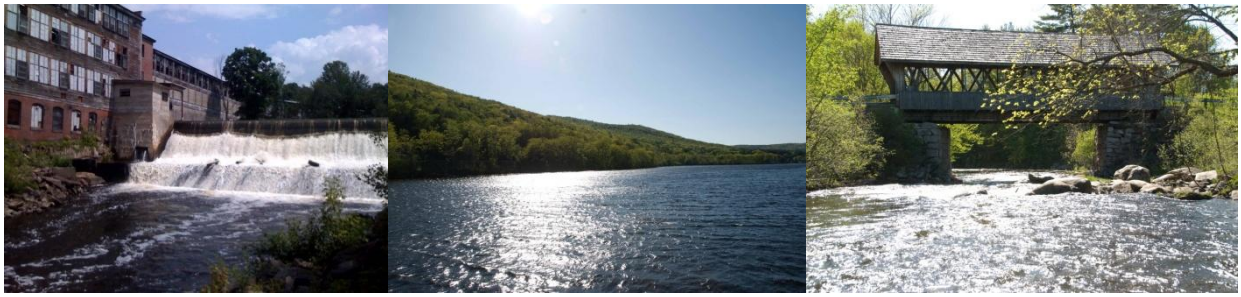


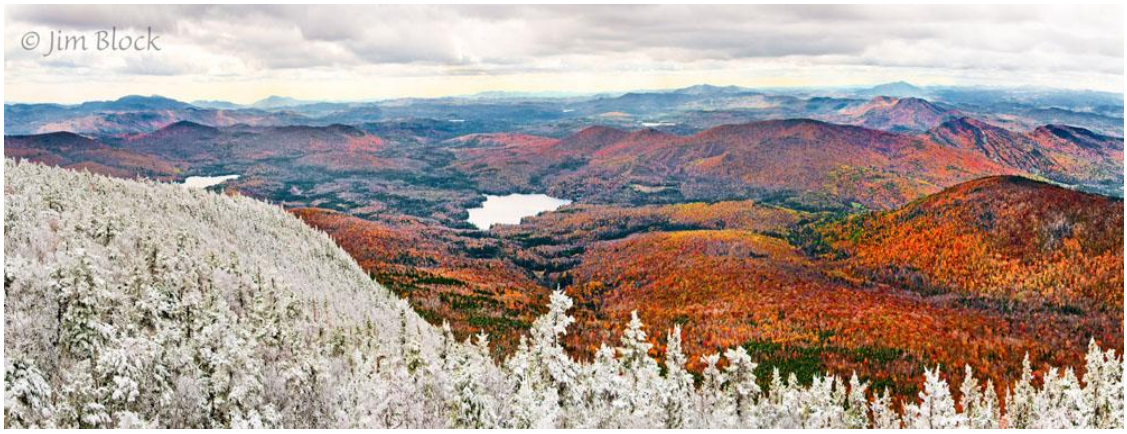
Nomination of the Mascoma River

From Canaan Center to West Lebanon

New Hampshire Rivers Management and Protection Program

Submitted by:
Upper Valley Lake Sunapee Regional Planning Commission,
On behalf of the Mascoma River Nominating Committee

June 1, 2010
Revised July 7, 2010



River Nomination Form

New Hampshire Rivers Management and Protection Program

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

I. NOMINATION INFORMATION

1. Name of River: Mascoma River

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

Mascoma River, starting at downstream confluence with the Canaan Street Lake outlet in Canaan Center and ending at the upstream confluence of the Mascoma with the Connecticut River in West Lebanon; Length 25.27 miles

3. (a) Sponsoring Organization or Individual: Upper Valley Lake Sunapee Regional Planning Commission, on behalf of the Mascoma River Nominating Committee

(b) Contact Person: Rachel Ruppel

(c) Address: 30 Bank St., Lebanon, NH 03766

(d) Daytime Telephone Number: (603) 448-1680

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	X
Hydroelectric Resources	X	X

Cultural Resources

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	
Land Use Controls	X	
Water Quantity	X	X
Riparian/Flowage Rights	X	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 Mascoma River supports the full spectrum of river resources along its length between Canaan Center and West Lebanon. The river connects several villages and downtown areas among the Towns of Canaan and Enfield and the City of Lebanon, providing drinking water, watershed protection, economic activity and opportunities, fish and wildlife habitat, water- and land-based recreation, and connections to history for residents and visitors.

Important natural resources in the Mascoma River corridor have been documented in the New Hampshire Wildlife Action Plan as well as Natural Resources Inventories for the Mascoma Watershed, the Town of Enfield and the City of Lebanon. In particular, there are three state Wildlife Management Areas, one State Forest and numerous locally-protected natural areas within the river corridor to protect natural resources. Mascoma Lake and the small impoundments created by dams in Enfield and Lebanon provide habitat for waterfowl and aquatic life, but the majority of the river is free-flowing. In the river itself, the State manages a superior eastern brook trout fishery, a salmon restoration program, and a stocking program for Mascoma Lake. The Mascoma River in Enfield and Canaan are also included as one of the Core Conservation Focus Areas for the Quabbin to Cardigan Partnership, a collaborative land protection initiative to protect large undeveloped areas in central/western New Hampshire and Massachusetts.

The natural resources of the Mascoma River co-exist with the use of the river for economic activity. The river supplies the City of Lebanon with drinking water for 3,400 connections. Four active hydroelectric facilities produce energy and there are three registered water withdrawals for industrial and mining uses.

The history of the region is directly tied to the Mascoma River. Native Americans used the river corridor as a trail to the interior of the state and camped and fished on Mascoma Lake. Euroamerican settlers established their villages along the Mascoma River, establishing saw mills and other water-powered industries as early as the 1760's, which later gave way to industrial-scale woolen mills, tanneries and other factories. The Shakers established a large community on the shores of Mascoma Lake, which thrived for over 100 years. The Northern Railroad followed the Mascoma River, connecting local industries to regional trade networks and early leisure travelers to Mascoma Lake. Because of the early development along the river and its tributaries, the Mascoma River corridor now contains four National Historic Districts. The value of the river to each community has evolved over time, and the river is now valued for its recreational resources, public access, open space, wildlife habitat, and environmental quality as well as its role as an economic engine.

The Mascoma River is ideal for recreation – the State of New Hampshire and local municipalities have invested in public lands, boat launches and recreation areas along the full length of the river. Of particular significance are the fly-

fishing-only section of the Mascoma River in East Lebanon, the Northern Rail Trail's riverside section along the river between downtown Lebanon and Route 4/LaFortune Road in Canaan, the annual whitewater kayak race below Mascoma Lake Dam, and the three Wildlife Management Areas with frontage on the river or lake. The City of Lebanon and its local partners, notably the Lebanon Rotary Club, has developed a series of parks and open spaces along the Mascoma River, even in the urbanized parts of the city.

The Mascoma River has seen drastic improvements in its water quality since the closure of the mills in the 1960's and early 1970's and the passage of the Clean Water Act in 1972. Since 2001, the City of Lebanon has been working diligently to separate its sanitary sewer and stormwater sewer system, thereby eliminating Combined Sewage Overflows and further improving water quality in the Mascoma River and the Connecticut River. Non-point source pollution, stormwater runoff, development pressure and invasive species have emerged as new challenges, potentially degrading water quality for drinking, aquatic habitat, recreation and other highly valued uses. All four lakes in the watershed – Mascoma, Canaan Street, Crystal, and Goose Pond – have active water testing programs to help identify water quality problems. They also test tributaries and some parts of the Mascoma River. The Mascoma Watershed Conservation Council conducts additional testing on the Mascoma River.

Eurasian milfoil has invaded Mascoma Lake, and dedicated volunteers are working to manage and prevent the further spread of this noxious weed. All four lakes have Lake Host and Weed Watcher programs to prevent any further spread of milfoil or other invasive plants. Cyanobacteria blooms have occurred in Mascoma Lake and other lakes in the watershed in the past few years, which leads to beach closures and reduced recreational use of the lake. In addition, Dartmouth Medical School is leading a study of a possible link between the toxins produced by cyanobacteria and a relatively high number of cases of amyotrophic lateral sclerosis (ALS, or Lou Gehrig's disease) among residents near Mascoma Lake and other water bodies.

The Upper Valley region has seen significant economic growth over the last 25 years, with correlated growth in development and population. Between 1990 and 2005, housing units increased 22.3% in Lebanon, 18.8% in Enfield and 21.5% in Canaan [Source: Route 4 Corridor Study, 2007, UVLSRPC.] Route 4 parallels the Mascoma River for roughly 20 miles between Lebanon and Canaan; this is a primary travel route for commuters between easterly outlying communities and the Lebanon/Hanover/Hartford (VT) employment center. Particularly in Lebanon, the river has steep-sided banks prone to erosion and landslides; the 2007 Route 4 Corridor Study identified erosion near Mill Road and Route 4 in East Lebanon as an area of concern. Without thoughtful planning and management, further residential and commercial development in outlying areas could undermine the natural, scenic and recreation values of the Mascoma River. Designating the Mascoma River into the New Hampshire Rivers Management and Protection

Program will set up an intermunicipal forum to begin addressing these issues proactively from a river-wide perspective.

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.

The Mascoma River Nominating Committee has solicited and received support for the lower Mascoma River nomination from the following municipal entities: City of Lebanon City Council, Planning Board, and Conservation Commission; Town of Enfield Board of Selectmen, Planning Board, and Conservation Commission; Town of Canaan Planning Board and Conservation Commission; and the Hanover Conservation Commission. The Canaan Board of Selectmen voted to remain neutral, neither supporting nor opposing the nomination, at their May 25, 2010 meeting.

In addition, the following non-profit associations have written letters of support for the nomination: Greater Upper Valley Chapter of Trout Unlimited, Mascoma Lake Association, Goose Pond Lake Association, Upper Valley Land Trust, Mascoma Watershed Conservation Council, and Hanover Conservation Council.

Following an initial public information meeting organized by Upper Valley Lake Sunapee Regional Planning Commission and NH Department of Environmental Services in March 2008, the Mascoma River Nominating Committee organized, advertised, and conducted six public informational events, in addition to numerous meetings with individual boards and organizations (see complete listing below). The public information events included two field trips (to Cummins Pond in Dorchester and LeBrun Meadows/Mill Parcel/Rail Trail in Lebanon), three town-specific meetings, and one river-wide informational meeting.

Per the requirements of RSA 483, the three riverfront towns (Lebanon, Enfield, and Canaan) were notified in writing on May 11, 2010, as well as by email and fax, of the May 18, 2010 river-wide public information meeting. In addition, the meeting was advertised in the Valley News, both as a calendar listing and a legal

notice. Documentation is attached.

Public Outreach Activities for the Mascoma River Nomination – as of 05/26/2010

March 31, 2008 – Public Information Meeting on the Mascoma River and the State Rivers Management and Protection Program
April 10, 2008 – Presentation and Discussion with Lebanon Conservation Commission
April 28, 2008 – Presentation and Discussion with Lebanon Planning Board
May 19, 2008 – Presentation and Discussion with Enfield Board of Selectmen
May 20, 2008 – Presentation and Discussion with Canaan Board of Selectmen
June 11, 2008 – Presentation and Discussion with Enfield Planning Board
<< In the intervening time, UVLSRPC applied for and received a grant to help with the Mascoma River nomination. >>
August 3, 2009 – Presentation and Discussion with Canaan Conservation Commission
August 27, 2009 – Presentation and Discussion with Canaan Planning Board, and representatives of the Canaan Source Water Protection Committee, Canaan Lake Association, and Goose Pond Lake Association
September 15, 2009 – Project Update/Discussion with Upper Valley Subcommittee of the Connecticut River Joint Commissions
September 16, 2009 – Presentation and Discussion with Lebanon City Council
September 26, 2009 – Field Trip and Public Information Session, Dorchester
January 7, 2010 – Presentation and Discussion with Enfield Conservation Commission
January 26, 2010 - Presentation to Mascoma Lake Association
February 10, 2010 - Presentation to the Enfield Planning Board
February 27, 2010 – Winter Walk led by Nicole Cormen along Rail Trail, Lebanon; co-sponsored by Upper Valley Land Trust
April 26, 2010 – Public Discussion Session with the Lebanon Planning Board and Conservation Commission
April 27, 2010 – Public Discussion Session with the Canaan Board of Selectmen
April 29, 2010 – Public Discussion Session for the Town of Enfield
May 3, 2010 – Presentation and discussion with Enfield Board of Selectmen
May 5, 2010 – Presentation and discussion with Lebanon City Council
May 13, 2010 – Presentation and discussion with Canaan Planning Board and Canaan Selectboard
May 18, 2010 – River-Wide Public Information Meeting on the Nomination
May 25, 2010 – Discussion with the Canaan Selectboard

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.

Attached to this nomination as Appendices:

A. Documentation of public support
B. Documentation of municipal government notification of May 18, 2010 meeting
C. Maps (please see Section VI for a full listing of resource and reference maps)
D. Outreach brochure and flyer for individual town meetings (4/26-4/29/2010)
E. Copy of newspaper article from the Valley News, 05/14/2010
F. Mascoma Watershed Natural Resources Inventory, 2003

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.

(a) General Description

	The river or segment is free-flowing and characterized by high quality natural and scenic resources. The river shoreline is in primarily natural vegetation and the river corridor is generally undeveloped and development, if any, is limited to forest management and scattered housing. (Natural Rivers)
X	The river or segment is adjacent to lands which are partially or predominantly used for agriculture, forest management, and dispersed or clustered residential development. Some instream structures may exist, including low dams, diversion works and other minor modifications. (Rural Rivers)

X	The river or segment that flows through developed or populated areas of the state and which possesses existing or potential community resource values such as those defined in official municipal plans or land use controls. Such a river has mixed land uses in the corridor reflecting some combination of open space, agricultural, residential, commercial and industrial land uses. It is readily accessible by road or railroad and may include impoundments or diversions. (Rural-Community Rivers)
X	The river or segment flows through populated areas of the state and possesses actual or potential resource values, with some residential or other building development near the shoreline. The river or river segment is readily accessible by road or railroad, and may include some impoundments or diversions. (Community Rivers)

(b)Length

	The river or segment is at least 5 miles long. (Natural Rivers)
X	The river or segment is at least 3 miles long. (Rural and Rural-Community Rivers)
X	The river or segment is at least 1 mile long. (Community Rivers)

(c) Water Quality

	The actual water quality of the river or segment meet Class A standards under the state's water quality standards. (Natural Rivers)
X	The actual water quality of the river or segment meets Class B standards under the state's water quality standards. (Rural, Rural-Community and Community Rivers)

(d) Distance to Roads

	The minimum distance from the river shoreline to a paved road open to the public for motor vehicle use is at least 250 feet, except where a vegetative or other natural barrier exists, which effectively screens the sight and sound of motor vehicles for a majority of the length of the river. (Natural Rivers)
X	There is no minimum distance from the river shoreline to an existing road. Roads may parallel the river shoreline

2. Based on the boxes checked above, and your knowledge of the river or segment, identify those segments of the river that you believe should be classified as either a

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

Natural River: n/a

Rural River: the downstream side of the confluence of the Mascoma River with the Canaan Street Lake tributary in Canaan, 11.10 miles, to the upstream side of the railroad bridge east of the Baltic Mills Dam in Enfield

Rural-Community River: Downstream side of the railroad bridge south of Main Street in Enfield and through Mascoma Lake, 6.12 miles, to the upstream side of the Water Treatment Intake Dam in Lebanon

Community River: 2 segments: Upstream side of the Railroad bridge east of the Baltic Mills Dam in Enfield, 1.04 miles, to the downstream side of the railroad bridge south of Main St in Enfield; Upstream side of the Water Treatment Intake Dam in Lebanon, 7.01 miles, to the upstream side of the confluence of the Mascoma River with the Connecticut River in Lebanon

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.

Map 1. River Segments and Corridor
Map 2. Stratified-Drift Aquifers
Map 3. Wildlife Habitat
Map 4. Wildlife Corridors, Enfield Natural Resources Inventory
Map 5. Unfragmented Blocks, Mascoma Watershed Natural Resources Inventory
Map 6. Natural Communities
Map 7. Land Use Patterns
Map 8. Quabbin to Cardigan Partnership, New Hampshire-North
Map 9. Managed Resources
Map 10. Cultural Resources
Map 11. Recreational Resources
Map 12. Bicycle Routes Map, NH Department of Transportation
Map 13. Enfield Zoning Districts Map, Town of Enfield
Map 14. Lebanon Zoning Districts Map, City of Lebanon

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 Mascoma River has geologic resources that provide sites of natural history interest, scenery, and economic resources.

The bedrock geology of the Mascoma River basin consists primarily of Paleozoic sediments that have been metamorphosed into schist, quartzite, slate, gneiss and other metamorphic rocks; Devonian and Carboniferous igneous rocks are also present. The surficial geology is primarily glacial till, with some stratified sediments at the sites of glacial lakes and streambeds. Glacial Lakes Hitchcock, Upham and Mascoma covered the lower-lying areas of the Mascoma River watershed. These areas now are underlain by stratified drift-aquifers, some being used a ground water sources. Glacial Lake Hitchcock clays have been used commercially for brick making in Lebanon at the Densmore Brickyard. Glacial lake deposits also provide good farmland and opportunities for sand and gravel mining. Slate deposits in East Lebanon were quarried in the late 18th and early 19th centuries. [Sources: Water Resources Study Mascoma River Basin, New Hampshire, US Army Corps of Engineers New England division. February 1989; Enfield, New Hampshire 1761-2000: The History of a Town Influenced by the Shakers, published 2006; Lebanon, NH Master Plan, 2006; Archaeological Assessment and Preservation Options for the Lebanon Slate Mill Site, East Lebanon, New Hampshire, 2006, Robert G. Goodby, Ph.D. for the Lebanon Conservation Commission.]

The river runs through several sections of rapids on its lower sections. The first is a 1-mile-long section of Class II rapids between the Indian River confluence and the Route 4 Bridge in West Canaan. From Mascoma Lake to the Connecticut River, the Mascoma River drops 42 feet per mile, providing a series of rapids and waterfalls enjoyed by whitewater kayakers. Between the Mascoma Lake Dam and the dam upstream from the Lebanon water treatment plant is a four-mile-

long stretch of Class II and III rapids; this section includes Excelsior Rapids. A section of Class V rapids flows through downtown Lebanon, and the Mascoma River Falls are located just below this section next to the Rivermill Complex. [Source: Appalachian Mountain Club River Guide for New Hampshire and Vermont, 3rd edition, 2002; Water Resources Study Mascoma River Basin, New Hampshire, US Army Corps of Engineers New England division. February 1989; American Whitewater Inventory.]

Photo of Rapids in Downtown Lebanon

Stratified-drift aquifers are concentrated immediately along the Mascoma River; these valuable groundwater resources underlie only 14 percent of the State of New Hampshire, making these deposits valuable on a statewide level (Map 2). Lebanon's largest aquifer is near the confluence of the Mascoma and Connecticut Rivers and was identified as a potential community water supply in a water supply study commissioned by the City and completed by Wright/Pierce in 1999. Today the Lebanon Airport occupies the surface of what remains of a river delta, deposited into Glacial Lake Hitchcock by the Mascoma Valley drainage. [Source: Groundwater Resources in New Hampshire: Stratified Drift Aquifers, US Geological Survey, 1995; Geohydrology and water quality of stratified-drift aquifers in the Middle Connecticut River Basin, west-central New Hampshire, US Geological Survey, 1996; personal communication with Leland Wilder, Public Outreach Coordinator, NH Geological Survey, 2010.]

A site with interesting geology known as Devil's Kitchen, is located adjacent to the Mascoma River, at the oxbow area south of East Lebanon, north of the river, and west of Mascoma Lake. The Devil's Kitchen contains "unusual rock formations, giant pot holes and an abandoned slate quarry." This area and an area of potholes nearby were identified by the Lebanon Conservation Commission as Local Resource Protection Priorities. In addition, there are oxbows near the mouth of the Mascoma River. [Source: Inventory of Natural, Scenic and Historic Areas, Grafton County Conservation District 1968; Local Resource Protection Priorities, NHDES Regional Environmental Planning

Program, 1998, 1999, 2004; personal communication with Leland Wilder, Public Outreach Coordinator, NH Geological Survey, 2010.]

(b) Wildlife Resources

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

Mammal species observed within the river corridor.		
Bats (multiple spp.)	Grey Squirrel	Red Fox
Beaver	Mice	Red Squirrel
Black Bear	Mink	River Otter
Bobcat	Moles (multiple spp.)	Shrews (multiple spp.)
Chipmunk	Moose	Skunk
Cougar (2 unverified sightings)	Muskrat	Snowshoe Hare
Coyote	New England Cottontail	Voles (multiple spp.)
Flying Squirrel	Porcupine	Weasels (multiple spp.)
Grey Fox	Raccoon	White Tailed Deer

Songbirds/Woodpeckers	**Raptors/Owls**	**Waterfowl/Shorebirds**	**Game Birds**
American Crow	American Kestrel	Belted Kingfisher	American Woodcock
American Robin	Bald Eagle	Canada Goose	Ring-Necked Pheasant
Black-capped Chickadee	Barn Owl	Common Loon	Ruffed Grouse
Common Yellowthroat	Broad-winged Hawk	Great Blue Heron	
Downy Woodpecker	Great Horned Owl	Green-backed Heron	
Red-Tailed Hawk	Osprey	Mallard	
Turkey Vulture	Peregrine Falcon	Mergansers (mult. spp.)	
Pileated Woodpecker		Spotted Sandpiper	
Tree Swallow		Wood Duck	
White-Breasted Nuthatch			
Wild Turkey			
Wood Thrush			
Yellow Warbler			

[Source: DeLorme *N.H. Atlas and Gazetteer*; Water Resources Study Mascoma River Basin, New Hampshire, US Army Corp of Engineers New England division. February 1989; personal observations of the Mascoma River Nominating Committee.]

New Hampshire Fish and Game administers a volunteer program to track and report reptile and amphibian species occurrences; this provides the best overview of species distribution in New Hampshire, although some areas are undersampled. The following list shows species either reported through this program, or probable to occur in the Mascoma River watershed.

Amphibians	Reptiles
Bullfrog	Common garter snake
Green frog	Milk snake
Northern leopard frog	Ribbon snake
Pickerel frog	Smooth green snake
Wood frod	Brown snake
Spring peeper	Redbelly
Gray treefrog	Ringneck snake
American toad	Northern water snake
Eastern newt	Painted turtle
Blue-spotted salamander	Snapping turtle
Jefferson salamander	Spotted turtle
Spotted salamander	Wood turtle
Dusky salamander	
Spring salamander	
Two-lined salamander	
Redback salamander	

[Personal communication with Michael Marchand, NHFG, 2010; New Hampshire Reptile and Amphibian Species Distribution Maps, Nongame and Endangered Wildlife Program, NH Fish and Game Department, 2009.]

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

Animal Species Location E or T, N or S

The Natural Heritage Bureau has documented three occurrences of rare, threatened, and endangered wildlife within the Mascoma River corridor: two reptile species occurrences in Canaan and Enfield and one insect species occurrence in Enfield. In addition, common loons, a threatened species in New Hampshire, had two nests on Mascoma Lake in summer 2009. [Source: Personal communication with Susie Burbidge, Loon Preservation Committee biologist]

Rare, Threatened, Endangered Animal	Town(s)	Endangered or Threatened	Nation or State
none	n/a	n/a	n/a

There are no state or federally-listed endangered animals documented in the Mascoma River or its corridor [Source: personal communication with Anthony Tur, Endangered Species Biologist with US Fish and Wildlife Service, 2010.]

The New Hampshire Natural Heritage Bureau lists two occurrences of reptile species of concern, the spotted turtle and the wood turtle, and a one occurrence

of a rare Noctuid moth. These occurrences are in near the Enfield/Canaan town line. [Source: Rare, threatened and endangered species locations provided by NH Natural Heritage Bureau, 2008.]

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

Significant Habitat Diversity Rating

The State Wildlife Action Plan (updated 2010) completed by the NH Fish and Game Department indicates that there are four areas of wildlife habitat that rank as top-tier on a statewide level, as well as roughly a dozen areas of regionally-important wildlife habitat (Map 3.) The 2006 Wildlife Action Plan delineated the Mascoma River corridor above the Indian River as a Conservation Focus Area; with the 2010 update, NHFGD altered their methodology and no longer utilize the Conservation Focus Area designation; however, the 2006 focus areas remain valid. [Source: State Wildlife Action Plan, 2006 and 2010; personal communication with Catie Callahan, NH Fish and Game Department, 2010.]

Wildlife habitat that is significant on a statewide level occurs in the following locations:

- The immediate river corridor in Canaan, from the confluence of the Indian River to Canaan Center and continuing northward and including tributary streams and the floodplain forest west of the river, composed primarily of marsh wetland complex and floodplain forest;
- The river corridor in West Canaan, in the vicinity of Mascoma River and Webster WMAs, and including the Goose Pond Brook tributary to the river, composed primarily of marsh wetland complex and floodplain forest;
- A large marsh wetland complex in Enfield in the vicinity of the McConnell Well property, upstream of the Baltic Mill dam;
- The shoreline of Mascoma Lake, composed primarily of hemlock-hardwood-pine forest, with areas of grassland near Lower Shaker Village.

Wildlife habitat that is significant on a bioregional level is:

- Floodplain forest areas in Canaan and Enfield adjacent to the areas described above;
- A large wetland complex surrounding the confluence of the Mascoma and Indian Rivers in Canaan, just west of Switch Road;
- Grassland areas on the north shorelines of Mascoma Lake in Enfield and Lebanon;
- Grassland in the vicinity of Baker’s Crossing, just east of Interstate 89, in Lebanon;

- Localized occurrences of floodplain forest in Lebanon, the largest of which is just north of Miracle Mile between downtown Lebanon and West Lebanon.

[Source: Wildlife Action Plan NH Fish and Game 2010]

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

According to the Enfield Natural Resources Inventory [2003, by Watershed to Wildlife, Inc.], there are three large potential wildlife travel corridors on or near the Mascoma River (Map 4). Riparian buffers exist cover over 1,800 acres along the Mascoma River in Enfield and connect to two large wetland complexes and adjoining upland habitat. In addition, a very large potential corridor has been identified just west of Mascoma Lake.

Looking on a watershed level, there are several large areas of unfragmented land in the Mascoma River watershed (Map 5). These areas serve as refugia for wildlife, which has been recognized by the establishment of multiple Wildlife Management Areas in the Mascoma River corridor. The tracts of unfragmented land that abut the river corridor are listed below:

Name	**Acreage**	**Name**	**Acreage**
Boston Lot Lake	3,150 ac.	Lovejoy Brook	2,911 ac.
Signal Hill	1,270 ac.	Oxbow	845 ac.
Farnum	1,225 ac.	Goose Pond West	3,461 ac.
Goodwin	1,160 ac.	Mud Pond	1,453 ac.
Mount Tug	1,370 ac.	S-Curves	707 ac.
Smith Pond	8,205 ac.	Bear Pond	2,461 ac.

[Source: Mascoma River Watershed Natural Resources Inventory, 2003, Society for the Protection of New Hampshire Forests.]

Vegetation/Natural Communities

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

Common plants of the Mascoma River Corridor		
Alder, speckled	Elm, American	Oak, Red
Ash, White	Elm, Slippery Elm	Oak, White
Aspen, Bigtooth	Ferns	Pine, White (in Canaan)
Aspen, Quaking	Fir, Balsam (in Canaan)	Poplar, Balsam (in Canaan)
Barberry, Japanese	Galium	Raspberries
Birch, White	Grapes	Sorrel, Wood
Birch, Grey	Hemlock, Eastern	Spirea
Birch, Yellow	Honeysuckle	Spruce, Red (in Canaan)
Buckthorn, European	Hophornbeam, Eastern	Sumac
Buttercup	Ivy, Poison	Thistle
Creeper, Virginia	Jewel-weed	Viburnums

Chokecherry	Knotweed, Japanese	Willow, Black
Dogwood, Red-Osier	Maple, Red	Willow Herb
Dogwood, Silky	Maple, Sugar	
Elderberry	Maple, Mountain	

Common aquatic plants in Mascoma Lake include: Eurasian milfoil, native milfoils and bladderworts, with cattails and yellow pond lilies in the shallow wetland areas on the lake fringes.

In Canaan, the dominant forest type changes to a more northerly composition, with white pine, red spruce, balsam fir and balsam poplar.

[Source: Water Resources Study of the Mascoma River Basin, NH, US Army Corps of Engineers New England Division, 1989; Plant identification of common plants by Rachel Ruppel, UVLSRPC, on a river driving tour, May 2010; personal knowledge of Mascoma River Nominating Committee members]

Map 6 illustrates the location of Natural Ecological Communities of the Mascoma River as designated by the Wildlife Action Plan of 2010 completed by NH Fish and Game. As the river flows south through Canaan the corridor changes to primarily hemlock/hardwood/pine woodlands; areas of marsh, floodplain forest, grasslands and development increase as it nears the Mascoma Lake in Enfield. The area surrounding the lake in Enfield and Lebanon is a combination of developed areas, hemlock/ hardwood/pine woodlands with scattered grasslands and floodplain forests. Below Mascoma Lake, the land cover remains primarily wooded, with a few areas of grassland until the river meets Interstate 89. West of the Interstate, the corridor becomes more fragmented and developed, but there are small sections of hemlock/hardwood/pine forest, floodplain forest, and grasslands immediately along the river's shore.
[Source: New Hampshire Fish and Game, Wildlife Action Plan, 2010]

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

Plant Species Location E or T, N or S

The Natural Heritage Bureau has documented eight occurrences of rare, threatened, and endangered plants within the Mascoma River corridor. Due to resource protection concerns, exact locations and species names of rare, threatened and endangered plant occurrences are not available. Therefore, a full listing of rare, threatened, and endangered plant species in riverfront towns is provided below.

Town	Rare, Threatened, Endangered Plant Species	Endangered or Threatened	Nation or State
Canaan	Arethusa (*Arethusa bulbosa*)	T	S
Canaan	Bald Spike-rush (*Eleocharis erythropoda*)	E	S
Canaan	Reversed Bladderwort (*Utricularia resupinata*)	T	S
Canaan	Stickseed (*Hackelia virginiana*)	T	S
Enfield	Arethusa (*Arethusa bulbosa*)	T	S
Enfield	Bald Spike-rush (*Eleocharis erythropoda*)	E	S
Enfield	Flatstem Pondweed (*Potamogeton zosteriformis*)	E	S
Enfield	Giant Rhododendron (*Rhododendron maximum*)	T	S
Enfield	Stickseed (*Hackelia virginiana*)	T	S
Lebanon	Barren Strawberry (*Waldsteinia fragarioides*)	E	S
Lebanon	Black Maple (*Acer nigrum*)	T	S
Lebanon	Canadian Germander (*Teucrium canadense var. virginicum*)	T	S
Lebanon	Flatstem Pondweed (*Potamogeton zosteriformis*)	E	S
Lebanon	Gall-of-the-earth (*Nabalus serpentarius*)	E	S
Lebanon	Giant Pinedrops (*Pterospora andromedea*)	E	S
Lebanon	Ginseng (*Panax quinquefolius*)	T	S
Lebanon	Golden Corydalis (*Corydalis aurea*)	E	S
Lebanon	Green Adder's Mouth (*Malaxis unifolia*)	T	S
Lebanon	Hackberry (*Celtis occidentalis*)	T	S
Lebanon	Kalm's Brome Grass (*Bromus kalmii*)	E	S
Lebanon	Kalm's Lobelia (*Lobelia kalmii*)	T	S

[Source: New Hampshire Natural Heritage Bureau, 2008]

There are no federally listed endangered or threatened plant species in the Mascoma River corridor. [Source: personal communication with Anthony Tur, Endangered Species Biologist with US Fish and Wildlife Service, 2010.]

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

Exemplary Natural Ecological Community Location

Within the Mascoma River corridor, the NH Natural Heritage Bureau has identified two exemplary natural ecological communities, one in Lebanon and one on the border of Canaan and Enfield. Due to resource protection concerns, exact locations and names of exemplary communities are not available. Therefore, a full listing of exemplary communities in riverfront towns is provided below.

Natural Communities	Town
Red maple floodplain forest	Canaan
Rich mesic forest	Lebanon
Rich red oak rocky woods	Lebanon
Northern hardwood - black ash - conifer swamp	Lebanon

[Source: New Hampshire Natural Heritage Bureau, 2008]

(d) Fish Resources

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

Warmwater Species	Coldwater Species	Nongame Species
Carp, Common	Salmon, Atlantic	Creek Chub
Bass, Rock	Trout, Brown	Dace, Black-nosed
Bass, Large Mouth	Trout, Eastern Brook	Dace, Long-nosed
Bass, Small Mouth	Trout, Rainbow	Fallfish
Perch, Yellow		Johnny Darter, Eastern
Horned Pout		Sculpin, Slimy
Brown Bullhead		Shiner, Common
Smelt, Rainbow		Shiner, Eastern
Chain Pickerel		Shiner, Golden
Perch, White		Sucker, Common White
Bluegill		Sunfish, Red-breast
Pumpkinseed		
Walleye		

[Sources: 2010 New Hampshire Freshwater Fishing Digest; New Hampshire Fishing Stocking Report for 2008; New Hampshire Fish and Game Department Fish Survey Data, 2008; New Hampshire Fish and Game Department Inland Fisheries Division 2009 Master Operational Plan; Water Resources Study Mascoma River Basin, New Hampshire, US Army Corps of Engineers New England Division, 1989; personal observations of MRNC; personal communication with Gabriel Gries, Fisheries Biologist with NHFGD, 2010.]

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

Fish Species Location E or T ,N or S

There are no endangered or threatened fish species inhabiting the Mascoma River, according to the US Fish and Wildlife Service and New Hampshire Fish and Game. [Source: personal communication with Anthony Tur, Endangered Species Biologist with US Fish and Wildlife Service, 2010; personal communication with Gabriel Gries, Fisheries Biologist with NHFGD, 2010.]

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

Significant Habitat Diversity Rating

The Mascoma River upstream of the Indian River in Canaan has been ranked as a Conservation Focus Area in 2006 State Wildlife Action Plan and as Tier 1 habitat in the 2010 plan update (CFA's no longer used, due to change in

methodology.) [Source: personal communication with Catie Callahan, NH Fish and Game Department, 2010.]

According to NH Fish and Game fisheries biologists, there are several locations of significant aquatic habitat:

- The Mascoma River above the lake sustains a major annual rainbow smelt spawning run;
- The Mascoma River between Mascoma Lake Dam and the Packard Hill Covered Bridge sustains a high-quality seasonal trout fishery;
- The lowest 1.2 miles of the Mascoma River are stocked with Atlantic salmon as part of a Connecticut River basin restoration project. [Source: personal communication with John Magee, Gabriel Gries, and John Viar, 2010.]

In addition, Mascoma Lake provides aquatic habitat for several species of fish, including self-sustaining populations of bass, smelt, and smaller fish such as bluegill and pumpkinseed. [Source: Jim Martel, Mascoma Lake Association.]

(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 Mascoma River and Mascoma Lake are stocked with eastern brook trout, rainbow trout, and brown trout; because of seasonal low flows, the fish populations in the river are dependent on stocking. Atlantic salmon are stocked in the lower Mascoma River, and are wholly dependent on stocking. Smelt, bass, walleye and other warmwater fish rely solely on natural reproduction.
[Source: personal communication with John Magee, Gabriel Gries, and John Viar, Fisheries Biologists, NH Fish and Game Department, 2010.]

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

The Lower Mascoma River is a viable anadromous fish resource and is at this time part of the New Hampshire Anadromous Fish Restoration Program. The Mascoma River is stocked with approximately 12,000 Atlantic salmon fry each spring. Approximately 1.2 miles of the river is stocked; from 0.1 miles below the lower Mascoma Dam downstream to about the Route 12A bridge next to the Powerhouse Mall.

[Source: personal communication with Gabriel Gries, Fisheries Biologist, NH Fish and Game Department, 2010.]

Water Quality

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

Class A Class B

From the headwaters through to the outlet of the Mascoma Lake in Lebanon the river is classified as “Class B”; from the outlet of Mascoma Lake to 1,000 feet south of the Lebanon Water Treatment Plant Intake, it is “Class A”, and thence to its outlet into the Connecticut River it is classified as “Class B”.

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

Class A Class B

All segments of the Mascoma River meet water quality standards for drinking water after treatment and for safe boating.

All segments are impaired for safe fish consumption due to mercury contamination; all waterbodies in the State of New Hampshire have this impairment. Additional testing by NHDES Environmental Health Program have shown the Mascoma Lake, along with seven other lakes, have higher than average mercury concentrations than other lakes in New Hampshire.

For supporting aquatic life, Mascoma Lake is impaired due to low dissolved oxygen and invasive plant species and one segment in Lebanon is impaired due to high aluminum levels.

For safe swimming, nine segments of the river in Lebanon are impaired due to E.coli bacteria.

[Source: Final 2008 List of All Impaired or Threatened Waters, 9/2/08, NH DES; 2010 NH Freshwater Fishing Digest, NH Fish and Game Department.]

(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.

E. coli bacteria contamination for the Mascoma River in Lebanon is attributable to combined sewer overflows. The City of Lebanon is currently underway in a sewer-separation project, which will resolve this water quality problem.

There is invasive Eurasian milfoil in Mascoma Lake; however, the Mascoma Lake Association has been conducting an identification, containment, and eradication campaign against the milfoil for over 10 years and also conducts an

ongoing public education campaign.

Low dissolved oxygen levels in Mascoma Lake and high aluminum levels in one segment of the river in Lebanon were not attributed to a specific cause by NHDES.

Mercury contamination of New Hampshire waters is attributable to acid deposition; possible corrective measures include shifting to less-polluting energy sources in the United States.

[Source: Final 2008 List of All Impaired or Threatened Waters, 9/2/08, NH DES]

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 flow of the Mascoma River is regulated by several dams, both on the river and on tributary ponds in the watershed. Between Canaan Center and the Connecticut River in West Lebanon, there are seven impoundments on the mainstem in Enfield and Lebanon, but the river is primarily free-flowing. Of particular significance is the free-flowing section below Mascoma Lake Dam in Lebanon, where the annual whitewater kayaking race is held every spring.

The Mascoma River flows freely through Canaan and into the Town of Enfield, where the Baltic Mill Dam impounds 20 acres. The river flows through Enfield's downtown and then empties into Mascoma Lake, which is a natural lake raised by damming. The impoundment area of the Mascoma Lake Dam is 1,155 acres.

The Mascoma Lake Dam, located in Lebanon, is managed to have water levels that change with the seasons:

- In the summer (June 1 to Columbus Day), the lake level is held at 750 ft AMSL for recreational uses of the lake.
- After Columbus Day, the lake is drawn-down about 3 feet (to 747 ft AMSL) for shorefront maintenance and spring runoff preparations.
- Between April and June, the lake is gradually drawn back up to 750 ft AMSL; in addition, NHDES raises the level of the lake in preparation for the annual whitewater race in mid-April, allowing a release of 500-1,000 cfs.
- The average annual flow at the Mascoma Lake Dam is 217 cfs, based on 80 years of records (1924-2004).

[Source: NHDES Operations Information for the Mascoma River at Mascoma Gauging Station (ID# WCAN3), 2009; USGS Surface Water Annual Statistics]

Below Mascoma Lake, the river is again free-flowing to the Lebanon Water Treatment Plant Intake Dam (impounding 0.4 acres.) The river flows freely towards and through downtown Lebanon to the Rivermill Hydro Dam (impounding 20 acres) and the Plant No 1 Dam (impounding 3 acres.) Then the river flows freely again for several miles toward West Lebanon, where the Mascoma River Dam (impounding 2 acres) and the Glen Road Hydro Dam (impounding 7 acres) shortly before entering the Connecticut River. With the exception of Mascoma Lake Dam, all other dams on the Mascoma River impound only small stretches of the Mascoma River.

Summary data from the two gauging stations on the Mascoma River characterize the streamflow; note that the West Canaan station is located on a free-flowing section of the river, whereas the Mascoma Lake station is located at the Mascoma Lake Dam:

Station	**Average Annual Flow**	**Average Annual Peak Flow**	**Highest Peak Flow/Year**	**Years of Record for calculation**
West Canaan	118 cfs	1,741 cfs	3,780 cfs - 1953	1939-1978;1985-2004
Mascoma Lake	217 cfs	2,100 cfs	5,840 cfs - 1936	1924-2004

[Source: USGS Surface Water Historic Data and Annual Summaries]

The Mascoma River has experienced some large flooding events in the past. “The flood of March 1936 was the highest ever in Lebanon Village (on the Mascoma River) and caused nearly $50,000 damage in five days. This flood had a discharge of 5,800 cfs and a recurrence interval of approximately 45 years. The 1953 flood had a discharge of 73,300 cfs on the Connecticut River and 4,900 cfs on the Mascoma River, with a recurrence interval of approximately 15 years on the Connecticut and 30 years on the Mascoma, according to FEMA.”
[Source: City of Lebanon Hazard Mitigation Plan, 2009]

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.

The Mascoma River corridor provides large areas of open space in the upper sections of the river, from Canaan Center through East Lebanon (Map 7). Below East Lebanon, the corridor becomes more developed as it travels through downtown Lebanon, but there are a number of public parks, natural areas, and smaller open spaces even in the most developed sections. Notably, there are three Wildlife Management Areas in the river corridor.

Significant Areas of Open Space in the Mascoma River Corridor.

Type of Land	Type of Ownership	Location
Forest, wetland, floodplain	Private, Public, and Conserved (Mascoma State Forest, Bear Pond Natural Area, McKee, Town Forest)	Canaan – 0.25 mile south of Canaan Center to second crossing of Route 4
Wetland, floodplain, fields, some forest	Private, Public, and Conserved (Mascoma River WMA, Webster WMA, Hardy Wetlands, McConnell Well)	Canaan/Enfield – Second crossing of Route 4 to Enfield Village
Forest (somewhat interspersed with lakefront residential development)	Private Public (Enfield WMA) on western shore	Enfield/Lebanon – Area around Mascoma Lake
Forest	Private, Public and Conservation Easement (Mill Parcel, Farr Farms Set-Aside)	Lebanon – from Mascoma Lake Dam to Interstate 89

[Source: Public and Conserved Lands data, 2009; aerial photo interpretation]

Open Space Protected from Development within the Mascoma River Corridor.

Muncipality	Name	Acres	Primary Agency**	Primary Protection Type**
Canaan				
	Mascoma State Forest	231.5	NH DRED	Fee Ownership
	Bear Pond Natural Area	835.9	Upper Valley Land Trust	Conservation Easement
	Canaan 03-1196	38.8	Town of Canaan	Conservation Easement
	Canaan Town Forest Lot 1	100	Town of Canaan	Fee Ownership
	McKee/Bird-in-Hand Farm	231.9	Town of Canaan	Conservation Easement
	Mascoma River WMA	124.5	NH Fish & Game	Conservation Easement
	Herbert L. Webster WMA	91	NH Fish & Game	Fee Ownership
Enfield				
	Hardy Wetlands	98.8	Upper Valley Land Trust	Conservation Easement
	Livingston Lodge	23.1	Upper Valley Land Trust	Conservation Easement
	McConnell Well	27	Town of Enfield	Fee Ownership
	Enfield WMA	1095.8	NH Fish & Game	Fee Ownership
	Museum at Lower Shaker Village	17.8	NH Historic Resources	Historic Preservation Easement
	Hilco Property Services, Inc.	15.3	Town of Enfield	Fee Ownership
Lebanon				
	Lebrun Meadow	21.3	City of Lebanon	Fee Ownership

	Mill Parcel	2.4	City of Lebanon	Fee Ownership
	Farr Farms Open Space	13.6	City of Lebanon	"Set Aside" Open Space Areas of Developments
	Slack Land – Mascoma River Land	5.3	City of Lebanon	Fee Ownership
	Dana Property	0.5	Town of Hanover	Fee Ownership
	Old Dam Site - Mascoma River Land	3.8	City of Lebanon	Fee Ownership
	City of Lebanon Land	2.8	City of Lebanon	Fee Ownership
	Mascoma River Land	4.9	City of Lebanon	Fee Ownership
	City of Lebanon Land (Water Plant)	26.1	City of Lebanon	Fee Ownership
	Exit 18 - Mascoma River Land	12.9	City of Lebanon	Fee Ownership
	Lizzie Elliot Playground	12.1	SAU 88	Fee Ownership
	City of Lebanon Land	8.6	City of Lebanon	Fee Ownership
	Old Dam Site - Mascoma River Land	3.8	City of Lebanon	Fee Ownership
	Mascoma River Land	3.3	City of Lebanon	Fee Ownership
	Riverside Park	8.3	City of Lebanon	Fee Ownership
	Two Rivers Natural Area	27.2	City of Lebanon	Fee Ownership

**Please note that only the primary protection agency and type are listed here; several Town and City-owned parcels are also protected by a conservation easement held by a land trust.
[Source: Public and Conserved Lands data from NH GRANIT, 2009; City of Lebanon Trails and Recreation map, 2004; additional public lands data from City of Lebanon, 2010]

Looking at the entire Mascoma River watershed, there are substantial areas of open space in the upper parts of the watershed, particularly in the Mascoma River headwaters in Dorchester. Cummins Pond and then Reservoir Pond feed the uppermost reaches of the Mascoma, which is almost entirely undeveloped timberland. The photo below showcases the nearly pristine upper watershed at Cummins Pond, from Smarts Mountain (photo used by permission.)

From a regional perspective, the upper Mascoma River watershed is an important area of open space, identified as a Core Conservation Focus Area by the Quabbin-to-Cardigan Partnership (Map 8.) "The Quabbin-to-Cardigan Partnership (Q2C) is a collaborative, landscape-scale effort to conserve the Monadnock Highlands of north-central Massachusetts and western New Hampshire. The two-state region spans one hundred miles from the Quabbin Reservoir northward to Mount Cardigan and the White Mountain National Forest, and is bounded to the east and west by the Merrimack and Connecticut River Valleys. Encompassing approximately two million acres, the Quabbin to Cardigan region is one of the largest remaining areas of intact, interconnected, ecologically significant forest in New England, and is a key headwater of the Merrimack and Connecticut rivers." [Source: Quabbin-to-Cardigan Partnership website, www.q2cpartnership.org]

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 and asterisk (*) next to the name of the dam. Do not include existing or proposed dams which are used for hydroelectric energy production. These will be listed separately in the managed resources category.

Minimum Name of Dam Location Ownership Purpose Flow Requirements

Impoundments (Map 9)

Name of Dam	Location	Status	Ownership	Purpose	Flow Req?
Mascoma River Sawmill Dam	Canaan	Ruins	Private	Mill	n/a
Mascoma River Tool Co Dam	Canaan	Ruins	Private	Mill	n/a
Mascoma River II Dam	Enfield	Breached	Private	Mill	n/a
Mascoma River IV Dam	Enfield	Ruins	Private	Mill	n/a
Mascoma Lake Dam	**Lebanon**	**Active**	**State**	**Recreation**	**see #1**
Mascoma River I Dam	Lebanon	Ruins	Private	Mill	n/a
Mascoma River II Dam	Lebanon	Ruins	Private	Mill	n/a
Lebanon Water Treatment Intake	**Lebanon**	**Active**	**Municipal**	**Water**	**see # 2**
Cummings Tannery Dam	Lebanon	Ruins	Private	Mill	n/a
Split Ballbearing Dam	Lebanon	Ruins	Municipal	Mill	n/a
Plant No 1 Dam	**Lebanon**	**Active**	**Municipal**	**Conservation**	**No**
Mascoma River Dam	Lebanon	Ruins	Unknown	Recreation	n/a
Mascoma River	**Lebanon**	**Active**	**Municipal**	**Recreation**	**No**

[Source: NH DES Dam Bureau, 2010; flow requirements confirmed with NHDES Dam Bureau/City of Lebanon, 2010.]

Note # 1: The Mascoma Lake Dam generally manages the flow at 100 cfs in the winter and 40 cfs in the summer, although depending on conditions, the flow may drop lower than 40 cfs. [Source: Personal communication with Dan Mattaini, NHDES Dam Bureau, 2010]

Note #2: The Water Treatment Plant manages their flow for 100 cfs in the winter and 40 cfs in the summer. The lowest summer flow has been 14 cfs, in very low-flow conditions. [Source: Personal communication with Jim Angers, Water Treatment Plant Superintendent, City of Lebanon, 2010]

(b) Water Withdrawals and Discharges

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

Withdrawal Purpose Location Potential Source (ID Study)

Water Withdrawals (Map 9)

Withdrawal	**Purpose**	**Location**
Lebanon Water Works	Municipal Water Supply	Pumping Station Rd, Lebanon
Timken Aerospace	Industrial	Mechanic St, Lebanon
Blaktop Inc	Industrial	Elm St Ext, Lebanon
Twin State Sand & Gravel	Mining	Elm St Ext, Lebanon
Glen Mascoma Hydro Project	Hydroelectric Power	Route 12A, Lebanon

The river is used as a public drinking water supply for the City of Lebanon currently supplying 3,406 connections with clean drinking water, and was identified as a river with statewide significance for its water supply resources.

An additional potential water supply location has been identified for the City of Lebanon within the Mascoma River corridor. The site is an esker aquifer north of the Mascoma River and adjacent to the eastern bank of the Connecticut River, just north of the City's wastewater treatment facility.

The river has not been identified to serve as a public water supply for either Canaan or Enfield, although Enfield does draw part of its drinking water supply from three groundwater wells within the Mascoma River corridor and Canaan has identified the stratified-drift aquifer near the Mascoma River as an important resource in its Master Plan. On the south side of Mascoma Lake in Enfield, the Lower Shaker Village draws drinking water from two bedrock wells.
[Source: personal communication with Jim Angers, Water Plant Superintendent, City of Lebanon, 2010; NHDES Water Division records, 2010; New England Rivers Center Study, 1983; Lebanon Master Plan, 2006; Canaan Master Plan, 2006.]

(2) List all known surface water and potential discharges to the river and identify the

source, type (e.g., industrial wastewater) and location of the discharge. Indicate whether the discharge has been permitted by the state (yes or no).

Point Source Discharge Type Location Permit

Water Discharges (Map 9)

Point Source Discharge	Type	Location	Permit?
Timken	Industrial – groundwater remediation, process wastewater, storm water	Mechanic St, Lebanon	NH0000248 (currently inactive)
Lebanon Water Department	Municipal water treatment	Pumping Station Rd, Lebanon	NHG640012

Note: Both sources discharge to wetlands that drain to the Mascoma River, not directly into the river.
[Source: NHDES One-Stop Database, NHDES Water Division, 2009]

(c) Hydroelectric Resources

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

FERC Hydroelectric Facility Owner Location regulated or exempt

Hydroelectric Facilities (Dams Shown on Map 9)

Name	Location	Owner	Status	Regulated?
Baltic Mills Dam	Enfield	Energetic Enterprises Inc.	Active	Exempt
Mascoma Lake Dam	Lebanon	NH DES	Potential	5050
Riverside Hydro Dam	Lebanon	Lebanon Woolen Mills Corp.	Ruins	No longer permitted
Lower Falls Hydro Dam	Lebanon	Kendall Davis Company	Ruins	No longer permitted
Glen Hydro Dam	Lebanon	City of Lebanon	Breached	No longer permitted
Rivermill Hydro Dam	Lebanon	Rivermill Hydroelectric Inc	Active	094030101
Glen Road Dam	Lebanon	Enel North America Inc	Active	084050101
Glen Mascoma Hydroelectric Project	Lebanon	Mascoma Hydro Corporation	Active	084050101

In 2009, a preliminary permit was granted by FERC to Northeast Hydrodevelopment, LLC to study the feasibility of the Mascoma Lake Dam Hydroelectric Project. There are three defunct dams in Lebanon, once used for hydroelectric production; NHDES Dam Bureau and FERC records indicate that

these sites no longer carry a current FERC permit.

[Source: personal communication with Nancy McGrath at NHDES Dam Bureau, 2010; NHDES listing of Registered Water Withdrawals; FERC website for permitting information, accessed 2010.]

3. Cultural Resources

(a) Historical and Archaeological Resources

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

Historical/Archaeological Resource Listing/Eligibility Significance

Historical/Archaeological Resources (Map 10)

Historical/Archeological Resource	Listing/Eligibility	Location	Community
Canaan Street Historic District	HD	Canaan Street	Canaan
Hewitt House	NRHP	Route 4	Enfield
Enfield Village Historic District	HD	Route 4	Enfield
Enfield Shaker Historic District	HD	Route 4A	Enfield
Colburn Park Historic District	HD	Downtown Lebanon	Lebanon
Stone Arch Overpass	NRHP	Glen Road	Lebanon

In particular, the Enfield Shaker Historic District is of national significance; it is part of the Shaker Historic Trail, which connects the fifteen Shaker Communities on the National Register of Historic Places on the east coast of the United States. This trail is a partnership project of the National Park Service's Northeast Regional Office and the National Register of Historic Places, with the Shaker communities and museums of the east coast and the National Conference of State Historic Preservation Officers. [Source: Shaker Historic Trail website, http://www.nps.gov/history/nr/travel/shaker/]

There are no sites on the New Hampshire Register of Historic Places within the river corridor.

[Source: National Register of Historic Places, New Hampshire Properties Listed by County/Town; personal communication with Jim Taylor, Enfield Director of Community Development, 2010; NH State Register of Historic Places, NH Division of Historic Resources]

Local Town Histories, Oral Histories or General Historical Knowledge

The Mascoma River translates to “Clap Place River” or a man’s name in Abenaki [Source: 1, see below.] Chief Mascoma was a “talking sachem” for the Squakheag tribe that ranged from central Massachusetts to New Hampshire along the Connecticut River; his role in the tribe was to negotiate treaties and other agreements on behalf of the tribe [Source: 2.]

Native American History

Paleoindians had moved into the upper Connecticut River Valley by 9,000 B.C. and used the river as a north-south trade route [Source: 3.] The Mascoma River corridor was also used as a travelway, to access the interior of the New Hampshire. The river became non-navigable at the section of rapids in East Lebanon, and Native Americans would sink their canoes at this point and continue on foot along the Maskwamok-Aguadakan trail. This trail led along Mascoma Lake and the Indian River, all the way to The Weirs in Laconia [Source: 2.]

Tanya Kress, Historic Archaeologist with the New Hampshire Division of Historical Resources, stated that ”all along the river is archaeologically sensitive…both pre-contact and historic sites.” For privacy purposes, the precise locations of these sites were not provided [Source: 4.]

The native tribe that lived near and fished Mascoma Lake, the Sokoki, was decimated, likely to disease, prior to 1761 when the first European settlers began to arrive in the area [Source: 2.]

Euroamerican Settlement and History

Settlement of the Mascoma River by Euroamericans began in the mid-18th century; Lebanon, Enfield, and Canaan were all chartered in 1761. West Lebanon, adjacent to the Connecticut and Mascoma Rivers, was settled first, and settlers moved eastward along the Mascoma River. The river was used intensively for waterpower to run sawmills, gristmills, wool carding and textile mills, farming tool mills, and other factories from the late 18th century to the early 20th century. Near West Lebanon (today’s Glen Road area) was Scytheville, so named for its scythe factory; in East Lebanon, Payne’s Mills was a booming settlement founded in the 1770’s with several mills until a catastrophic fire in 1840. Enfield also had a large number of mills on the river, supporting a large woolen industry, and Canaan Center was known as Factory Village because of the mills in that settlement.

Mill development and village growth on the Mascoma River was aided by the Fourth New Hampshire Turnpike built in the early1800’s and the Boston and Maine Railroad completed in 1847, connecting Mascoma River towns to the Massachusetts seacoast. The railroad carried products from the riverside factories to market, and also carried the seeds and herbs grown and packaged and other export goods produced by the large Enfield Shaker community that lived along Mascoma Lake, founded in 1793. One of the Shaker villages was on the southern side of the lake, and the railroad was on the northern side; in 1849,

the Shaker Bridge was built across a narrow section of Mascoma Lake. This bridge, rebuilt following the 1938 hurricane, remains an important connection for Enfield residents. [Source: 2]

By 1900, Mascoma Lake had become a popular tourist destination, boasting 2 hotels, a boardwalk, boathouse, casino, bowling alley and dance hall. The Shakers closed their settlements on the lake in 1923, which led to subdivision of the land and development of cottages along the lake [Source: 2.] Mascoma Lake remains a very popular destination for leisure and recreation.

Because of the importance of water power to earlier generations, no fewer than five current-day villages or town centers lie next to the Mascoma River – Canaan Center, West Canaan, Enfield downtown, Lebanon downtown, and West Lebanon. Following the 1840 fire, the settlement at Payne's Mills and in East Lebanon declined and the area now supports a rural population [Source: 3,5.]

The mill industry declined in the 20th century as the American economy expanded and evolved, coming to an end after the Second World War. Many of the mill dams are now in ruins or have been breached, and the Boston Excelsior Dam and Caplan Dusting Mill Dam have been removed. The last large woolen textile mill, the Baltic Mill, closed in 1971, marking the end of a 200-year era [Source: 2.]

The waters of the Mascoma River were used to produce energy for industry and also to carry away industrial wastes. The color of the river would change based on the color of fabric dye being used at the textile mills, and other untreated industrial waste was flushed into the river. Following the passage of the Clean Water Act in 1973 and the establishment of water quality standards, the water quality of the Mascoma River has greatly improved.

In recent years, the Mascoma River has transitioned to a river increasingly valued for its natural characteristics, scenic views and recreational opportunities. Mascoma Lake Association and other lake association in the watershed are active stewards of water quality, participating in the Volunteer Lake Assessment Program, the Lake Host Program, and Weed Watchers. In 2009, volunteers began water-quality monitoring on the Mascoma River through the Volunteer River Assessment Program. Community groups have also invested in promoting recreation along the Mascoma River, including the Lebanon Rotary Club's "String of Pearls" park improvement project and the Friends of the Northern Rail Trail that helped to develop the Northern Rail Trail from Lebanon to Grafton.

[Source: (1)Where the Great River Rises, 2009, Connecticut River Joint Commissions; (2) Enfield, New Hampshire 1761-2000: The History of a Town Influenced by the Shakers, 2006; (3) Lebanon Master Plan 2006; (4) personal communication with Tanya Kress, Division of Historical Resources, 2009; (5) Archaeological Assessment and Preservation Options for the Lebanon Slate Mill Site, East Lebanon, New Hampshire, 2006, Robert G. Goodby, Ph.D. for the Lebanon Conservation Commission.]

(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 Northern Rail Trail is a community resource of statewide significance, connecting town and village centers via a multi-use path.

Other community resources significant on a local level in the Mascoma River corridor include:

- Huse Community Park in Enfield;
- Enfield's community development projects on Main Street, as undertaken by the Town of Enfield and the Enfield Village Association;
- The parks established or improved by the Lebanon Rotary Club as part of their String of Pearls project, in cooperation with the Lebanon Recreation Department;
- The work of the Lebanon Fountain Committee to purchase and install fountains in public spaces, many of which are in the Mascoma River corridor and utilize water from the Mascoma River;
- The recently developed Mascoma River Greenway, connecting to the Northern Rail Trail in Lebanon.

Parks and other areas open for public recreation are shown on Map 10.

The four National Historic Districts within or partly within the Mascoma River corridor reflect the historic patterns of development along the river and the sense of community recognition and pride of their historic resources. Not only are these National Historic Districts important on a historical basis, they also are active village centers or downtown areas in Canaan, Enfield and Lebanon.

Canaan Master Plan, 2006

The Canaan Master Plan recognizes the recreational and water supply resources offered by the Mascoma River and its corridor. In Section II: Vision, Natural Resources and Recreation, one of the community goals states: "The shorelines along Canaan Street Lake and the Mascoma River will largely be free from development and accessible to the public, particularly along the Mascoma where the Northern Rail Trail runs" and "The quality of the water in Canaan Street Lake and the aquifer under US 4 will be better protected, ensuring a long-term drinking water source for residents." In Section V: Economic Policies and Recommendations, there is a recommendation to "support the Northern Rail Trail and other recreational trails." In Section VIII: Natural Resources and Recreation Policies and Recommendations, there are recommendations to "provide additional public open space along the shoreline of ponds and rivers in town." Under Section X: Land Use Policies, there are recommendations to "conserve and protect selected undeveloped land for wildlife corridors, open space and recreation purposes", "protect lake, pond and river shore frontage for public access", and "establish a 150-ft minimum shore frontage requirement for new lots

created fronting on Canaan's lakes and major ponds and the Mascoma and Indian Rivers west of Canaan Village."

Enfield Master Plan, 1995
The Enfield Master Plan identifies the Mascoma River as offering "a variety of recreational activities and scenic attractions." The Master Plan contains the following goals pertaining to the Mascoma River and its corridor:

- "Enfield should continue to protect its critical natural resource areas: wetlands, steep slopes and floodplains."
- "Enfield should coordinate continued efforts to clean up and protect the Mascoma River with the neighboring towns of Lebanon and Canaan."
- "Improve sidewalks, bike paths, parking areas, and recreational areas in and around Enfield Village…" (Note: The Mascoma River flows through Enfield Village.)
- "Create a new Shoreland zone around lakes, ponds and the Mascoma River based on the recently passed Shoreland Protection Act."
- "An additional swimming beach and picnicking area should be secured on either Mascoma or Crystal Lake."
- "The railroad line should be explored for future use as a trail…"
- "Pedestrian needs should be evaluated in Enfield Village and along Route 4A, particularly along Mascoma Lake…"

Lebanon Master Plan, 2006
The Lebanon Master Plan summarizes in its introduction the value of the Mascoma River to its community:
"Most of Lebanon is located in the natural drainage system (watershed) of the Mascoma River, a significant natural resource and a tributary of the Connecticut River. The rivers and tributary streams provide the community with storm water drainage, groundwater recharge, wildlife habitat, and active and passive recreational opportunities. In addition, the Mascoma River serves as the City's public drinking water supply."

In the Land Use Chapter, the Master Plan further enumerates the community resources of the Mascoma River:
"The Mascoma River is perhaps the most distinctive and underutilized resource in Lebanon. The river serves a dual role of linking the eastern and western ends of the city and of partitioning the north from the south. Running through the heart of the downtown, it is a scenic treasure and the upper reaches, accessible from the Rail Trail, feel quite remote. The Mascoma River played a vital role in historical downtown settlement patterns and it is responsible for Lebanon's position as the commercial and industrial hub of the Upper Valley. It continues to serve critical functions, as the source of Lebanon's drinking water and a place of visual beauty important for recreation, solitude, and wildlife habitat. The river deserves to be protected and restored to its natural potential, as much as feasible, to ensure that it continues to serve its vital role in the city."

The Lebanon Master Plan lists key issues and recommendations for action, several of which pertain to the unique resources of the Mascoma River:

Chapter 3: Community Facilities, Utilities and Services

- Continue identifying significant threats to the City's water supply.
- Follow up on recommendations from the Wright-Pierce study that investigated a supplemental water supply source.
- Establish a program to reduce water use and increase capacity.
- Consider developing a water extension policy.

Chapter 4: Historic Resources

- Consider developing interpretive educational materials and events focused on the City's mill history and old mills.
- Support efforts to extend the Northern Rail-Trail from downtown Lebanon to West Lebanon.
- Evaluate for preservation historic features along the railroad corridor in Lebanon and East Lebanon.
- Continue to investigate and encourage ways to bring attention to our rivers and to use them as a source for history education.

Chapter 5: Natural Resources

- Develop and adopt a buffer zone along all water bodies, including streams, with a minimum buffer width of 100 feet…
- Support the Rotary Club's biennial clean-ups of the Mascoma River and encourage other civic groups to adopt other water bodies for cleanup.
- Seek funding to identify, characterize, and clean up old dumping sites along the Mascoma River.
- Continue alliances with neighboring communities and regional organizations, such as the Mascoma Watershed Conservation Council, to foster cooperation in protecting waterbodies and watersheds.
- Create source water overlay for existing drinking water sources…
- Develop and adopt an aquifer protection overlay district to more strictly regulate development adjacent to potential drinking water sources.
- Conduct land use and environmental constraints studies of the Stoney Brook, Hardy Brook, and Blodget Brook Corridors to guide appropriate development in order to protect drinking water supplies. (Note: these brooks are tributaries to Mascoma River)
- Take the lead on developing a Mascoma Watershed Plan to protect our important drinking water source.

Chapter 8, Recreation, Parks and Cultural Resources

- Improve public access to Mascoma Lake and other waterways.

Chapter 8A: Civic Art

- Financially support the fountain committee's efforts to re-establish Lebanon as "The City of Fountains."

Chapter 9, Transportation.

- Cooperate with the Friends of the Northern Rail Trail to maintain and extend the existing trail.

Chapter 10, Lebanon Central Business District

- Develop a plan for highlighting and making better use of the Mascoma River as a focal point for the CBD.
- Improve access to Mascoma River frontage, through development of a phased plan for a "river walk" along the Mascoma River as recommended in the 1993 Master Plan and 1985 *Lebanon Downtown Improvement Plan*.

Chapter 12, Land Use

- Develop and adopt an aquifer protection overlay district.
- Develop and adopt a locally implemented shoreland protection district, in reference to the Connecticut River Corridor Management Plan and the updated Shoreland Protection Act.
- Develop and adopt wetland buffer zoning standards (overlay district).
- Develop a water resources management plan to guide the protection and utilization of Lebanon's surface and ground waters; coordinate internally among the City's departments and boards, as well as with neighboring watershed communities.
- Work with the Mascoma Watershed Conservation Council, the Town of Enfield, and other communities with portions of their territory in the Mascoma watershed by establishing a longterm protection plan and strategy.
- Sustain important water resources (including future water supplies), shorelands, wetlands, soils, habitat, recreational lands, and scenic areas by purchasing, land-banking, and facilitating voluntary private conservation efforts.
- Create or enhance recreational facilities and bike/pedestrian ways within the City downtown areas and along the Mascoma and Connecticut Rivers.

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.

Mascoma River, Mascoma Lake and its tributary streams are very popular, year-round fishing destinations for a variety of warmwater and coldwater species:

Warmwater Species	Coldwater Species
Carp, Common	Salmon, Atlantic
Bass, Rock	Trout, Brown
Bass, Large Mouth	Trout, Eastern Brook
Bass, Small Mouth	Trout, Rainbow
Perch, Yellow	
Horned Pout	
Brown Bullhead	
Smelt, Rainbow	
Chain Pickerel	
Perch, White	
Bluegill	
Pumpkinseed	
Walleye	

[Sources: 2010 New Hampshire Freshwater Fishing Digest; New Hampshire Fishing Stocking Report for 2008; New Hampshire Fish and Game Department Fish Survey Data, 2008; New Hampshire Fish and Game Department Inland Fisheries Division 2009 Master Operational Plan; Water Resources Study Mascoma River Basin, New Hampshire, US Army Corps of Engineers New England Division, 1989; personal observations of MRNC; personal communication with Gabriel Gries, Fisheries Biologist with NHFGD, 2010.]

There are several special rules and fisheries on the Mascoma, reflecting the unique and important fisheries resources of this river system that are significant on a statewide level:

- Atlantic Salmon – lower Mascoma River – creel limit of 1 salmon per day, 5 per season
- Rainbow Smelt – Mascoma River (Canaan/Enfield town line to Mascoma Lake) – season for dip netting March 15-April 30 (1 of 10 locations in the state)
- Eastern Brook Trout, Rainbow Trout, Brown Trout – Mascoma River in East Lebanon – fly-fishing only; daily creel limit of 2 brook trout
- Common Carp – Mascoma Lake – May be taken by bow and arrow with a cord attached, in addition to angling and ice fishing (1 of 2 locations in the state.)
  [Source: NH Freshwater Fishing Digest, 2010; personal communication with Gabriel Gries, John Magee, and John Viar, Fisheries Biologists with NHFGD, 2010.]

The New England Rivers Center Study of 1983 identified the Mascoma River as a river with high statewide significance for its inland fisheries resource, particularly for its fly-fishing only section.

The Mascoma River, from the Route 4 bridge south of the Mascoma Lake Dam to the Packard Covered Bridge, is managed as a high-quality seasonal fishery for trout, one of 27 such areas in the state. This section is fly-fishing only, with a 2-

fish creel limit. Other sections of the river and Mascoma Lake are open to all types of fishermen. [Source: Inland Fisheries Division Master Operational Plan 2009; NH Freshwater Fishing Digest, 2010.]

The Mascoma River has been targeted for both Atlantic salmon restoration (lower section only) and eastern brook trout conservation. [Source: Inland Fisheries Division Master Operational Plan 2009; Eastern Brook Trout Joint Venture, 2009.]

(b) Boating

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

The New England Rivers Center Study of 1983 identified the Mascoma River as a river with high statewide significance for its whitewater boating resource.

The AMC River Guide describes several sections of the Mascoma River with paddling potential. Between Canaan Center and Mascoma Lake in Enfield are twelve miles of river good for quickwater paddling, with one 1-mile section of Class II rapids. The "scenery is a mixture of alder swamps, meadows, fields, and the Town of Enfield." There is one portage in this section, though boaters will pass by several broken dams. Below Mascoma Lake are several sections of whitewater. From Mascoma Lake to downtown Lebanon is a 5.5-miles section of Class II/III rapids, which includes Excelsior Rapids. This section of whitewater is included in AMC's Classic Northeastern Whitewater Guide. A slalom and wildwater race is held on this section each April. From Lebanon to the Connecticut River, there is a 4-mile section of quickwater and Class II rapids. There is a rapid in downtown Lebanon that has been run, but is not recommended – this section can be portaged.
[Source: AMC River Guide, New Hampshire/Vermont, 3rd edition, 2002]

In addition to river paddling, Mascoma Lake is very popular for boating, both motorized and nonmotorized. The Dartmouth College sailing team and the Shaker Village Sailing Club both use the lake for training, racing, and pleasure.

(c) Other Recreational Opportunities

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

Recreational Area Ownership Location

The Mascoma River offers an abundance of recreational opportunities year-round (Map 11.) Directly on the river, there is a swimming beach on Mascoma Lake, a public pool operated by the City of Lebanon, several parks and natural areas that offer picnicking and/or walking trails, the Northern Rail Trail and the Mascoma River Greenway, and three State Wildlife Management Areas. The New Hampshire Department of Transportation has designated all major roads along the Mascoma River and Mascoma Lake as bicycle routes, with the exception of Glen Road in Lebanon and Shaker Boulevard on the east side of Mascoma Lake; the Northern Rail Trail is also shown on their bike route map (Map 12.)

Recreation Areas with frontage on the Mascoma River

Recreational Area	**Ownership**	**Location**	**Existing/Potential**
Mascoma SF	State	Canaan	Existing
Bear Pond Natural Area	Private (Conservation Easement)	Canaan	Existing
Canaan Town Forest	Town	Canaan	Existing
Bird-In-Hand Farm	Private (Conservation Easement)	Canaan	Existing
Mascoma River WMA	Easement, with State	Canaan	Existing
Webster WMA	State	Canaan	Existing
McConnell Well	Town	Enfield	Existing
Huse Park	Town	Enfield	Existing
Shakoma Beach	Town	Enfield	Existing
Enfield WMA	State	Enfield	Existing
Shaker Museum	Private	Enfield	Existing
LeBrun Meadow	Private (Conservation Easement)	Lebanon	Existing
Mill Parcel	City	Lebanon	Existing
Mill Road (trail)	City	Lebanon	Existing
Baker's Crossing	City	Lebanon	Existing
Memorial Pool	City	Lebanon	Existing
Carter Witherell Center	City	Lebanon	Existing
Riverside Park	City	Lebanon	Existing
Two Rivers Park	City	Lebanon	Existing
Northern Rail Trail	State Right-of-Way	Downtown Lebanon to Indian River confluence in Canaan	Existing/Potential – plans to extend westward to West Lebanon
Mascoma River Greenway	City	Lebanon	Existing/Potential – first ½ mile of 4 miles completed in 2010

Recreation Areas within the River Corridor (but no river frontage)

Recreational Area	Ownership	Location	Existing/Potential
Mascoma Valley Regional High School – Sports Fields, Picnicking, Day Camp	School District	West Canaan	Existing
Enfield Elementary School – Playground	School District	Downtown Enfield	Existing
Shaker Recreation Park – sports fields	Town	Enfield, Rt 4A	Existing
Fellows Hill Park – picnicking, open space	City	East Lebanon, Rt 4	Existing
Eldridge Park – sports fields	City	Downtown Lebanon	Existing
Sacred Heart School – playground	City	Downtown Lebanon	Existing
Colburn Park – picnicking, playground, bandshell	City	Downtown Lebanon	Existing
Pat Walsh Park – sports fields, ice skating,	City	Downtown Lebanon	Existing
Lebanon Junior High School – sports fields	City	Downtown Lebanon	Existing
High Street Park – open space	City	Downtown Lebanon	Existing
Starr Hill Natural Area – trails, open space	City	Downtown Lebanon	Existing
School Street School - playground	City	Downtown Lebanon	Existing
Carter Country Club	Private	Lebanon, Mascoma St	Existing

[Sources: 2008 Recreation Inventory, NH Office of Energy and Planning; 2009 Conserved/Public Lands data from NH GRANIT; Lebanon Trail and Recreation Map, 2004.]

(d) Public Access

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

Location Type of Access Related Facilities Ownership

The locations of boat launches are included on Map 11 and described below:

Location	Type of Access	Related Facilities	Ownership
Route 4, Canaan	Cartop Boat Launch	None	State – NHFG
South of Shaker Bridge, Rt 4A, Enfield	Trailer/Ramp Boat Launch	Town Beach, Parking	State – NHDES
Route 4A, Lebanon	Boat Launch	None	State – NHDES
Mill Road, Lebanon	Fishing Access	Trail, Parking, connects to Rail Trail	City of Lebanon
Baker's Crossing, Lebanon	Canoe/Kayak	Trails, Parking	City of Lebanon
Bank St Ext, Lebanon	Informal Access – Whitewater Kayak	None	Private
Riverside Park – walking path along Glen Rd	Fishing Access	Picnicking, skate park, horseshoes, parking	City of Lebanon
Two Rivers Natural Area	Fishing Access	Trails, parking	City of Lebanon

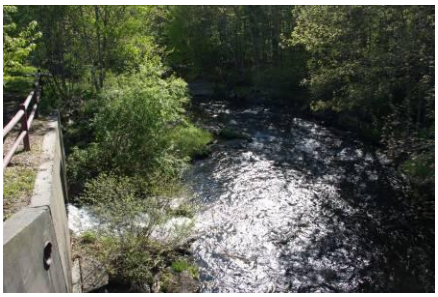
[Sources: 2008 Recreation Inventory, NH Office of Energy and Planning; Lebanon Trail and Recreation Map, 2004; AMC River Guide, New Hampshire/Vermont, 3rd edition, 2002.]

5. Other Resources

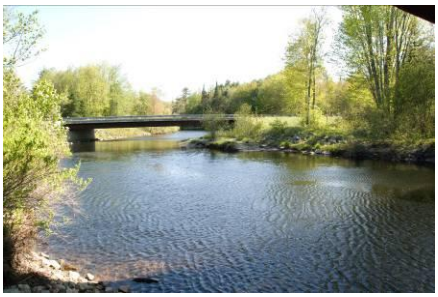
(a) Scenic Resources

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.

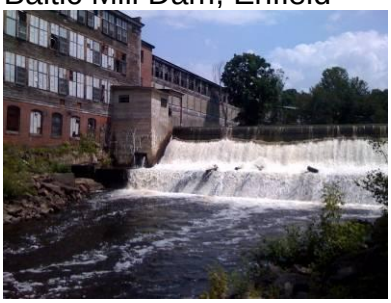
Canaan Center



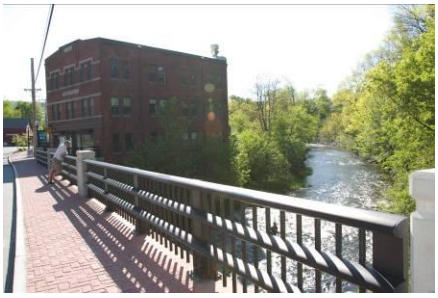
Boat launch – West Canaan



Baltic Mill Dam, Enfield



Downtown Enfield, Main Street



At Canaan Center, the Grafton Turnpike bridge offers a lovely view where the tributary from Canaan Street Lake tumbles from a large box culvert into the Mascoma River. The river banks are steep and wooded, and rocky ledges are exposed along the riverbed. South to Route 4, the Mascoma River is protected from view by a natural woodland buffer. There is little development along the river, and public/conserved lands provide views of the river in its natural, free-flowing state.

South of Route 4, the river turns west and flows through flatter, more open terrain. The river is not generally visible from the road, but the Northern Rail Trail and the NHFG boat launch in West Canaan provides scenic views of the river corridor.

In the Town of Enfield, the Northern Rail Trail passes directly opposite the Baltic Mill Dam, providing travelers an interesting juxtaposition of the natural and the industrial.

The Mascoma River then flows through downtown Enfield, and the Main Street bridge has sidewalks on both sides for looking over the river; the Copeland Block is an historic brick building on the river's edge.

Mascoma Lake provides beautiful views to the surrounding hillsides sculpted by glaciers. The Shaker Bridge provides a unique perspective to look at all shores of the lake from one vantage point. One iconic view from the bridge is looking toward Lower Shaker Village and the Enfield Shaker Museum across Mascoma Lake; the combination of the lake, the Great Stone Dwelling and other historic Shaker buildings, and the wooded hills rising sharply provide an excellent viewscape. There are also numerous views of the lake from Route 4A.

The Lebanon end of Mascoma Lake is no less scenic than the eastern side of the lake, with similar wooded hillsides along the lake. This section is best viewed from the Northern Rail Trail or near the Mascoma Lake Dam.

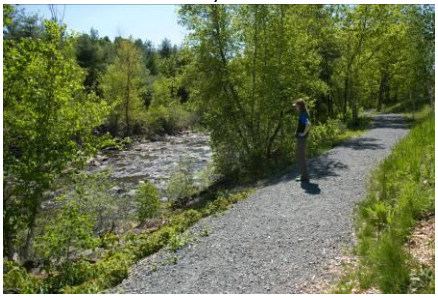
Between Mascoma Lake Dam and Interstate 89, the Mascoma River can be seen at the bridge crossings of the Northern Rail Trail and the Mill Road Class A Trail; in this area, the river is free-flowing through a steep-sided forested gorge with consistent areas of rapids. Just east of Interstate 89, the terrain flattens significantly and the river meanders past Baker's Crossing and the Packard Hill Covered Bridge.

Through downtown Lebanon, the river can be seen from bridges over Route 4; there are several scenic areas of rapids flowing past old mill buildings. The river then follows closely to Glen Road, where mill pond of the Glen Road Dam and the free-flowing section upstream may be viewed.

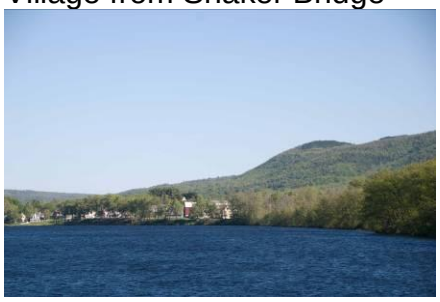
Below the Glen Road Dam, the walking path at Riverside Park offers more views of undeveloped forested steep hillsides along the riverbank. The river then flows past the Powerhouse Mall and other shopping plazas, and finally out to the Connecticut River. Two Rivers Park is located at the mouth of the Mascoma River; this provides a scenic view of the undeveloped final reach of the Mascoma River.

In addition to localized views of the river, the summit of Mount Cardigan in Cardigan State Forest provides a panoramic view of the Mascoma River watershed.

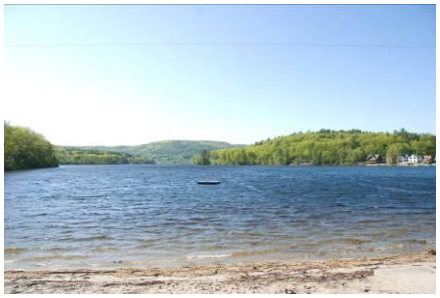
Riverside Park, West Lebanon



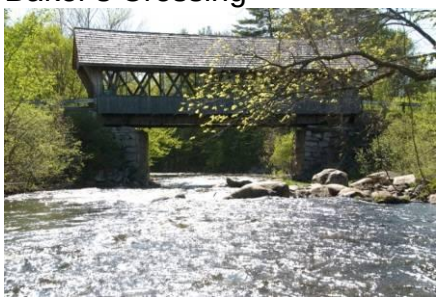
Mascoma Lake, Lower Shaker Village from Shaker Bridge



Mascoma Lake, eastern end from Shakoma Beach



Packard Hill Covered Bridge, at Baker's Crossing



Mascoma River in downtown Lebanon, from Route 4 bridge

(b) Land Use

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

The river flows through six village or town centers with a mix of land uses surrounded by residential and rural development (Map 7.) Residential development patterns along the river follow a gradient, with Canaan being the least developed and Lebanon being the most developed. Canaan and Enfield also have more agriculture and forested areas, and larger areas dedicated to open space. Within the river corridor, Enfield has 1,614 buildings, and Lebanon has 3,104 buildings or other structures. However, very few of these buildings are directly on the riverbank or lake shore; there are only eight buildings in Enfield and 25 in Lebanon within 50-ft of the riverbank, and 167 buildings within 50-ft of Mascoma Lake in both municipalities. Statistics on river corridor buildings were unavailable for the Town of Canaan for a building assessment, due to a lack of high-resolution aerial photography and GIS building footprints. [Source: GIS building data from Town of Enfield and City of Lebanon.]

Land Cover Type	Acres	% Corridor
Developed, High-Intensity	156	2%
Developed, Medium-Intensity	542	6%
Developed, Low-Intensity	562	6%
Developed, Open Space	542	6%
Agriculture or Grassland	806	9%
Forest	3,573	40%
Scrub/Shrub	286	3%
Wetlands	1,215	14%
Bare Land	37	0%
Open Water	1,229	14%
Total	8,949	100%

[Source: Land cover classification (generalized by UVLSRPC) from NOAA Coastal Change Analysis Program, based on satellite imagery from 2005-2006.]

Commercial and industrial development near the Mascoma River is concentrated in the western half of Lebanon, between Lebanon downtown and West Lebanon, along Route 4 (including Miracle Mile), Glen Road, Interstate 89, and Route 12A. The western end of Glen Road and Route 12A include large shopping plazas on both sides of the river. The Lebanon Airport is also partially within the river corridor. Downtown Enfield also has commercial development near the river

along Route 4 and Main St.

There is residential development around Mascoma Lake, particularly in Lower Shaker Village and on the lakefront, but between Mascoma Lake and the Water Treatment Plant in Lebanon, the area is more rural. Starting in the Riverdale area, near the Water Treatment Plant, residential development becomes the predominant land use leading into downtown Lebanon.

There are numerous road and railroad right-of-way crossings over the Mascoma River. In Canaan, Switch Road parallels the river from Canaan Center southward and then crosses to meet Route 4. Route 4 and the Northern Railroad right-of-way parallels the river from just east of West Canaan to West Lebanon, crossing the river numerous times. There are five road crossings in downtown Enfield, and the Shaker Bridge spans Mascoma Lake. There are two bridge crossings in East Lebanon, and nine bridge crossings in downtown Lebanon and West Lebanon, including two crossings by Interstate 89.

Major electric transmission lines cross the river three times in Lebanon, between downtown Lebanon and the airport. There are no other major electric utility lines or pipelines crossing the Mascoma River. For the Town of Enfield, the sewer line crossing Mascoma Lake at the Shaker Bridge is currently being buried underground; previously, the sewer line was attached to the bridge. [Source: NH Pipelines at 1:24,000-Scale from NH GRANIT, 1992; 2009 Annual Report, Enfield, NH.]

Enfield and Canaan currently have no large development proposals within the Mascoma River corridor, based on a review of 2009-2010 Planning Board minutes. As of May 2010, there are three proposed development projects in Lebanon within the Mascoma River Corridor; these are currently undergoing development review:

1) Mascoma Shores Limited, a 34-unit two-phase major subdivision on Mascoma Lake and Route 4A;

2) Twin State Sand and Gravel, a planned business park/industrial planned unit development on Glen Rd in West Lebanon;

3) Lebanon Plaza Associates, LLC, a proposed change in commercial use for a shopping plaza on Route 12A.

(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).

All municipalities along the Mascoma River have master plans and subdivision regulations; Enfield and Lebanon have zoning ordinances. The State

Comprehensive Shoreland Protection Act applies to all sections of the Mascoma River considered for this nomination.

Canaan's subdivision regulations include a provision to "minimize flood damage" and "reduce exposure to flood hazards" by requiring base flood elevation data for all subdivision proposals and other proposed new developments greater than 50 lots or 5 acres.

Local Zoning Requirements for the Mascoma River [Source: Enfield, Lebanon Zoning Ordinances]

Regulation	**Enfield**	**Lebanon**
Building Setback	Varies – see below	Varies – see below
Septic Setback	n/a	100-ft setback from wetland
Stream/River Buffer	50-ft setback from all waterbodies	
Wetland Setback/Buffer	50-ft setback from all wetlands No dredge, fill, excavation in wetland	No structure, dredge, fill, dam in wetland
Lot Coverage Percentage	n/a	Varies – see below
Underground Storage Tanks	n/a	200-ft setback from wetland
Floodplain Development Ordinance	Yes	Yes
Prime Wetlands Designation	Yes – 2 on Mascoma R.	No
Steep Slopes Provision	No structures on 25% slopes	No building, structure, parking lot on 25% slope in RL-3 District
Residential Cluster/PUD	Yes, cluster	Yes, cluster and PUD
Industrial PUD	No	Yes
Other	Limits on clearcutting in Forested Areas	n/a

Enfield's zoning ordinance permits residential uses along most of the Mascoma River and all of Mascoma Lake; the Commercial Business district allows commercial uses along Route 4, which is north of the Mascoma River (Map 13.)

Zoning Districts in Enfield within the Mascoma River Corridor

Zoning District	**Minimum Lot Area**	**Front/Side/Back Setback**	**Max. Building Coverage**	**Open Space Provisions?**
Residential 1	1 acre with on-site water and septic; ½ acre with town service	20-ft, 15-ft, 15-ft	n/a	Cluster development
Residential 3	3 acres per dwelling unit	30-ft, 20-ft, 20-ft	n/a	Cluster development
Commercial Business*	1 acre with on-site water and septic; ½ acre with town service	30-ft, 20-ft, 20-ft	n/a	n/a

* The downtown area of Enfield Village is exempt from lot size and other dimensional requirements.

Lebanon's zoning ordinance permits a variety of uses along the Mascoma River, with commercial districts in the downtown area, the Route 12A commercial area, and along Route 4 between downtown and Route 12A. There are also industrial districts north of Interstate 89 near Exit 18, near the airport, and north of Glen Road. East Lebanon is composed primarily of Rural Lands districts and Residential districts cover the remainder of downtown Lebanon and West Lebanon (Map 14).

Zoning Districts in Lebanon within the Mascoma River Corridor
(*Districts with river/lake frontage are starred*)

Zoning District	**Minimum Lot Area**	**Front/Side/Back Setback**	**Max. Building Coverage**	**Open Space Provisions?**
IND-L Light Industrial *	2 acres	40-ft, 20-ft, 20-ft	50%	Industrial PUD
IND-RA Industrial Rail Access	2 acres	30-ft, 20-ft, 20-ft (waiver for lots with rail access)	50%	Industrial PUD
GC General Commercial *	50,000 sq. ft.	40-ft, 20-ft, 20-ft	30%	Commercial PUD
CB Central Business *	3,000 sq. ft.	None, None, 10-ft	None	Commercial PUD
NC Neighborhood Commercial *	10,000 – 40,000 sq. ft.	20-40-ft, 15-25-ft, 20-30-ft	15-25%	Residential PUD, cluster subdivision
R-1, R-2, R-3 Residential *	10,000 – 40,000 sq. ft.	20-40-ft, 15-25-ft, 20-30-ft	15-25%	Residential PUD, cluster subdivision
R-O, R-O-1 Residential-Office	10,000 – 40,000 sq. ft.	20-40-ft, 15-25-ft, 20-30-ft	15-25%	
PB Professional Business	10,000 – 40,000 sq. ft.	20-40-ft, 15-25-ft, 20-30-ft	15-25%	
RL-1 Rural Lands One *	1-3 acres	40-ft, 25-ft, 30-ft	15%	Residential PUD, cluster subdivision
RL-2 Rural Lands Two *	1-3 acres	40-ft, 25-35-ft, 25-30-ft	10-20%	Residential PUD, cluster subdivision
RL-3 Rural Lands Three *	10 acres	50-ft, 50-ft, 50-ft	1%	Residential PUD, cluster subdivision

(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.

Gauge Location	Years of Record	Partial or Full Record Station
Mascoma River at Mascoma Lake Dam	1923-2004 (USGS) 2004-present (NHDES)	Full Record Station (Lake Stage,River Stage/Flow, Temp, Precip)
Mascoma River at West Canaan	1939-1978;1985-2004 (USGS) 2004-present (NHDES)	Full Record Station (Stage/Flow, Temp, Precip)

(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.

There are three cases of legislatively granted water rights in Mascoma River towns. The Enfield Village Fire District was granted rights in 1903 “for the purpose of introducing into and distributing… an adequate supply of pure water in subterranean pipes, for extinguishing fires and for the use of its citizens and for other purposes.” The Fire District was disbanded by a Town Meeting vote in 1972 and the rights were transferred to the Town of Enfield. A similar situation occurred in Canaan, where in 1889 the Crystal Lake Water Company was granted rights to withdraw water “for domestic uses, the extinguishment of fires, and for such other purposes as may be deemed necessary” and later the Town of Canaan purchased the Crystal Lake Water Company and water rights were transferred to the Town.

In Lebanon, the New Hampshire Legislature incorporated the Lebanon Aqueduct Company in 1850 “for the purpose of bringing water from the Mascoma river into the centre village of Lebanon.” In 1887, the Legislature authorized the Lebanon Centre Village Fire Precinct to establish water works “for the purpose of introducing an adequate supply of water for extinguishing fires, for the use of the citizens of said precinct, and for such other purposes as may be required…” with the stipulation that water taken from the Mascoma River for motive power shall be returned to the river above Shaw’s dam. According to City of Lebanon records, the water works for a public water supply was constructed in 1887, with a timber crib dam built in 1907 (replaced in 1929 with a concrete dam); this water works system is still in use as a public water supply for the City of Lebanon. [Sources: NHDES records of legislatively granted water rights; personal

communication with Jim Angers, Water Plant Superintendent, City of Lebanon, 2010]

For the Mascoma Lake Dam, the State of New Hampshire (NHDES) has established flowage rights up to about elevation 754. The dam would be overtopped at about elevation 758, so there may also be some prescriptive flowage rights between elevations 754 and 758. Beyond this, there are no known significant flowage rights on the Mascoma River from Canaan Center to the Connecticut River. [Source: Personal communication with Mark Stevens, NHDES Land Agent, and Wayne Ives, NHDES Instream Flow Specialist, 2010]

Under New Hampshire common law, owners of frontage on surface waters have riparian rights to use surface waters as long as the use if reasonable with respect to uses of other riparian landowners and has no undue effect of public trust uses of surface waters. The City of Lebanon, Twin State Sand and Gravel, Timken Aerospace, Blaktop, Inc., and Mascoma Hydro Corporation are riparian landowners who have such rights; they have also registered water withdrawals from the river with the Department of Environmental Services under RSA 488, the Water Management Act. Rivermill Hydroelectric Inc. and Energetic Enterprises also utilize water for hydroelectric power generation from the Mascoma River, and are registered for such activity with the Federal Energy Regulatory Commission.

(f) Scientific Resources

All four lakes in the watershed – Mascoma, Canaan Street, Crystal, and Goose Pond – have active water testing programs to help identify water quality problems. They also test tributaries and some parts of the Mascoma River. The Mascoma Watershed Conservation Council conducts additional testing on the Mascoma River. The years of data collected by volunteer citizen scientists provides an important baseline on water quality and is used to identify and monitor problems.

Mascoma Lake is the subject of a public health study conducted by Dartmouth Medical School, examining a cluster of amyotrophic lateral sclerosis (ALS, or Lou Gehrig's disease) in residents on Mascoma Lake. The study theorizes a potential connection between cyanobacteria toxins in the water and the disease, but more research will be needed to determine causal factors of this disease cluster. Major partners on this study are the UNH Center for Freshwater Biology and the Institute for Ethnomedicine in Jackson Hole, Wyoming. [Source: "Lakeside ALS cluster draws attention but is still unexplained", Dartmouth Medicine magazine, Fall 2009, available online at http://dartmed.dartmouth.edu/fall09/html/vs_als_cluster.php.]

In addition, the glacial lake deposits on the western end of the Mascoma River, associated with Lakes Hitchcock and Upham are of significant scientific interest to geologists. The Northeast Friends of the Pleistocene, an organization of

geologic researchers in the northeastern United States, will tour the Mascoma River in Lebanon as part of their 73rd annual field conference, in June 2010. [Source: Northeast Friends of the Pleistocene website, http://www.geology.um.maine.edu/friends/.]

The United State Geological Survey and its partners have invested in scientific research on the Connecticut River watershed, which includes the Mascoma River, through its Connecticut River Watershed Sustainability Project. One of the products of this project is the Connecticut River Watershed Atlas, an online web-mapping interface designed to share scientific information with researchers, resource managers, land-use planners and the public. [Source: USGS Connecticut River Water Atlas website, http://nh.water.usgs.gov/projects/ct_atlas/background.htm]

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			
(2) statewide significance	20		20	Glacial lakes formed large areas of stratified-drift aquifers along river
(3) local significance	10			
(b) Wildlife Resources		30		
(1) endangered or threatened species		15		
a. national significance	15			
b. statewide significance	10		10	2 loon nests on Mascoma Lake
(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	Conservation Focus Area in Canaan
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			

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
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	Per Enfield and MWCC NRI's
(c) Vegetation/Natural Communities		20		
(1) endangered or threatened plant		15		
a. national significance	15			
b. statewide significance	10		10	8 plants id'd by Natural Heritage Bureau
(2) exemplary natural ecological community		5	5	2 communities id'd by NHB
(d) Fish Resources		35		
(1) endangered or threatened fish		15		
a. national significance	15			
b. statewide significance	10			
(2) significant aquatic habitat		10		

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
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	River section in Canaan (upstream of Indian River confluence) is a Conservation Focus Area
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			
d. Adjacent habitat not located within any of the above.	1			
(3) fish reproduction		5		
a. natural reproduction	5			
b. some stocking	3		3	Stocked: trout (3 spp.), salmon; Natural – bass, smelt, etc.
c. stocking	1			
(4) anadromous fish		5		
a. reproducing populations of diadromous fish	5			
b. restoration begun	3		3	Annual Atlantic salmon stocking

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
c. documented restoration plan	1			
(e) Water Quality		30		
(1) Class A	30		30	Class A near Lebanon Water Treatment Plant; B otherwise
(2) Class B	15			
(f) Open Space	10 per occurrence	30	30	Areas of open space in all 3 towns
(g) Natural Flow Characteristics		30		
(1) 100 percent free-flowing	30			
(2) largely free-flowing	15		15	Largely free-flowing in all 3 towns
SUBTOTAL NATURAL RESOURCES		205	151	
MANAGED RESOURCE CATEGORY		90		
(a) Impoundments		30	30	3 dams for recreation or conservation
(b) Water Withdrawals and Discharges		30		
(1) water withdrawals		20		
a. existing public drinking water supply	10		10	Water supply for City of Lebanon; Wells for Enfield Village; Lower Shaker

Category	Points Available	Maximum Points	Suggested Points to be Awarded	Justification for Points
				Village wells in Enfield
b. potential public drinking water supply	5		5	Aquifer in West Lebanon id'd as potential back-up public water supply
c. existing industrial water supply	5		5	4 industrial users in Lebanon
d. potential industrial water supply	3			
e. existing agricultural water supply	5			
f. potential agricultural water supply	3			
(2) wastewater discharges		10		
a. wastewater treatment facility discharge	10			
b. industrial wastewater discharge	5		5	
(c) Hydroelectric Resources		30		
(1) existing hydroelectric power production	30		30	3 active hydro dams; 1 hydro project; 1 potential (by adding hydro power to existing dam)
(2) potential hydroelectric power site	15			
SUBTOTAL MANAGED RESOURCES		90	85	
CULTURAL RESOURCE CATEGORY		60		

Category	**Points Available**	**Maximum Points**	**Suggested Points to be Awarded**	**Justification for Points**
(a) Historical or Archeological Resource		30		
(1) national significance	30		30	4 Districts, 2 Places on National Register
(2) regional significance	15			
(3) statewide significance	10			
(b) Community River Resource	10 per occurrence	30	30	Recreational, Natural Resources, Commercial, and Water Use values recognized in Master Plans
SUBTOTAL CULTURAL RESOURCES		60	60	
RECREATIONAL RESOURCE CATEGORY		120		
(a) Fishery		30		
(1) Year-round coldwater, warmwater, and saltwater fish species fish habitat.	30			
(2) Year-round habitat for 2 or more coldwater, warmwater or saltwater fish species.	20		20	Trout (3 spp.), Smelt, Bass (2 spp.)
(2) Year-round habitat for wither coldwater, warmwater or saltwater fish species.	10			

Category	**Points Available**	**Maximum Points**	**Suggested Points to be Awarded**	**Justification for Points**
(b) Boating		30	30	Whitewater, flatwater, Mascoma Lake
(c) Other Recreation	10 per occurrence	30	30	Northern Rail Trail, "String of Pearls" public lands, hiking, swimming, etc.
(d) Public Access		30		
(1) on publicly-owned land	30		30	3 publicly-owned boat launches; plus fishing access points on public lands
(2) on privately-owned land	15			
SUBTOTAL RECREATIONAL RESOURCES		120	110	
OTHER RESOURCE CATEGORY		120		
(a) Scenery		30	30	Rail Trail, Route 4, Mascoma Lake, etc.
(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			

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		10	Predominately residential development; commercial/industrial development limited to town centers; Route 4 and Switch Rd follow river
(4)corridor highly populated; contains significant development	5			
(c) Land Use Controls	10 per occurrence	30	30	All 3 towns have Master Plan and subdivision regulations; 2 have zoning
(d) Water Quantity		30	30	Mascoma Lake Dam gage: 1923-present
SUBTOTAL OTHER RESOURCES		120	100	
TOTAL POINTS		595	506	

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.

Nomination Checklist

The following is a checklist of required information for each river nomination, as described in RSA 483:6.

(a)__x__ Name of the river

(b)__x__ Location of the river or segment; __x__ Length of the river or segment

(c)__x__ Sponsor's name; __x__ Address; __x__ Daytime Telephone

(d)__x__ Description of significant resources contained in the river or segment and its corridor

(e)__x__ Description of community and public support for the nomination; __x__ Copies of any letters of support from elected and appointed local officials

(f) __x__ Documentation of notification of the nomination to elected public officials of all municipalities through which each nominated river or segment flows.

(g) __x__ Recommendation on the classification(s) for the river or segment; __x__ Start and End point of each segment; ___x_ Length in miles of each segment

(h)__x__ USGS map of the river or segment and its corridor; __x__ Inset or locator map showing location of river or segment within the state

(i)__x__ Assessment of river or segment's resources, including, but not limited to, the following:

(1)__x__ Geologic resources

(2)__x__ Wildlife resources

(3)__x__ Vegetation; __x__ Natural communities

(4)__x__ Fish resources

(5)__x__ Water quality as designated pursuant to RSA 485-A:9 or as shown by actual water quality analysis, if available

(6)__x__ Hydrologic resources, including natural flow characteristics

(7)__x__ Open space

(8)__x__ Dams/Impoundments

(9)__x__ Existing withdrawals

__x__ Potential withdrawals
__x__ Existing discharges
__x__ Potential discharges

(10)_x__ Existing hydroelectric resources

_x__ Potential hydroelectric resources

(11)__x_ Historical or archaeological resources

(12)_x__ Community river resources

(13)_x__ Existing recreational resources
__x__ Fishery
__x__ Boating
__x__ Other
__x__ Public access

__x__ Potential recreational resources
__x__ Fishery
__x__ Boating
__x__ Other
__x__ Public access

(14)_x__ Scenic characteristics

(15)_x__ Current land use
_x__ Current land use controls

(16)_x__ Water quantity

(17)_x__ Riparian interests/Flowage rights

(j)_x__ River point evaluation and justification

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