott river is available from the NH Fish and Game

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
				boat landing
(2) on privately-owned land	15			
SUBTOTAL RECREATIONAL RESOURCES		120	120	
OTHER RESOURCE CATEGORY		120		
(a) Scenery		30	30	There are significant river corridor view sheds provided by town owned parks in Exeter, from NH Route 101, NH Route 108, and the Fish and Game boat ramp in Stratham
(b) Land Use		30		
(1)high quality scenic and natural resources; corridor generally undeveloped or limited to forest management or scattered housing	30			
(2)corridor partially to predominantly used for agriculture, forest management and residential housing	20		20	The river corridor contains over 18 parcels of permanently protected land. The Lower Exeter River corridor includes the Phillips Exeter Academy forest, residential and limited commercial. The Squamscott River has limited residential and commercial development

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
(3)corridor populated; some residential or other building developments; readily accessible by road	10			
(4)corridor highly populated; contains significant development	5			
(c) Land Use Controls	10 per occurrence	30	30	Each of the towns in the river corridor have adopted significant land use controls and policies to protect shoreland buffers, water quality, and wildlife habitat
(d) Water Quantity		30	30	The Exeter River has two gage stations maintained by the USGS/DES
SUBTOTAL OTHER RESOURCES		120	110	
TOTAL POINTS		595	555	

Final note: Before submitting the nomination, please check the form for completeness. Nomination forms are reviewed for completeness by the Department of Environmental Services. Be sure to consult [RSA 483](#) and Env-Wq 1803.02 to make sure that all information requirements have been met. Incomplete nominations will be ineligible for consideration by the State Legislature in the next legislative session.