

# Ammonoosuc River, Upper Reach

May 29, 2008

Steve Couture  
Rivers Coordinator  
NH Department of Environmental Services  
PO Box 95  
29 Hazen Drive  
Concord, NH 03302-0095

Dear Mr. Couture,

It is with great enthusiasm that we submit this nomination for the Ammonoosuc River, Upper Reach. This nomination includes the Ammonoosuc River from the White Mountain National Forest property line at Lower Falls in Carroll, upstream to and including the Lakes of the Clouds on the western slope of Mount Washington in Sargents Purchase. The requested designation will truly make the river "whole" and is consistent with the intention of the New Hampshire Rivers Management and Protection Program.

The Ammonoosuc Local Advisory Committee believes this is a logical culmination in the effort to protect this scenic, pristine river, and its valuable watershed. The research and findings, supported by the endorsements make an overwhelmingly compelling case for inclusion of the Ammonoosuc River, Upper Reach into the NH River Management and Protection Program.

The Ammonoosuc Local Advisory Committee is willing to accept the additional responsibilities for this stretch of the Ammonoosuc River.

Thank you for your consideration in the review of this nomination.

Respectfully Submitted,

The Ammonoosuc River Local Advisory Committee  
C/O Charles Ryan, Chair  
95 Dodge Road  
Littleton, NH 03561



**New Hampshire Rivers Management and Protection Program  
River Nomination Form**

**Instructions:** Before beginning any work on a river nomination, Sponsors should contact the State Rivers Coordinator at the NH Department of Environmental Services (DES). 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: DES Rivers Coordinator, P.O. Box 95, 29 Hazen Drive, Concord, NH 03302-0095, (603) 271-8801.

**I. NOMINATION INFORMATION**

1. **Name of River:** Ammonoosuc River, Upper Reach \_\_\_\_\_

2. **River/River Segment Location (and start/end points) and Length (miles):**  
Starting from the White Mountain National Forest property line at Lower Falls in the Town of Carroll upstream to and including the Lakes of the Clouds on the western slope of Mount Washington in the unincorporated place of Sargents Purchase, a distance of approximately 12 miles (Map 1).

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

**(b) Contact Person:** Charlie Ryan  
Chair, Ammonoosuc River LAC  
95 Dodge Road  
Littleton, NH 03561  
Telephone: 603-444-2398  
[squarepeg@worldsurfer.net](mailto:squarepeg@worldsurfer.net)

**II. SUMMARY: RESOURCES OF STATEWIDE OR LOCAL SIGNIFICANCE**

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

**Instructions:**

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

<b>Natural Resources</b>	<b>Value Present/ Statewide Significance</b>	<b>Value Present/ Local Significance</b>
Geologic or Hydrologic Resources	X	
Wildlife Resources	X	
Vegetation/Natural Communities	X	
Fish Resources	X	
Rare Species or Habitat	X	
Water Quality		X
Open Space	X	
Natural Flow Characteristics		X

**Managed Resources**

Impoundments		
Water Withdrawals/Discharges		X
Hydroelectric Resources		

**Cultural Resources**

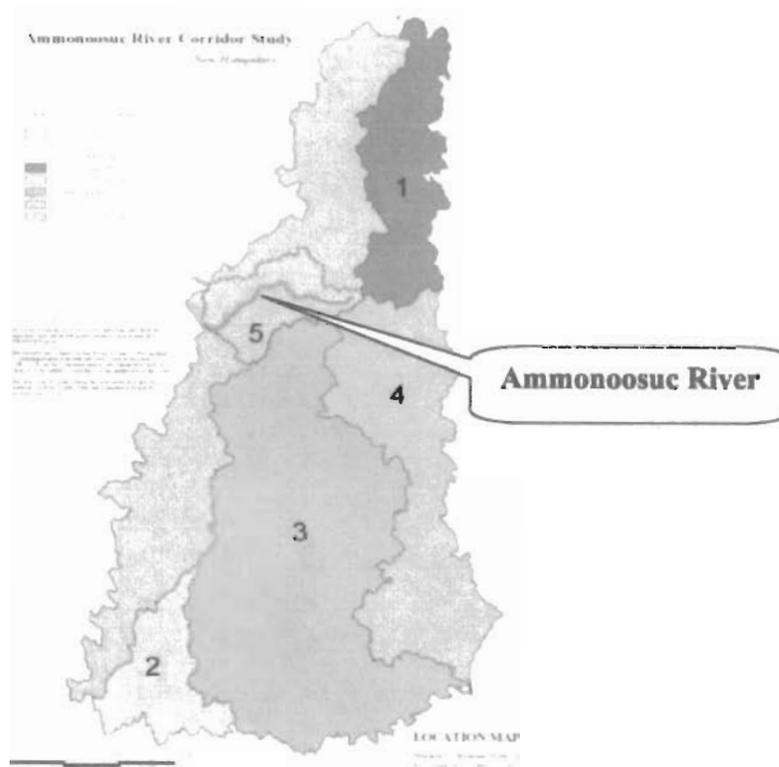
Historical/Archaeological Resources	X	
Community River Resources		X

**Recreational Resources**

Fishery Resources	X	
Boating Resources	X	
Other Recreational Resources	X	
Public Access	X	

**Other Resources**

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



**2. Briefly describe the most important resource values which 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 kayaking and canoeing segment, you should identify recreational kayaking and canoeing 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.**

**CULTURAL**

The Upper Reach of the Ammonoosuc River offers many historic and cultural resources of local and statewide importance representing all of the important historical periods, from the early settlers to the rise of tourism in the 20th century. This segment of the river corridor boasts the worlds first mountain climbing railway, the Mount Washington Cog Railway, The Mount Washington Hotel, which is listed on the National Historic Register, as well as several locally important archeological and historic sites. Here along the river stood many of Carroll's old hotels catering to early 20th century tourists. Several historic markers identify sites including The Crawford Family marker, the family for which the notch was named, The Mount Washington Hotel marker, located at the hotel's entrance on 302, and the Bretton Woods Monetary Conference

marker located on the north side of 302. Here too is the site of a Fabyan's, a railroad station that welcomed the many passengers visiting the local grand hotels. Efforts are being made to preserve and enhance the unique historic past by restoring the railroad station, and the grand hotel. A section of Route 302 paralleling the Ammonoosuc River is historically known as the 10<sup>th</sup> New Hampshire Turnpike dating back to 1803. This stretch is also designated the 10<sup>th</sup> Mountain Division Mountain Highway. NH honors a small group of American skiers, who in the early 1940's believed the US should develop a military capability for mountain and winter warfare. More than 20,000 troops were trained in skiing and climbing. The division endured a short but intense period of combat in Italy in 1945 and suffered a high casualty rate. After the war a large number of 10<sup>th</sup> veterans returned to civilian lives that included skiing and setting the direction for the next generation of ski industry development (taken from exhibit text from the New England Ski Museum, Franconia, NH).

## **BEAUTY**

The Upper Reach of the Ammonoosuc River includes one of the most beautiful and significant river valleys in NH. It is valued by locals and tourists from around the country for its spectacular vistas of Mount Washington and the Presidential Range of the White Mountains. The river's steep, mountainous features provide rushing rapids and beautiful waterfalls including the Upper and Lower Falls. The Ammonoosuc Ravine Trail follows the headwaters of the Ammonoosuc River in a direct route to the Lakes of the Clouds. This popular trail boasts many fine waterfalls, cascades, and Gem Pool, a beautiful emerald pool at the foot of a cascade. The upper section of the river trail affords excellent views of the area. In addition, this portion of the corridor along Route 302 has been designated as a state Cultural and Scenic Byway. Source: AMC White Mountain Guide.

## **WATER SUPPLY AND QUALITY**

The Ammonoosuc directly and indirectly provides drinking water to the communities through which it passes. Individual wells as well as aquifers lie along this length of the river. The water quality of the river has improved dramatically since the 1970's with nearly the entire river meeting or exceeding Class B standards. However, concerns about the lack of water quality data have resulted in volunteers recently involving the river in the NHDES Volunteer Water Quality Monitoring Program. Source: Ammonoosuc River Corridor Study (supporting documents).

## **RECREATION**

This portion of the Ammonoosuc River offers recreational opportunities of importance to both the residents and tourists. This area of the White Mountain National Forest is associated with hiking, camping, skiing, snowmobiling, horseback riding, golf, mountain biking and other activities. The river itself is one of the state's best white water rivers with rapids rated from Class II to IV and is enjoyed by an increasing number of kayakers and canoeists. The easily accessible river is heavily fished for native and stocked trout. It is not unusual on a hot summer day to see people, residents and tourists alike, swimming at many locations along the river.

## WILDLIFE/AQUATIC

The Upper Reach watershed area and river corridor remain one of the most pristine ecosystems in the northeast. The extreme diversity of living things within this relatively small area is significant. The NH Natural Heritage Inventory has identified several exemplary natural communities and many plants that are endangered or threatened species. Mammals and invertebrates also make this critical list. Over 140 bird species have been identified with bald eagles, osprey, and variety of hawks seen in the spring and fall as they migrate along the river. Native brook trout, an American symbol of persistence, adaptability and pristine wilderness still inhabit the Upper Reach waters. The US Silvio O. Conte National Wildlife Refuge identifies the Ammonoosuc River as “an important cold water fishery” and places a ‘high’ priority on protecting the river, not only as an important fishery, but also for “contiguous habitat communities” which include portions of the White Mountain National Forest.

## THREATENED RESOURCES

This portion of the Ammonoosuc River is currently in the middle of a development boom with increases in commercial and residential users. There is growing concern about the impact these changes and the resulting fragmentation will have on water quality, wildlife, stream bank erosion rates, access, and the quality of the recreational experience on the river. The expansion of the golf course along the Ammonoosuc River at the Mt. Washington Resort may pose a threat to the water quality that currently exists in the river. The introduction of invasive species, particularly *Didymosphenia geminata* also known as Didymo or Rock Snot, is a continuing threat to this resource.

## 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 which exists for the river nomination and attach appropriate documentation. Include copies of any letters of support from local elected and appointed officials.**

In the fall of 2003, the Town of Littleton applied for and received a grant from the Upper Connecticut River Mitigation and Enhancement Fund to conduct an assessment of the river corridor. The project, called The Ammonoosuc River Corridor Assessment and Enhancement Project, was designed to determine local concerns about the river and address these concerns on a corridor wide basis rather than piecemeal attempts on only a town-wide or short river segment basis. In the early spring of 2004, the Littleton Selectmen sent a letter to each of the other 6 Boards of Selectmen in the towns that abut the river and asked if they would appoint a person to serve on the Ammonoosuc River Corridor Advisory Committee. Additionally, 3 members were selected

representing each of 3 interest groups along the river: recreation, development, and agriculture. This committee of 10 was formed in the spring of 2004 and their first meeting was held on April 22, 2004. They continued to meet. Workshops were held on stream bank erosion and buffers, which were attended by local officials and landowners.

Over the next two years the committee reported on the various aspects of the river, established a volunteer water quality monitoring program and initiated nomination of the lower 44.8 mile of the river from the White Mountains National Forest boundary near Lower Falls in the Town of Carroll to its confluence with the Connecticut River. In the entire two years of undertaking the initial nomination process, no one and no group have been against that nomination.

The Ammonoosuc River was accepted into the New Hampshire Rivers Management and Protection Program in August, 2007 and Local Advisory Committee (LAC) members were nominated and appointed over the winter 2007/2008. The first Ammonoosuc River LAC meeting was held in January 2008. One of the first subjects brought to the table by the newly appointed LAC was the desire to move forward in seeking designation for the Upper Reach of the river. A unanimous vote was taken and a subcommittee was established to proceed with the nomination.

Letters of public support have been mailed directly to Steve Couture, Rivers Coordinator for NHDES. Documents of notification include:

- Minutes from The Town of Carroll Board of Selectmen meeting May 12, 2008. Approval and signing of letter of support (supporting documents).
- Letter to Coos County Planning Board Chair (supporting documents).

#### **IV. OTHER SUPPORTING INFORMATION**

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

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

- Q & A pamphlet on Ammonoosuc River Designation (supporting document).
- Ammonoosuc River Fact Sheet NHDES WD-R&L-20 (supporting document).
- Eastern Brook Trout Joint Venture: Status and Threats Report, Road Map to Restoration (supporting document). Also available online at: <http://www.easternbrooktrout.org/index.html>
- The Ammonoosuc River, A Report to the General Court. Available online at: <http://www.des.state.nh.us/rivers/documents/ReportGeneralCourt.final.pdf>.
- Volunteer Water Quality Monitoring Reports-2005, 2006, 2007. Available online at: <http://www.des.nh.gov/WMB/VRAP/ammonoosuc.html>.

- Ammonoosuc River NHRMPP River Nomination Form. Available online at: <http://www.des.state.nh.us/rivers/documents/AmmonoosucRiverNominationWithMaps.pdf>
- Ammonoosuc River Corridor Study Phase 1 Report. Available online at: <http://www.townoflittleton.org/docs/arcsphase1.pdf>.
- Ammonoosuc Watershed Regional Conservation Plan. Available online: <http://www.aconservationtrust.org/actplan.pdf>.

## **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 Appendices A and B 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.

### **Instructions:**

1. For each classification criteria listed below (a-d), check the one box which most accurately describes the nominated river or segment.

### **Proposed Ammonoosuc River Designations by Location**

<b>From</b>	<b>To</b>	<b>Segment Length (miles)</b>	<b>Water Quality Classification</b>	<b>Distance to Nearest Road (minimum)</b>	<b>Designation</b>	<b>Description</b>
Lower Falls (Carroll)	A point 1.33 miles above Upper Falls (Crawfords Purchase)	6.6	B	Bridge crossing	Rural/Community	Forested, WMNF, residential, commercial, recreation, Rt 302 and Base Rd adjacent, 3 bridge crossings, Bretton Woods Mountain Ski Resort, Mt. Washington Hotel
A point 1.33 miles above Upper Falls (Crawfords Purchase)	Lakes of the Clouds (Sargents Purchase)	5.5	B	Bridge crossing*	Natural	Forested, WMNF, Base Road crosses river at 1.05 mi above beginning of segment, Cog RR, Lakes of the Clouds hut, Ammonoosuc Ravine Trail

\*The Base Road bridge over the Ammonoosuc River, approximately 1.05 mile above the lower end of this segment, is the only point at which a paved road approaches to within 250 ft of the river.

(Map 1)

## **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.**

Nine maps are included and can be found in the back section of this nomination.

<b>Map</b>	<b>Name</b>	<b>Topics</b>
<b>1</b>	Ammonoosuc River, Upper Reach	Proposed designations
<b>2</b>	WAP Wildlife Habitat Land Cover	Known and potential critical wildlife habitat
<b>3</b>	WAP Highest Ranked Habitat By Ecological Condition	Wildlife habitat, supporting landscape
<b>4</b>	Predicted Lynx Habitat	Probability of occurrence
<b>5</b>	Profile of the Ammonoosuc River	Elevation drop
<b>6</b>	WAP Upper Ammonoosuc River Watershed	Upper Ammonoosuc River Watershed
<b>7</b>	Lakes of the Clouds to Lower Falls	<b>Aerial of the Upper reach</b>
<b>8</b>	NH Heritage Natural Bureau Known Location of Rare Species and Exemplary Natural Community	Acidic Riverside Seep
<b>9</b>	Locally Identified Historic Sites	Historic Site Locations

## **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 headwaters of the Ammonoosuc River are in the Presidential and Dartmouth Ranges in the White Mountains. High in the alpine zone at an elevation of 5,012 ft, the river originates at the Lakes of the Clouds on a col between Mount Washington and Mount Monroe along the crest of the Presidential Range. This main lake is the highest perennial lake in New England and the site of the renowned Appalachian Mountain Club Hut. The headwaters of the river and Lakes of the

Clouds are on the Appalachian Trail, one of the premiere hiking trails in the U.S. Scenic Trail System and located along the crest of the Presidential Range. The Presidential Range in this vicinity is a prime geologic and scenic destination among hikers and others visiting the highest summit in New England. Of the 4,850 ft drop in elevation over its course to the confluence with the Connecticut River, 3495 ft or 76% takes place from Lakes of the Clouds to Lower Falls.

As the Ammonoosuc River descends the range to the north and west, it flows alongside the Ammonoosuc Ravine Trail, another popular trail in the region. The river and trail pass Marshfield Station, the base station for the Mount Washington Cog Railway, a popular and historic attraction in operation since 1869. Several important streams from the Presidential Range to the east (e.g. Mount Pleasant, Abenaki, Assaguam, Sebasis, and Crawford brooks) and the Dartmouth Range to the north (e.g. Jefferson, Halfway, Dartmouth, and Deception brooks) join the Ammonoosuc River as it flows west to the Town of Carroll. The Upper Falls of the Ammonoosuc are the site of a popular but sometimes dangerous swimming hole. The river then passes the world-renowned Bretton Woods Resort, Mount Washington Hotel, and the community of Fabyan along U.S. 302 before it flows over the Lower Falls in the Town of Carroll. The reach of the river between Bretton Woods and the Lower Falls flows through a scenic flat valley between the Dartmouth Range to the north and the Rosebrook Range to the South. This valley has a classic U-shape characteristic of an alpine glacial origin. Overall, the Ammonoosuc valley in the Bretton Woods vicinity offers one of the most popular views of Mount Washington.

Exposed bedrock in the valley consists of volcanic and metasedimentary units. These are exposed along the walls of the stream valleys. The valley of the Ammonoosuc from its source to the Lower Falls displays geomorphic features that are characteristic of the glaciation in the area, including rapids and the above-mentioned waterfalls. There has been little or no mining in the upper Ammonoosuc basin. The valley bottom in the Bretton Woods – Fabyan area consists of Stratified drift that serves as a local aquifer.

(kindly submitted by Ernst H. Kastning and Leland A. Wilder NHGS, with minor additions)

### **(b) Wildlife Resources**

The wildlife and aquatic resources within the 12 miles of the Upper Reach corridor stretch are significant. From the alpine zone to the valley floor below, the corridor offers a wide diversity of habitat types (Map 2). According to the NH Fish and Game Wildlife Action Plan, 64% of the watershed area acreage falls within the highest ranked wildlife habitat in NH and an additional 23% offers supporting landscapes. 8% falls within the highest rank for biological region (Map 3). This all adds up to a significant abundance and variety of wildlife.

The NH Natural Heritage Inventory has identified 33 rare species specifically associated with the Upper Reaches of the Ammonoosuc River. Many are endangered, threatened and or are in decline. Over 140 bird species have been identified in the Upper Reach watershed area including state endangered Bald Eagle, state threatened Osprey, declining Bicknell's Thrush, and the rare Black Backed Woodpecker. Many make their spring and fall migration along the river and some can be seen in route to nearby Pondicherry Wildlife Refuge, a division of the Silvio O. Conte National Fish and

Wildlife Refuge. Others find the diverse habitats along the river as ideal nesting grounds and many of these songbirds call the White Mountain National Forest their summer home.

According to the Eastern Brook Trout Joint Venture, today it is estimated that less than 9% of the areas that historically supported brook trout are intact. Brook Trout are the only native trout that inhabits cold clear streams. A native brook trout population is still intact in the Upper Reach stretch with the occurrence of natural reproduction. The Eastern Brook Trout Joint Venture, a cooperative effort to develop and implement a conservation strategy for Brook Trout, places a high priority on protecting these important fisheries (supporting documents: Eastern Brook Trout Joint Venture, Status and Threats and Road Map to Restoration Reports).

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

**MAMMALS**

Beaver, mink, weasel, and otter are often seen in the river, while white tail deer, moose, and black bear can be seen crossing it. Sections of this corridor stretch are prime viewing areas for moose. In the corridor these and other mammals are found including woodchucks, chipmunks, squirrels, mice, moles, rats, raccoons, foxes, skunks, rabbits, snowshoe hare, bats, fishers, coyotes, state threatened American marten, and bobcats. Large sections of unfragmented land in the White Mountain National Forest found in the corridor are especially important for black bear, bobcat, state threatened American marten, and federally threatened/state endangered Canada lynx. A full list of mammals in the area is as follows:

**Mammals of the  
Upper Reach Ammonoosuc River Watershed**

Common Name	Scientific Name	Status	Common Name	Scientific Name	Status
Little Brown Myotis	<i>Myotis lucifugus</i>	K	Eastern Chipmunk	<i>Tamias striatus</i>	K
Northern Long-eared Myotis	<i>Myotis septentrionalis</i>	K	Gray Squirrel	<i>Sciurus carolinensis</i>	K
Small-footed Myotis	<i>Myotis leibii</i>	?	Red Squirrel	<i>Tamiasciurus hudsonicus</i>	K
Silver-haired Bat	<i>Lasiomycteris noctivagans</i>	K	Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	K
Big Brown Bat	<i>Eptesicus fuscus</i>	K	Woodchuck	<i>Marmota monax</i>	K
Red Bat	<i>Lasirus borealis</i>	K	Beaver	<i>Castor canadensis</i>	K
Hoary Bat	<i>Lasirus cinereus</i>	?	Muskrat	<i>Ondatra zibethicus</i>	K
Eastern Pipistrelle	<i>Pipistrellus subflavus</i>	K	River Otter	<i>Lutra canadensis</i>	K
Smoky Shrew	<i>Sorex fumeus</i>	?	Porcupine	<i>Erethizon dorsatum</i>	K
Long-tailed Shrew	<i>Sorex dispar</i>	?	Coyote	<i>Canis latrans</i>	K
Pygmy Shrew	<i>Sorex hoyi</i>	?	Red Fox	<i>Vulpes vulpes</i>	K
Short-tailed Shrew	<i>Blarina brevicauda</i>	K	Gray Fox	<i>Urocyon cinereoargenteus</i>	K
Hairy-tailed Mole	<i>Parascalops breweri</i>	K	Black Bear	<i>Ursus americanus</i>	K
Star-nosed Mole	<i>Condylura cristata</i>	K	Raccoon	<i>Procyon lotor</i>	K
Deer Mouse	<i>Peromyscus maniculatus</i>	K	Marten	<i>Martes americana</i>	K T
White-footed Mouse	<i>Peromyscus leucopus</i>	K	Fisher	<i>Martes pennanti</i>	K

Common Name	Scientific Name	Status	Common Name	Scientific Name	Status
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	K	Ermine	<i>Mustela erminea</i>	K
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	K	Long-tailed Weasel	<i>Mustela frenata</i>	K
House Mouse	<i>Mus musculus</i>	K	Mink	<i>Mustela vison</i>	K
Norway Rat	<i>Rattus norvegicus</i>	K	Striped Skunk	<i>Mephitis mephitis</i>	K
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	K	Bobcat	<i>Felis rufus</i>	K
Meadow Vole	<i>Microtus pennsylvanicus</i>	K	Canada Lynx	<i>Felis lynx</i>	K H F
Rock Vole	<i>Microtus chrotorrhinus</i>	K	White-tailed Deer	<i>Odocoileus virginianus</i>	K
Southern Bog Lemming	<i>Synaptomys cooperi</i>	?	Moose	<i>Alces alces</i>	K
Northern Bog Lemming	<i>Synaptomys borealis</i>	? H			

K: Known to exist

?: Unconfirmed presence but expected to be present

H Historical record of presence

T: NH State threatened species

E: Federally Endangered species

### Extirpated Mammals

Common Name	Scientific Name
Eastern Cougar	<i>Felis concolor</i>
Wolf	<i>Canis lupis</i>

Source: David Govatski, Silviculturalist, US Forest Service, retired.  
Personal communication 05/08.

The NH Natural Heritage Bureau has indicated Northern Bog Lemming as a rare species specifically associated with the Upper Reach area. The historical documents read as follows: Description of the subspecies SYNAPTOMYS BOREALIS SPHAGNICOLA based on one specimen trapped at Fabyans (1600') near the base of Mt. Washington on 29 June 1898. Habitat "is swampy and quite densely carpeted with moss..." Associated species included MICROTUS, PEROMYSCUS, BLARINA, CLETHRIONOMYS, ZAPUS HUDSONICUS, and NAPOZAPUS INSIGNUS (Preble, E. A. 1899. Description of a new lemming mouse from the White Mountains, New Hampshire. Proc. Biol. Soc. Wash. 13:43-45.)

### BIRDS

The list of the bird species identified in the Upper Reach Ammonoosuc watershed area is impressive. Some of these species, such as the Bald Eagle, Osprey, and hawks can be seen in the spring and fall as they migrate to and from their breeding grounds. The Bicknell's Thrush breeds in windswept stunted spruce fir stands at elevations between 2,200 and 4200 ft. and the pipit nests only in the alpine zone. Some including the chestnut sided warbler and the spruce grouse are species of concern as populations are in decline.

**Checklist of Birds of the  
Upper Reach Ammonoosuc River Watershed**

<b>Common Name</b>	<b>Common Name</b>	<b>Common Name</b>
<b>Bitterns-Herons</b>	<b>Flycatchers</b>	<b>Wood Warblers</b>
American Bittern	Olive-sided Flycatcher	Nashville Warbler
Great Blue Heron	Eastern Wood-Pewee	Northern Parula
Green Heron	Yellow-bellied Flycatcher	Yellow Warbler
<b>Geese-Ducks</b>	Alder Flycatcher	Chestnut-sided Warbler
Canada Goose	Willow Flycatcher	Magnolia Warbler
Wood Duck	Least Flycatcher	Cape May Warbler
Mallard	Eastern Phoebe	Black-throated Blue Warbler
American Black Duck	Eastern Kingbird	Yellow-rumped Warbler
Green -winged Teal	<b>Shrikes-Vireos</b>	Black-throated Green Warbler
Ring-necked Duck	Northern Shrike	Blackburnian Warbler
Bufflehead	White-eyed Vireo	Palm Warbler
Common Goldeneye	Red-eyed Vireo	Pine Warbler
Hooded Merganser	Warbling Vireo	Bay-breasted Warbler
Common Merganser	Blue-headed Vireo	Blackpoll Warbler
<b>Hawks-Falcons-Vultures</b>	<b>Jays-Crows</b>	Prothonotary Warbler
Turkey Vulture	Gray Jay	Black-and-white Warbler
Osprey	Blue Jay	American Redstart
Bald Eagle	American Crow	Ovenbird
Broad-winged Hawk	Common Raven	Northern Waterthrush
Red-tailed Hawk	<b>Larks</b>	Mourning Warbler
Merlin	<b>Horned Lark</b>	Common Yellowthroat
Peregrine Falcon	<b>Swallows</b>	Canada Warbler
American Kestrel	Tree Swallow	<b>Sparrows</b>
<b>Grouse-Turkey-Pheasant</b>	No. Rough-winged Swallow	Eastern Towhee
Spruce Grouse	Bank Swallow	American Tree Sparrow
Ruffed Grouse	Barn Swallow	Chipping Sparrow
Wild Turkey	<b>Chickadees-Nuthatches-Creepers</b>	Fox Sparrow
<b>Plovers-Sandpipers</b>	<b>Black-capped Chickadee</b>	Song Sparrow
Solitary Sandpiper	Boreal Chickadee	Lincoln's Sparrow
Spotted Sandpiper	Tufted Titmouse	Swamp Sparrow
Wilson's Snipe	Red-breasted Nuthatch	White-throated Sparrow
American Woodcock	White-breasted Nuthatch	White-crowned Sparrow
<b>Gulls-Terns</b>	Brown Creeper	Dark-eyed Junco
Herring Gull	<b>Wrens-Kinglets-Gnatcatchers</b>	Lapland Longspur
Ring-billed Gull	House Wren	Snow Bunting
<b>Doves-Cuckoos</b>	<b>Winter Wren</b>	<b>Waxwings</b>
Rock Pigeon	Golden-crowned Kinglet	Bohemian Waxwing
Mourning Dove	Ruby-crowned Kinglet	Cedar Waxwing

<b>Common Name</b>	<b>Common Name</b>	<b>Common Name</b>
Black-billed Cuckoo	Blue-gray Gnatcatcher	Thrashers
<b>Owls</b>	<b>Thrushes</b>	Gray Catbird
Great Horned Owl	Eastern Bluebird	Starlings
Barred Owl	Veery	European Starling
Northern Saw-whet Owl	Gray-cheeked Thrush	<b>Pipits</b>
<b>Swifts-Hummingbirds</b>	Bicknell's Thrush	American Pipit
Chimney Swift	Swainson's Thrush	<b>Woodpeckers</b>
<b>Ruby-throated Hummingbird</b>	Hermit Thrush	Yellow-bellied Sapsucker
<b>Kingfishers</b>	Wood Thrush	Downy Woodpecker
Belted Kingfisher	American Robin	Hairy Woodpecker
<b>Cardinals-Finches-Grosbeaks</b>	<b>Blackbirds-Orioles</b>	Black-backed Woodpecker
Northern Cardinal	Red-winged Blackbird	Northern Flicker
Rose-breasted Grosbeak	Eastern Meadowlark	Pileated Woodpecker
Indigo Bunting	Rusty Blackbird	<b>Old World Sparrows</b>
Pine Grosbeak	Common Grackle	House Sparrow
Purple Finch	Brown-headed Cowbird	
House Finch	Baltimore Oriole	
Red Crossbill		
White-winged Crossbill		
Common Redpoll		
Pine Siskin		
American Goldfinch		
Evening Grosbeak		

Species not confirmed as having been seen in the area but possible:

Ross's Goose  
 Snowy Egret  
 Eastern Screech Owl  
 Short-eared Owl  
 Snowy Owl  
 Three-toed Woodpecker  
 Red-bellied Woodpecker

List Last Update: April 2008 by David Govatski,  
 Friends of Pondicherry, NH Audubon Ammonoosuc Chapter

**(2) List any endangered or threatened animals which 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.**

**Threatened and Endangered Species**

Animal Species	Endangered or Threatened	National or State
Canada Lynx	T/E	N/S, Historical data
American Marten	T	S
Osprey	T	S
Bald Eagle	E	S
Three Toed Woodpecker	T	S

Source: NHF&G, USF&W

There is local historical evidence that lynx were present and trapped in the area of the Upper Reach watershed. (Attachment 1: State of NH Document from Eric Orff, Wildlife Biologist.) The NH Fish and Game Wildlife Action Plan indicate a high probability of lynx occurrence in the area (Map 3). Lynx in or transiting the upper reach watershed may make use of the river as a travel corridor and source of water. In addition, the corridor offers habitat where beaver inundation provide snowshoe hare habitat as a primary food source.

The state threatened American marten is listed by NH Natural Heritage Bureau in Beans and Crawford's Purchase, as well Thompson & Merserve. Jillian Kelly of NH Fish and Game recently reviewed the Dartmouth Brook area immediately adjacent to the river in Carroll and indicates moderate to high suitability for the state threatened American marten.

**(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**

The NH Fish and Game Wildlife Action Plan Scores indicate the Upper Reach stretch of the Ammonoosuc and its watershed area to be very diverse. 64% of its area falls in the highest rank habitat area in the state (Map 3). Some of the key aspects of this high habitat ranking are:

- Approximately one third of the Upper Reach watershed is high-elevation spruce- fir forest. High elevation spruce-fir forest has a very limited distribution in NH covering 4% of the state's land and provides some of the last areas relatively free of human disturbance.

- Lowland spruce-fir forest cover only 10% of NH, and represent over 30% of the Upper Reach watershed area. Many bird species are heavily dependant on this habitat type and 7 require mature trees. Moose find this habitat type important for year round cover. Coarse woody debris associated with Lowland spruce-fir forests is ideal for marten providing prey access, abundance, safety from predators and denning and nesting sites.
- Another significant habitat type is the Northern Hardwood conifer forest, accounting for approximately 1/3 of the watershed acreage. Varying tree types and ages of those trees is critical in maintaining the diversity of wildlife that utilizes this habitat.

The NH Fish and Game Wildlife Action Plan wildlife habitat land cover by type is illustrated on Map 2, and the scores and habitat breakdown on attachment 2.

It is interesting to note that the Wildlife Action Plan identifies 19 distinct habitat types in NH and the upper reach contains 7 of them in a relatively small area showing its great diversity. Mammals, such as beaver, mink, otter, moose, deer, and black bears, within the corridor and watershed area are attracted to these areas because of their abundant food and cover. These areas also support a rich variety of amphibians, invertebrates and fish, important in maintaining regional biodiversity.

The mixed forest matrix and offers outstanding opportunity for bear dens, moose calving as well as connectivity for those mammals such as the American marten which move from one area to another in the landscape.

Wetlands along the corridor, together with the stream channel itself provide important and unique habitats for a large number of species including birds, amphibians, and reptiles. They provide diversity and are productive wildlife habitats. The riparian areas also provide habitat for wildlife that is equally as important as the wetlands. The upland edge provides nesting habitat for songbirds and numerous waterfowl.

Although small (147 acres in the Upper Reach watershed), the floodplain forest present along the lower part of the stretch provide important habitat and travel corridors for wildlife. They serve as stopover points where long distance migratory wildlife can find food, water, and shelter. Like wetlands, these are highly productive ecosystems. The floodplains forest offers abundant food for mammals and birds including wild turkeys, moose, and deer. Adjacent grassland habitats at the Bretton Woods Ski Area offer opportunity for food for a variety of species including bear and wild turkey during late spring and summer months.

The Alpine habitat occurs above treeline at approximately 4,900 feet elevation. This is where high winds, precipitation, cloud cover and fog result in low annual temperatures and a short growing season. The Ammonoosuc River begins here at an elevation of 5,018 feet above sea level. Unique plant communities, extreme climate, and isolation lead to rare, sometimes site-specific species such as the White Mountain Fritillary butterfly. Climate change and acid deposition are cited as the greatest risk to this habitat.

## REPTILES AND AMPHIBIANS OF THE UPPER REACH AMMONOOSUC

The following table shows reptiles and amphibians found in the area. The habitats of the Upper Reach Ammonoosuc corridor, especially adjacent vernal pools with connecting uplands are favorable for these species, but no inventory has been done.

### Reptiles and Amphibians of the Upper Reach Ammonoosuc

<b>Salamanders</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Spotted Salamander	<i>Ambystoma maculatum</i>
Red-spotted Newt	<i>Notophthalmus viridescens</i>
Northern Dusky Salamander	<i>Desmognathus fuscus</i>
Northern Redback Salamander	<i>Plethodon cinereus</i>
Northern Two-lined Salamander	<i>Eurycea bislineata</i>
<b>Frogs</b>	
Eastern American Toad	<i>Bufo a. americanus</i>
Northern Spring Peeper	<i>Pseudacris c. crucifer</i>
Gray Treefrog	<i>Hyla versicolor</i>
Bullfrog	<i>Rana catesbeiana</i>
Green Frog	<i>Rana clamitans melanota</i>
Wood Frog	<i>Rana sylvatica</i>
Northern Leopard Frog	<i>Rana pipiens</i>
<b>Turtles</b>	
? Common Snapping Turtle	<i>Chelydra s. serpentina</i>
Painted Turtle	<i>Chrysemys picta</i>
<b>Snakes</b>	
Northern Redbelly Snake	<i>Storeria o. occipitamaculata</i>
Eastern Garter Snake	<i>Thamnophis s. sirtalis</i>
Maritime Garter Snake	<i>Thamnophis sirtalis pallidula</i>
Northern Ringneck Snake	<i>Diadophis punctatus edwardii</i>
Eastern Smooth Green Snake	<i>Opheodrys vernalis vernalis</i>

? = unknown

Source: list by David Govatski, 04/08

Silviculturalist, US Forest Service, retired

Personal communication.

## INVERTEBRATES

The NH Heritage Bureau indicates an inventory of invertebrates in the area with the majority of them found in Sargents Purchase (12 moths with historical data, and 2 butterflies). Three of them have been identified as specifically associated with the river corridor:

*Anarta melanopa* (a noctuid moth)

*Boloria chariclea montinus* (White Mountain Fritillary)

*Gynaephora rossii* (a moth)

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

Many wildlife species are prone to use riparian areas as travel corridors. The Upper Reach corridor is unique in that it offers an incredible elevation drop in a relatively short distance (Map 5). The types and variety of pristine habitats along the stretch is significant (Map 2).

This area includes vast tracts of forestland within the thousands of acres of the White Mountain National Forest (Map 6, 7). While there is some development in the corridor, the majority is unfragmented lands allowing wildlife movement and access to the river itself. The existing connectivity between these primary habitats along the river corridor and in the watershed area is critical to insure seasonal movement between those habitats as well as gene flow and long range dispersal of many wildlife species.

**(C) Vegetation/Natural Communities**

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

The plant species present along the Upper Reach are the result of climate, elevation, hydrology, soils, and human impact.

Large areas of spruce-fir forest and northern hardwoods dominate a significant portion of the Upper Reach.

Literally hundreds of plant species can be found in the corridor. Representative tree species include: balsam fir, white spruce, black spruce, arbor vitae, eastern hemlock, tamarack, red oak, red maple, sugar maple, yellow birch, beech, moose/striped maple, moosewood, white birch, 3 species of aspens, shadbush, beech, ash, poplar, white cedar, along with alder. Willows, dogwoods, elderberry, winterberry, blueberry, cherry, and a large and varied number of herbaceous weeds, grasses and wildflowers are also found in the corridor. .

Wetlands including river and stream banks provide a unique riparian habitat that is suitable for hundreds of species of sedges, rushes, grasses, ferns, and woody species.

The alpine zone occurs above treeline at approximately 4,900 feet elevation, is an area that due to its extreme climate and isolation leads to many rare species. High winds, precipitation, cloud cover and fog result in low annual temperatures and a short growing season. Some of the rare communities include alpine tundra, subalpine heath, NE alpine/subalpine pond, and Alpine herbaceous snowbank. The NH Natural Heritage indicates 33 rare plants alone in Sargents Purchase.

(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.

The list of known endangered or threatened plant species in the Town of Carroll, the unincorporated places of Crawfords, Beans, and Sargents Purchase and Thompson & Meserve, are extensive.

Below is a list of rare species plants, compiled by the NH Natural Heritage Bureau, both vascular and non-vascular, that are specifically associated with the Upper Reaches of the Ammonoosuc River.

**Endangered or Threatened Plants of the Upper Reach Ammonoosuc**

Plant Species	Location	E or T	N or S
<i>Betula glandulosa</i> (dwarf birch)	CH, TM	E	S
<i>Calamagrostis canadensis</i> var. <i>langsdorfi</i> (harsh bluepoint)	S	E	S
<i>Calamagrostis pickeringii</i> (Pickering's bluepoint)	S	T	S
<i>Carex atratiformis</i> (black sedge)	S, TM, CH, CR, B, C	E	S
<i>Carex bigelowii</i> (Bigelows sedge)	S, TM, CH, B	T	S
<i>Diapensia lapponica</i> (diapensia)	S, TM, CH, B	T	S
<i>Epilobium hornrmanni</i> (Hornemann's willowherb)	B, TM, S	T	S
<i>Geum peckii</i> (mountain avens)	TM, B, S	T	S
<i>Harrimanella hypnoides</i> (moss plant)	TM, S	E	S
<i>Hierochloe alpina</i> var. <i>orthantha</i> (sweet alpine grass)	TM, S	T	S
<i>Listera convallarioides</i> (lily-leaved twayblade)	C, S	T	S
<i>Listera cordata</i> (heart-leaved twayblade)	C, S, B, TM	T	S
<i>Loiseleuria procumbens</i> (alpine azalea)	CH, TM, S	T	S
<i>Luzula spicata</i> (spiked woodrush)	TM, S	T	S
<i>Nabalus boottii</i> (Boott's rattlesnake root)	CH, TM, S	E	S
<i>Phyllodoce caerulea</i> (mountain heath)	TM, S	T	S
<i>Poa laxa</i> ssp. <i>Fernaldiana</i> (wavy bluegrass)	TM, S	E	S
<i>Rhododendron lapponicum</i> (Lapland rosebay)	CH, TM, S	T	S
<i>Rubus chamaemorus</i> (baked apple berry)	CH, S	T	S
<i>Salix argyrocarpa</i> (silver willow)	E	E	S
<i>Salix planifolia</i> (tea-leaved willow)	TM, S	T	S
<i>Salix uva-ursi</i> (bearberry willow)	CH, TM, S	T	S
<i>Saxifraga rivularis</i> (alpine brook saxifrage)	TM, S	E	S
<i>Sphagnum riparium</i> (peat moss)	CR, S	T	S
<i>Vaccinium boreale</i> (alpine blueberry)	B, TM, S	T	S
<i>Vahlodea atropurpurea</i> (mountain hairgrass)	TM, S	T	S
<i>Viola palustris</i> (alpine marsh violet)	CH, TM, S	E	S

C Carrol CH Chandlers Purchase CR Crawfords Purchase TM Thompson & Meserve  
 B Beans Purchase S Sargents Purchase

**(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.**

The list of exemplary natural communities (Terrestrial, Palustrine and one Lacustrine) that exist in the Upper Reach Ammonoosuc watershed area is extensive. The following are specifically associated with the river corridor itself.

<u>Exemplary Natural Ecological Community</u>	<u>Location</u>
Palustrine Acidic riverside seep	Carroll *Bretton Woods area at Lower Falls
Palustrine Wet alpine/subalpine bog	Chandlers Purchase, Thompson & Merserve, Sargents Purchase

\*Map 8, Attachment 3: NH Natural Heritage Bureau-Community Record

**(d) Fish Resources**

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

**Fish of the Upper Reach Ammonoosuc River**

Common Name	Scientific Name	Remarks
Brook Trout	<i>Salvelinus fontinalis</i>	N S
Rainbow Trout	<i>Salmo gairdneri</i>	S
Atlantic Salmon	<i>Salmo salar</i>	* S
Longnose Sucker	<i>Catostomus catostomus</i>	N
Longnose Dace	<i>Rhinichthys cataractae</i>	N
Blacknose Dace	<i>Rhinichthys atratulus</i>	N
Slimy Sculpin	<i>Cottus cognatus</i>	N
Creek Chub	<i>Semotilus atromacultus</i>	N

N = Natural S=Stocked \*=Native origin

Sources: Dianne Timmons: NH Fish and Game 05/08

NH Fish & Game has little detailed information about exact fish populations and populations by species in this area. The Eastern Brook Trout Joint Venture has supporting data pointing to intact brook trout populations in the Ammonoosuc River. The most recent electro-fishing data in this stretch was done in August 2000 by NHF&G with the following results: In addition to the below results, all stations had naturally reproducing Eastern Brook Trout.

**Station #25** Junction of route 302 and Base Rd: Atlantic Salmon, blacknose dace, longnose dace, slimy sculpin, rainbow trout, creek chub, eastern brook trout.

**Station #24** Base Rd, 2.9 miles up, by Halfway Brook: Eastern brook trout only.

**Station #53** (electro-fished in 1999) Jefferson Notch Rd. 3 miles from Base Rd in Crawfords Purchase: Eastern brook trout, rainbow trout.

**(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.**

There are no naturally occurring endangered or threatened fish species in the Upper Reach of the Ammonoosuc River. Atlantic salmon, whose native origin was this river, are now being reintroduced into this stretch through the Connecticut River Atlantic Salmon Restoration Program in conjunction with NH Fish and Game, US Fish and Wildlife Service, Trout Unlimited and many volunteers. Salmon fry were released May 2, 2008 on the last 3 miles of this corridor stretch. Approximately 36,360 of these fry were released from The Mount Washington Hotel front entrance area to the Zealand bridge, a short distance down from Lower Falls.

**(3) Describe the presence and location of spawning beds, feeding areas, and other significant aquatic habitat for fish populations. Determine if the habitat is exceptionally diverse, very diverse or moderately diverse as determined by the NH Fish and Game Department or the U.S. Fish and Wildlife Service.**

The NH Fish & Game Department does not have any detailed information relative to aquatic habitat diversity ratings. Data collected in 1997 and 1999 concerning aquatic habitat are shown below.

**Summary of Habitat Information- Stream Surveys, 1999**

Town	Sta #	% Pool	% Riffle	% Glide	% Boulder	% Rubble	% Gravel	% Sand	% Mud	% Wooded	% Shrub s	% Pasture	% Other
Carroll	24	20	36	44	53	40	5	2	0	80	20	0	0
Carroll	25	18	8	74	10	45	15	30	0	0	80	0	20

**Physiochemical Information**

Town/Year	Sta#	Avg. Width	Avg. Depth	Discharge	Max. Temp	Min. Temp	DO	pH	Alkalinity	Conductivity
Units	-	Meters	Cm	m3/s	F	F	mg/l	Units	Mg/l	uMhos/cm
Carroll/97	53	10.4	26	1.3	59	47	10.2	6.1	5	12

Source: NH Farm & Game

Importantly, the station 53 data shows temperature readings well within the brook trout's 36-68 degree range and PH well above 5 where brook trout become stressed as a viable breeding population (Karas, Brook Trout, 1997)

In the original designation of the Ammonoosuc River, The Silvio O. Conte National Fish and Wildlife Refuge Final Action Plan and Environmental Impact Statement sited that the US Fish & Wildlife valued the Ammonoosuc River as “an important cold water fishery.” Additionally, in the report “NH River Protection and Energy Development Project Report” available at: <http://www.des.state.nh.us/rivers/documents/NHRiverProtectionandEnergyDevelopmentProjectFinalReport> the Ammonoosuc River was evaluated as an inland fishery and was identified as “a most outstanding river” and was rated “high” for six of seven criteria considered: species composition, water quality, aquatic habitat, fishing quality, aesthetic experience, and current use.

**(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.**

While natural brook trout reproduction is present, principle fisheries in the river rely on a regular stocking program, as natural reproduction could not meet the level that would sustain the angling pressure. The NH Fish & Game stocks the Upper Reach of the Ammonoosuc River every year. Fish stocking occurs in May and June. According to NH Fish & Game, fish stocking is undertaken for 3 reasons: 1) to create or enhance angling opportunities 2) as part of a restoration effort (example Atlantic salmon), and 3) to create or enhance the foraging base of a freshwater game-fish.

Below is the stocking program for 2008. This represents fish stocked in the Ammonoosuc River in the town of Carroll as well as the Crawford Brook a tributary that feeds into the Upper Reach stretch. This does not count the thousands of Atlantic salmon fry, as discussed below.

**Fish Stocking Ammonoosuc River 2008**

Town	Species	Number
Carroll (Ammo)	RT, EBT,	13,500
Carroll (Crawford Brook, a tributary)	RT, EBT	250

Source: NH F & G, 2008 (RT-rainbow trout, EBT-brook trout)

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

The river provides a viable setting for Atlantic salmon as NH Fish and Game sampling efforts have shown much success finding fish of one, two, and three years of age. The current restoration of Atlantic salmon to the Connecticut River watershed began in 1967. The Sport Fishing and Wildlife Restoration Program is a major cooperative effort between the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Forest Service, the North Atlantic Salmon Conservation Organization, state fish and wildlife departments in the watershed, private organizations, and industry. While the program has had many setbacks and the number of salmon returning to date is very small, the program is continuing with hope of greater returns and ultimate restoration to much of the Connecticut River Watershed, including the Ammonoosuc. This season, on May 2, 2008 a member of the Ammonoosuc LAC assisted NH Fish and Game and other volunteers in releasing 208,300 salmon fry into the Ammonoosuc from the Mount Washington Hotel in Carroll to Wing Road in Bethlehem. Approximately 36,360 of these fry were released from The Mount Washington Hotel front entrance area to the Zealand bridge, a short distance down from Lower Falls.

**(e) Water Quality**

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

**Class A**

**X Class B**

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

In February of 2004, the NH Department of Environmental Services released its most recent assessment of water quality in the river. The report, which is required by the US Environmental Protection Agency (US EPA) under the Clean Water Act (Sections 305b&d) describes the quality of the river and analyzes the extent to which the river provides for the protection of and propagation of shellfish, fish, and wildlife, allows for recreational activities in and on the water, and contains a list of waters impaired or threatened by a pollutant. Overall, the river meets Class B standards. According to NHDES, "there has not been enough data on almost all of the river to make a full assessment. It is unknown at this time if sections of the River meet Class A standards. For fish consumption, most waters in the state are rated as "Not Supporting" due to mercury contamination, however just recently, NHDES has made a stocked trout exemption.

As part of the public participation component of the nomination process, volunteers have acted to have the Ammonoosuc River become a participant in the NHDES Volunteer Water Quality Monitoring program. Over \$3,000 of testing equipment has been purchased by the Corridor Study Group and sampling begun in the summer of 2005 with the goal of continuous monitoring to provide improved water quality data for the river. The data collected includes turbidity, pH, dissolved oxygen, temperature, and conductivity. The NHDES Volunteer River Assessment Program has produced reports based on the VRAP testing for 2005, 2006, and 2007. There are 2 Sampling Stations within the corridor, Station ID#27 Mount Washington Historic Marker, and Station ID #26 Fabyans/Base Station Rd, both in the Town of Carroll. Ammonoosuc River Water Quality Reports are available online at <http://www.des.nh.gov/WMB/VRAP/ammonoosuc.html>. Although sampling was limited in 2006, water quality met B standards for the entire river except low pHs at both of these location. Lower pH measurements in this area are likely the result of natural conditions such as the soils, geology. Rain and snowfall in NH is relatively acidic and after snowmelt or significant rain events surface water will generally have a lower pH. Testing will resume this summer. The Physiochemical Information table in fish section page has the results from the highest point ever sampled that does fall within the quality standard.

**(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).**

As stated above, in order to increase the base line data on the water quality of the River, the Ammonoosuc River Corridor Study Action Plan includes a citizen's based, volunteer monitoring project for the River. In the 2007 report, low pHs could be the result of acid rain or natural bedrock conditions.

**(f) Natural Flow Characteristics**

**Briefly describe the natural flow characteristics of the river, including natural periodic variation in flow (e.g., spring run-off and summer flow amounts) 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 Upper Reach corridor is a free flowing stretch. Stream flow varies dramatically on the on the Ammonoosuc due to climate, precipitation patterns, and watershed characteristics. Currently the USGS maintains a stream flow gauging station downstream of the reach on the Ammonoosuc River at Bethlehem Junction in Bethlehem. This location has 68 years of continuous data from 1939-2007. Data can be found at: [http://waterdata.usgs.gov/usa/nwis/uv?site\\_no=01137500](http://waterdata.usgs.gov/usa/nwis/uv?site_no=01137500).

Spring is the normal period of high river flow due to snowmelt and rainfall. As in most of New Hampshire, the runoff potential varies greatly with the season. Flooding within the corridor is affected primarily by the intensity and duration of rainfall in areas of the watershed upstream and the presence of very few storage areas (wetlands, lakes, large floodplains) where the impact of the excess runoff can be absorbed. The following is a list of flood history specific to the Ammonoosuc, Coos County and statewide events of record.

Date	Area Affected (River Basins or Region)	Recurrence Interval (yr)	Remarks
November 3-4, 1927	Pemigewasset, Baker, Merrimack, Ammonoosuc and Connecticut	25 to >50	Upper Pemigewasset River and Baker River - exceeded the 1936 flood. Down stream at Plymouth - less severe than the 1936 flood
March 11-21, 1936	Statewide	25 to > 50	Double flood; first due to rains and snowmelt; second, due to large rainfall
September 21, 1938	Statewide	Unknown	Hurricane. Stream stages similar to those of March 1936 and exceeded 1936 stages in Upper Contoocook River
March 27, 1953	Lower Androscoggin, Saco, Ossipee, Upper Ammonoosuc, Israel, and Ammonoosuc	25 to >50	Peak of record for the Saco and Ossipee Rivers.

October 25, 1959	White Mountain Area; Saco, Upper Pemigewasset and Ammonoosuc Rivers	25 to >50	<i>Largest of record on Ammonoosuc at Bethlehem Junctions; third largest of record on the Pemigewasset and Saco Rivers</i>
June 30, 1973	Ammonoosuc River	25 to > 50	<i>Northwestern White Mountains</i>
July, 1986 - August 10, 1986	Statewide	Unknown	<i>FEMA DR-711-NH: Severe summer storms with heavy rains, tornadoes; flash flood and severe winds</i>
August 7-11, 1990	Statewide	Unknown	<i>FEMA DR-876-NH: Series of storm events from August 7-11, 1990 with moderate to heavy rains during this period produced widespread flooding.</i>
August 19, 1991	Statewide	Unknown	<i>FEMA DR-917-NH: Hurricane Bob struck New Hampshire causing extensive damage in Rockingham and Strafford counties, but the effects were felt statewide.</i>
October, 1996	Northern and Western Regions	Unknown	<i>FEMA DR-1077-NH: Counties declared: Carroll, Cheshire, Coos, Grafton, Merrimack, and Sullivan.</i>
May 13-15, 2006	Central and Southern NH	Exceeded 100	<i>FEMA-1643-DR: Heavy rainfall 8-16 inches</i>
April 7, 2007	Statewide	100	<i>FEMA-1695-DR: Severe storms and flooding, starting on April 15th.</i>

Source: [http://www.nhflooded.org/flood\\_history.php](http://www.nhflooded.org/flood_history.php)

**(g) Open Space**

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

Much of the land in the Upper Reach watershed area, approximately 65%, is forested and protected through the White Mountain National Forest. The Mount Washington Resort and Bretton Woods Mountain Ski Area are the only significant parcels not permanently protected. Based on a 2001 land cover classified from satellite imagery, approximately 50% of the resort area at that time was recreational open space. Some floodplain forest areas (147 acres) exist in the lower section of the reach (attachment 2) with additional floodplain in the resort area valley floor.

## 2. Managed Resources

### (a) Impoundments

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

There are no dams on the upper reach of the Ammonoosuc River.

### (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.

According to the NHDES, the following facilities utilize the river as a resource for withdrawals:

NAME	PURPOSE	TYPE	LOCATION
Rosebrook Water Co.	Water source	Ground water / Gravel Well	BW, Carroll
Mt Washington Hotel	Golf course Irrigation	Surface water / Ammonoosuc River	Rt. 302, Carroll
Bretton Woods Resort Management CO, LLC. NHDES Permit 2002- 00708	Snow Making BrettonWoods Ski Area	Surface water / Ammonoosuc River	Rt. 302, Carroll

No recent study has identified the river as a future water supply source, but this may only be a matter of time. Growth and development may make the low volume supplies higher up in the watershed inadequate for some town.

**(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).**

According to the NHDES the following entities discharge to the river:

NAME	PURPOSE	TYPE	LOCATION
Mt. Washington Hotel	Waste water treatment	Spray irrigation	Carroll
Bretton Woods Waste Water Treatment Facility	Waste water treatment	Collection system (transfer waste water to facility) / Infiltration basin (return water to ground water by artificial recharge)	Route 302, Carroll

**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).**

According to the above report, the entire Ammonoosuc River is identified as possessing the one of the state’s highest natural and recreational resource values, one of 24 river segments on 16 rivers so identified. There are no dams on the upper reach of the Ammonoosuc River and no locations have been identified as proposed sites.

**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.**

## HISTORY OF THE RIVER

The Ammonoosuc River corridor has played a major role in the history of the area. Before the first white settlers, the Abenaki Indians fished and camped along the river, netting fish in the narrow river bends. Ammonoosuc is an Abenaki word for 'fish place,' a very appropriate designation even today. In 1792, Timothy Nash, a moose hunter, crossed the great mountain gap known today as Crawford Notch and opened an invaluable trade route between coast and mountains. Frontiersmen and settlers continued into the area around 1750 when Carroll was originally named Bretton Woods. As early as 1803, room and board was offered to travelers at the site now called Fabyan's. The majority of these pioneers were people of limited means and made their living as hunters, blacksmiths, farmers and lumbermen. In the early 1800's there are records of saw and gristmills being erected along the Ammonoosuc River. A local starch mill was also established and operated which gave employment to some and a market to farmers who sold their potatoes. Historic documents mention large charcoal kilns erected in the area which gave employment to about 300 men.

The prosperity of the area began with the opening of the summer hotels and the coming of the railroad early in the 20<sup>th</sup> century. Trains came to depend on an ever increasing number of tourists from Boston and New York, who came to the several large and small hotels throughout the area. The White Mountain House built in 1845 a mile above the Lower Falls of the Ammonoosuc was a square two story building which could accommodate 150 guests. The Mount Pleasant Hotel was situated a short distance from Fabyan's and overlooked the Presidential Range. The Pleasant View House was also located in the area and was capable of accommodating 25 guests for those who preferred a small house. The Fabyan Hotel stood upon a mound of river gravel that was once known as the Giant's Grave. Locals tell the ancient tale of a Native American curse cast by a Indian maniac who, swinging a blazing pitch-pine torch, which he had kindled at a tree struck by lightning, shouted in the storm this prophecy—"The Great Spirit whispered in my ear, no pale-face shall take deep roots here." This hotel, as many of the local hotels, was destroyed by fire but The Mount Washington Hotel built in 1902 and located along the Ammonoosuc River and in front of the mountain from which it takes its name, still stands. In its heyday, several trains a day brought many tourists to this grand resort. It was the location of the Bretton Woods Monetary Conference in 1944. It was here that 44 countries gathered and established the World Bank and International Monetary Fund. Also located in the hotel is a former 1920s speakeasy still operated as the Resort's nightclub "The Cave". In addition, in 1945 the Hotel served as a caddy camp to recruit young men from inner cities to provide caddies for golfers staying at the luxury hotel. Although the only train passing by these days is the seasonal tourist train from Conway in route to the station at Fabyan's, The Mount Washington Hotel remains a premier resort in New Hampshire.

In 1869, Sylvester March accomplished the impossible when he completed the world's first mountain climbing railway up Mount Washington known today as the Cog Railway located at Marshfield Station in the Thompson and Meserve's Purchase. It was an engineering marvel, a new technology of toothed cog gears, rack rails and tilted boilers. Ulysses S. Grant and his family were among the first passengers to ride the Cog to the mountain summit. The Cog still operates today and is one of NH's most recognizable tourist attractions.

Modernization brought road improvements to accommodate the automobile and tractor trailers. Routes 302 and 3 brought traffic to and from the area from all directions, as the railroads began to

lose popularity. In the 1980's and 90's the interstate highway system reached the North Country with I-93 passing through Littleton and I-91 in Vermont, running parallel to the Connecticut River.  
Sources: Carroll New Hampshire, First 200 Years 1772-1972

Historical Relics of the White Mountains by John H. Spaulding  
History of Coos County, NH by George Drew Merrill

## **HISTORIC SITES AND RESOURCES**

### **National Register of Historic Places**

- Mount Washington Hotel
- The Crawford Family marker- located on US 302 near its junction with Base Station Road, about 4 miles east of its junction with US 3 in Carroll, NH. Erected 1965
- Mount Washington Hotel marker- located on the north side of US 302 at the entrance to the hotel at Bretton Woods. Erected 1978
- Bretton Woods Monetary Conference marker- located on the north side of US 302 at the entrance to the hotel at Bretton Woods.
- Cog Railway Historic Marker along Base Road.

The Town of Carroll and the Unincorporated Towns have identified other locally important cultural and historic structures and sites near the river, some of which are listed below.

### **Locally Identified Historic Sites** (several locations below identified on map 9)

- Twin River Farm and Bobbin Mill
- Bretton Woods Choir Camp
- Old Farm Site
- Brown Co. Logging RR Spur
- Charcoal Kilns
- Crawford Cemetery off Base Road
- Stickney Memorial Chapel
- Herbert Judson Young Memorial Marker

### **(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.**

Town of Carroll recognizes the Ammonoosuc River as a significant resource for both recreation and tourism. The Town of Carroll supported the initial nomination of the Ammonoosuc River into the NH Management and Protection Program. Residents appreciate the rivers beauty as well as its economic importance as a recreational resource.

The Town of Carroll's Master Plans lists the Ammonoosuc River as very significant resource for recreational, wildlife, environmental, economic and scenic purposes.

#### **4. Recreational Resources**

The Upper Ammonoosuc River corridor is well suited for recreation. Encircled by the natural beauty of the area, residents and tourists enjoy swimming, fishing, camping, hiking, hunting, photographing, picnicking, and kayaking.

##### **(a) Fishery**

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

The Ammonoosuc River is an excellent fresh water fishery that offers anglers good access and long stretches of fishing opportunity. Stocking by the NH Fish & Game enhances the opportunities and helps meet the high fishing pressure. The river is stocked along its entire length. According to a Trout Unlimited fisherman, long reaches of the river are exceptional, offering quality pocket waters and pools ideal for fly fishing.

##### **(b) Boating**

**Describe any significant recreational boating opportunities which 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 AMC Guide to Canoeing and Kayaking rates the upper portions of the river as having Class II to IV white water canoeing. One river guide describes the river as follows:

“The Ammonoosuc River is a great run. A smaller river with steeper gradient, the section of the Ammonoosuc we run sports a turny, gravelly, rock strewn character with steady current and several small sections of class I/II rifts. The scenery is fantastic.”

The NH Atlas & Gazetteer describes the river as a “...wilderness river offering thrilling whitewater and Class III rapids; best at high water.” Canoe and kayak rental businesses in the area report that they rent to individuals from all over the country.

The report, “NH River Protection and Energy Development Project”, identifies the Ammonoosuc as being of the “highest significance” in the state for white water boating (canoeing and kayaking).

Kayaking in this segment of the river is dependent on location, season and depth of the river.

##### **(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.**

## **RECREATION SITES ALONG THE AMMONOOSUC RIVER BOTH PUBLIC AND PRIVATE.**

- Lower Falls – Swimming, Fishing, Snowmobile trails, Hiking trails, Cross Country Skiing.
- Bretton Woods Ski Resort- Alpine Skiing, snowboarding and Mountain Biking.
- Mount Washington Resort- Cross Country Skiing, Golf, Horseback Riding, Snow Shoeing and Fishing.
- Upper Falls- Swimming, Snowmobile trails, Cross Country Skiing trails, Hiking Trails and Fishing.
- Lake of the Clouds- Ammonoosuc Ravine Trail and AMC Hut that accommodates 90 overnight guests.
- Mount Deception Campground- privately owned.

### **(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.**

Public access for fishing, kayaking, wildlife viewing and swimming can be found almost any place along the River where there isn't a private residence. NHDOT's Route 302 right of way extends to the river's edge along many portions of the river. There are several informal pull offs along the river that make it easily accessible to the public for recreation. Following are a few of the well-known, favorite access points along the River:

### **AMMONOOSUC RIVER PUBLIC ACCESS**

- Carroll Lower Falls off Old Cherry Mountain Road, parking lot, swimming, fishing, snowmobiling, hiking, cross country skiing and wildlife viewing.
- Carroll Upper Falls off Base Road, informal pull off, swimming, fishing.
- Corner of Base Road and Rte 302 at Bridge, informal pull off, fishing.
- Corner of Rte 302 & entrance to Mount Washington Resort, parking lot, Scenic and Wildlife Viewing only.

## **5. Other Resources**

### **(a) Scenic Resources**

**Briefly describe any significant scenic focal points along the river including designated viewing areas and scenic vistas and overlooks. Indicate the location of the significant views to and from the river. The entire river offers spectacular and varied scenic and cultural vistas. Route 302 from Twin Mountain east to the upper limit of the corridor and beyond has been designated a federal Scenic Byway. Some views are spectacular natural views, such as views of the Presidential Range and Mount Lafayette in the White Mountain National Forest. Others involve a mix of natural and manmade features such as viewing fall foliage along the river as one drives a curving section of Route 302.**

The entire river offers spectacular and varied scenic and cultural vistas. Route 302 from Twin Mountain east to the upper limit of the corridor and beyond has been designated a federal Scenic Byway. Some views are spectacular natural views, such as views of the Presidential Range and Mount Lafayette in the White Mountain National Forest. Others involve a mix of natural and manmade features such as viewing fall foliage along the river as one drives a curving section of Route 302.

A few specific viewing locations include:

- Views of the White Mountains, including Mt. Washington, from many locations along Route 302.
- Views of the Ammonoosuc River and the White Mountains from the Bretton Woods Ski slopes.
- Views of Lower Falls from the walking path adjacent to them.
- Views of Mount Washington Hotel and Mount Washington from the Hotel entrance on Rte302.
- Panoramic Views of the Mountain Range from Lakes in the Clouds AMC Hut located in Sargents Purchase.

#### **(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 land use cover types for this segment of the river corridor is based on the GRANIT map program and the WAP map. Land use in this portion of the river corridor is a complex mix of forestland, wetlands and built-up or disturbed areas. The primarily forested area includes a variety of forest cover types from softwoods (spruce/fir) to hardwoods (birch/aspen). The Bretton Woods area is a mixed use development with areas of forested and wetland acreage. Most of the forest land, however, is located in Crawford's Purchase, Beans Grant, Chandler's Purchase, Thompson & Meserve Purchase and Sargents Purchase. Much of the wetland acreage is included in the forest land cover type because most of it is forested wetland. This area is predominately undeveloped land and some is used for forest management. Commercial and residential buildup areas are rising especially around the Mount Washington Resort and Bretton Woods Ski Resort. Route 302 has bridges over the Ammonoosuc at 3 locations within Bretton Woods. The Base Road also runs along sections of the Ammonoosuc River corridor. There are sections of the railroad from Conway to Fabyan's and the Cog Railway that also fall within the River's corridor.

The Ammonoosuc River Corridor in the Bretton Woods area is in the middle of a development boom with increases in commercial and residential users and a steadily rising population growth. The presence of Interstate 93 and Route 302, which parallels the river, makes the area a desirable location for small-scale commercial development for tourism. The rate of this development has been increasing, with several locations currently in the planning stages. There is growing concern about

the impact of development on the river corridor. The change in land use to commercial, and other high intensity uses has many people concerned in Carroll. The possibility of increased turbidity, higher water temperatures, increased bacteria levels, increased stream bank erosion and more frequent flooding are all concerns that have been raised. Recreational users are also concerned about a decrease in the quality of their river experiences.

A recent study by the North Country Council (Ammonoosuc Valley Mitigation Banking Feasibility Study, 2001) found that most of the land within 250-feet of the Ammonoosuc, even though often within the 100 year floodplain, was zoned for commercial growth and concluded that this could have a significant impact on the ecology of the valley.

### **(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, and subdivision regulations).**

The Town of Carroll's Master Plan was adopted in 1986. Although efforts were made to update it in the past few years, recent surveys from local residents have not yet been documented. The Town Ordinance includes an Aquifer Protection and Excavation of Earth Resources Ordinance. Development approvals are conducted by the Town Planning Board in adherence to the Town Subdivision Regulations and Site Plan Review Regulations. Land use and land density regulations are divided into two areas: Twin Mountain and Bretton Woods. The Upper Reach of the Ammonoosuc falls primarily in the Bretton Woods section of town and development of this area is guided by its own Concept Plan. It is zoned Residential 2, which allows a mixed use of residential and commercial units as well as common open space. The land use permitted and density is based on a percentage chart as applied to the total acreage owned within the district for which the Concept Plan is defined. There are no setback limitations or minimum lot sizes.

Bretton Woods Ski Resort and the Mount Washington Hotel was recently purchased by CNL Income Properties and Celebration Associates who plan to make the area a four star plus resort. The companies inherited a plan by the previous owners to build approximately 1,400 homes near the hotel and ski area approximately 400 of which have already been built. Their 10 year plan will bring 1,000 new residential units to be located around the resort. Recently, subdivision approval from the town was obtained to build their newest community of 199 residential units called Dartmouth Brook located off Base Road. In 2008, a 182 acre Village Overlay District located at the base of Bretton Woods Ski Resort and within the Ammonoosuc corridor, was approved by the town (Attachment 4). It will include a mix of commercial and residential units and allow a more flexible layout of roads and buildings as well as a more flexible height restriction.

### **(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.**

There are no stream gauge stations on the upper reach of the Ammonoosuc River. Currently, the

USGS maintains stream flow gauging stations on the Ammonoosuc River at Bethlehem Junction in Bethlehem, north of the Bethlehem Dam. Continuous records are available for the 68year period from 1939-2007. This and real time data is available at:  
[http://waterdata.usgs.gov/usa/nwis/uv?site\\_no=01137500](http://waterdata.usgs.gov/usa/nwis/uv?site_no=01137500)

**(e) Riparian Interests/Flowage Rights**

**Briefly describe any riparian interests in the corridor, including any known flowage rights, historic water uses, and legislative authorizations or appropriations (for example, a town given legislative authorization to water for public consumption in the 19th century).**

There are no known significant riparian interests or flowage rights along the Ammonoosuc.

**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 Env-C 700 and RSA 483 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.**

The Ammonoosuc River Local Advisory Committee and the Upper Reach Subcommittee would like to thank all of the people who contributed in making this nomination possible. We appreciate your expertise, your knowledge, and especially your enthusiasm and support.

## SUPPORTING DOCUMENTS

- Minutes from The Town of Carroll Board of Selectmen meeting May 12, 2008. Approval and signing of letter of support.
- Letter to Coos County Planning Board Chair
- Q & A pamphlet on Ammonoosuc River Designation
- Ammonoosuc River Fact Sheet NHDES WD-R&L-20
- Eastern Brook Trout Joint Venture: Status and Threats Report, Road Map to Restoration

## SUPPORTING DOCUMENTS AVAILABLE ONLINE

- Ammonoosuc River NHRMPP River Nomination Form. Available online at: <http://www.des.state.nh.us/rivers/documents/AmmonoosucRiverNominationWithMaps.pdf>
- The Ammonoosuc River, A Report to the General Court. Available online at: <http://www.des.state.nh.us/rivers/documents/ReportGeneralCourt.final.pdf>.
- Volunteer Water Quality Monitoring Reports-2005, 2006, 2007. Available online at: <http://www.des.nh.gov/WMB/VRAP/ammonoosuc.html>.
- Ammonoosuc River Corridor Study Phase 1 Report. Available online at: <http://www.townoflittleton.org/docs/arcsphase1.pdf>.
- Ammonoosuc Watershed Regional Conservation Plan. Available online: <http://www.aconservationtrust.org/actplan.pdf>.
- Eastern Brook Trout Joint Venture: Status and Threats Report, Roadmap to Restoration, and Conservation Strategy Draft. Available online at: <http://www.easternbrooktrout.org/index.html>

- ACTIVITIES
- AIRPORT
- ANTIQUES
- CALENDAR
- CAMPING
- CHURCHES
- CONTACT US
- FIRE
- FISH HATCHERY
- HIKING
- HISTORICAL
- HOME PAGE
- LIBRARY
- LOCAL POLICE
- LODGING
- MOOSE VIEWING
- PHOTO GALLERY
- REAL ESTATE
- SERVICES
- SHOP ONLINE
- STATE POLICE
- THE OLD MAN
- TOWN SERVICES
- WEDDINGS

Lat. 44 16' 12.39"  
 Long. 71 32' 27.20"



**WHITE MOUNTAINS TRAIL**  
 (a New Hampshire Scenic Byway)



Trail maps and reports



## Minutes of Town Board Meetings

- Planning Board
  - Board of Adjustment
  - Select Board
- Budget Committee

### Minutes of 05/12/08

*May 18th, 2008*

Carroll Board of Selectmen  
 Meeting Minutes  
 May 12, 2008

"These minutes of the Town of Carroll Select Board have been recorded by its Secretary. Though believed to be accurate and correct they are subject to additions, deletions and corrections by the Select Board at its next meeting when the Board votes its final approval of the minutes. They are being made available at this time to conform to the requirements of New Hampshire RSA 91-A:2."

Minutes recorded by Maryclare Quigley,  
 Secretary

Board members present: Bonnie Moroney,  
 Christopher Hancock

The meeting was called to order at 7:00 PM.

Members of the public present: Roberta McGee, Carmine Fabrizio, John Goodney, Tom Gately, Lisa Covey, Jim Covey, Leslie Bergum, John Trammell

Pledge of Allegiance

The board announced the approval of bills and signing of checks.

Chairman Moroney moved to: accept the minutes of May 5, 2008, as written.  
 Selectman Hancock seconded and the motion

### 2008 Select Board Archives

[Minutes of 05/19/2008](#)

[Minutes of 05/12/08](#)

[Agenda, 05.19.2008](#)

[Minutes of 05/05/08](#)

[Minutes of 04/28/2008](#)

[Minutes of 04/21/2008](#)

[Minutes of 04/14/2008](#)

[Minutes of 04/07/2008](#)

[Minutes of 03/31/2008](#)

[Minutes of 03/24/2008](#)

[Minutes of 03/17/2008](#)

[Minutes of 03/10/2008](#)

[Planning Board Article Election Results](#)

[Warrant Article Election Results](#)

[Officers Election Results](#)

[Minutes of 03/03/2008](#)

[Minutes of 02/25/2008](#)

[Minutes of 02/18/2008](#)

[Minutes of 02/11/2008](#)

[2008 Town Warrant](#)

[Minutes of Deliberative Session 02/05/2008](#)

[Minutes of 02/04/2008](#)

[Minutes of 01/28/2008](#)

[Minutes of 01/14/2008](#)

[Minutes of 01/07/2008](#)

[Minutes of 01/02/2008](#)

[View Archived 2005](#)



passed unanimously.

Stan Borkowski's report has been posted on the bulletin board.

Chairman Moroney announced that the agreement for the Bretton Woods land donation as written up by Bernie Waugh is now with their legal representatives. She will contact Mr. Brunetti to inquire about discussing this at next week's meeting.

The following items were approved and signed:

Letter to NHDES Re: Upper Reach Ammonoosuc River  
 Intent to Cut – Manny Cardoza, New Page Corp.  
 Yield Tax Certificate – Stalaboin  
 Yield Tax Warrant – Stalaboin  
 Water Warrant – M. Saffian , Pleasant North, LLC, Stapleton Properties, Inc.  
 Water Abatement – M. Saffian

Liability insurance and medical insurance discussions were tabled until a future date. There is a lot of information that has just recently been received and the Board needs time to look it over.

Chairman Moroney said that John Jalbert from Wild Wood Products, across the street, had donated a handmade picnic table for the Town Hall -- needless to say, it is greatly appreciated. Chairman Moroney made a Motion to: sign a thank you card, Selectman Hancock seconded, and it passed unanimously. She suggested the office staff might wish to sign it also.

Roberta McGee told the Board that Joan Karpf had been looking on-line for information regarding cemeteries and discovered there's very little about those in the Town of Carroll. Mrs. McGee said they had received permission from Father George to work on the Catholic cemetery (St. Margaret's) and at this time, requested permission from the Board for Mrs. Karpf to help gather data and put it on-line. This will be helpful to a number of people, including those working on their genealogy. The Board thought this was a good idea, and agreed it would be fine.

John Goodney brought in the final draft of the Emergency Operation Plan on which he had made all the annual updates. He had spoken with Jeff Duncan and Bill Rines, both of whom have signed it but there are several signatures which he still needs to get. Chairman Moroney made a motion to: sign it. Selectman Hancock seconded and it passed unanimously. This will be kept in the office and copies will be sent to the State as well as the Federal Government. Chairman Moroney thanked Mr. Goodney for all his hard work, stating that it was greatly appreciated.

Jim Covey told about a service project the Chamber was doing about changing the light bulbs in the gym to something that would be low energy but high efficiency and that would be brighter. PSNH is coming Tuesday to do an audit

## Records

[View Archived 2006 Records](#)

[View Archived 2007 Records](#)

of the whole building, not just the gym and Mr. Covey will accompany them during the process.

Mr. Covey also wanted to address the painting of the Information Booth. He reminded everyone that he had been discussing it, using color chips, for quite sometime. Marketing and publicity professionals have advised that if the color of these buildings is too unobtrusive they will not be seen. (He gave examples of buildings in other towns, on which the color has been changed). This has proven to be the case here--many people have been unable to find it. It is believed that when the project is complete with signage, plantings and flowers, it will help to temper it. Mr. Covey said the goal is to get people to stop and thus to show or "sell" the area -- so they will stay here, not just drive through. He would be happy to have people contact him directly if they wish.

Mr. Covey was asked if the Chamber Music Series will be held again this year and he said they will. He added they still need two more groups, and if anyone has a favorite one, to please let him know.

John Goodney reported that regarding FEMA compliance, he believes NIMS will be doing an analysis on the town as far as what we have and don't have. From this, they will tell us what we need.

Chairman Moroney reminded everyone about the benefit for Eleanor Mason on Saturday, May 17. The doors will open at 6 p.m.

Evan Karpf reminded everyone about Carroll clean up day on Sunday, May 18. He has posters up and is hoping to get some RSVP's because there will be light breakfast food and lunch and they are hoping to have an idea of how much food to plan on. Lunch and a softball game will be at the recreation area. Dr. Karpf suggested if anyone has softball equipment, to bring it! Dr. Karpf also mentioned that he received a grant for \$400 and he had purchased reflective vests which will be kept at the Transfer Station. The Chamber had also given him money which he used to purchase pick-up sticks with and these, too, will be kept at the Transfer Station.

Chairman Moroney noted that the Memorial Day Parade is coming together. This year, it is on Monday, May 26, at 11 a.m. She noted if there are any organizations which would like to participate, they would be more than welcome.

Billy Rines advised that he had received a few more job descriptions as well as some information from Scott Hayes about water. Chairman Moroney had received some from LGC for Road Agent and some for Water Agent which will be printed and given to Mr. Rines. She asked him to look them over for keeping as they are or making changes as he sees fit--but to consider them for use if there is ever a position.

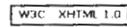
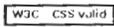
At 7:30 p.m., as there was no additional business, Chairman Moroney declared the meeting ended, and moved to go into executive session regarding town aid. The Board was polled and went into executive session.

At the close of executive session, Chairman Moroney made a motion to: return to public session and seal the minutes from executive session; Selectman Hancock seconded and the motion passed unanimously.

The Board then had a conversation about Bob Morency, (who had planned to attend this meeting but had to cancel), and water meters. He suggested the possibility of setting up an afternoon work session. The Board asked the secretary to contact Mr. Morency to find out the details for such a meeting.

There being no further discussion, Chairman Moroney made a motion to: adjourn the meeting. Selectman Hancock seconded, and the motion passed unanimously. Chairman Moroney declared the meeting ended at 9:10 p.m.

**Twin Mountain** ©2005 all rights reserved

  website ©2005 **notchnet**

**AMMONOOSUC RIVER LOCAL ADVISORY COMMITTEE**  
**95 Dodge Road**  
**Littleton, New Hampshire 03561-3426**

May 9, 2008

Mary Sloat, Chair  
Coos County Planning Board  
PO Box 424  
Lancaster, NH 03584

Dear Ms. Sloat:

On behalf of the Ammonoosuc Local Advisory Committee, I am writing to request your support for the nomination of the Upper Reach of the Ammonoosuc River into the NH Rivers Management and Protection Program.

In 2007 the Ammonoosuc River officially joined the list of designated rivers in the NH River Management and Protection Program. This designated section includes a 44.8-mile segment, which begins at the White Mountain National Forest (WMNF) boundary near Lower Falls in the Town of Carroll and continues until it reaches its confluence with the Connecticut River in Haverhill. In the entire two years of undertaking the nomination process, there had been no encounter of opposition towards this nomination.

Recently, the Ammonoosuc Local Advisory Committee voted unanimously in favor of including the Upper Reach of the Ammonoosuc River into the program. This special segment of the river is rich in history, culture and scenic beauty and provides excellent recreational opportunities to both residents and visitors. Its resources play an important role in maintaining tourism, which is the economic backbone in the area.

River designation increases public awareness and creates a local planning and management effort centered specifically on the river and its resources. It creates an incentive for future development practices, which assures that the valued river resources are maintained.

We hope you agree with our position to include the Upper Reach of the Ammonoosuc River into the NH Rivers Management and Protection Program and will send a letter of support to Steve Couture the Rivers Coordinator at DES. ([scouture@des.state.nh.us](mailto:scouture@des.state.nh.us))

Please feel free to contact me if you have any additional questions or would like to arrange a meeting.

Sincerely,

Charlie Ryan  
Chairman  
Ammonoosuc River Local Advisory Committee  
Charlie Ryan at 444-2398 or [squarepeg@worldsurfer.net](mailto:squarepeg@worldsurfer.net)

## Rivers &amp; Lakes

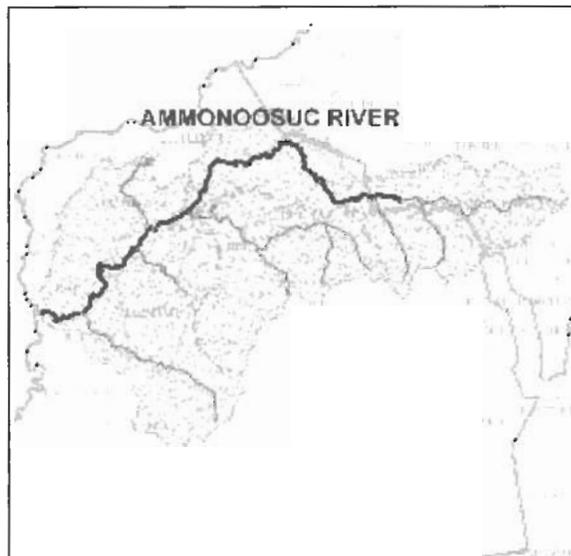
Environmental  
Fact Sheet[Print Version](#)

WD-R&amp;L-20

2007

## THE AMMONOOSUC RIVER

The Ammonoosuc River begins at the Lake of the Clouds on the western slopes of Mount Washington and flows approximately 60 miles west through the town of Carroll to Bethlehem Junction then north to Littleton and southwest through Lisbon, Landaff, and Bath to its confluence with the Connecticut River at Woodsville in the town of Haverhill. The Ammonoosuc River watershed drains an area of over 395 square miles. The entire Ammonoosuc River offers spectacular and varied scenic and cultural vistas.



the Ammonoosuc River and its watershed

The Ammonoosuc River corridor contains a number of historical interest sites including archeological sites and historical buildings. Due to its largely undeveloped landscape, proximity to the White Mountain National Forest and highly diverse natural communities the Ammonoosuc River boasts a large variety of wildlife and plant species. Several recreation areas along the Ammonoosuc River allow for a variety of recreational opportunities along the river, include fishing, boating, and land-based activities. The Ammonoosuc River is highly valued by the surrounding communities as reflected by its inclusion in local planning and protection efforts.

**History**

Ammonoosuc is an Abenaki word for "fish place." Before the first white settlers, the Abenaki fished and camped along the river, netting fish in the narrow river bends, such as Salmon Hole. Six archaeological sites containing evidence of the presence of Native American populations have been documented in the river corridor.

Several historic buildings dating from mid to late 1700s and early to mid-1800s are located within the Ammonoosuc River corridor. Notably, seven buildings are listed on the National Register of Historic Places, including the Bath Brick Store, the Bath Foodall-Woods Law Office, the Bath Jeremiah Hutchins Tavern, the Lisbon Inn, Littleton's Lane House, Littleton Opera House and Littleton's post office.

## Geology

The Ammonoosuc River watershed lies within the Connecticut River watershed and was once part of the great Glacial Lake Hitchcock. The Connecticut River watershed is internationally renowned as a glacial geology research site for the examination of sediment deposition that occurred in Glacial Lake Hitchcock as the ice sheet receded. Glacial till and glacial outwash deposits were the two major types of material deposited in this area. Outwash deposits are important economically for mining purposes, but they also serve as major groundwater-recharge areas.

## Wildlife and Vegetation

The Ammonoosuc River supports an extremely diverse habitat comprised of forest, wetlands, and open space that is home to a variety of wildlife. Its floodplains, wetlands, and large sections of unfragmented lands are critical habitat areas that offer important and often irreplaceable wildlife benefits. The New Hampshire Natural Heritage Inventory reports the presence of five threatened or endangered wildlife species in the Ammonoosuc River watershed, including the bald eagle, peregrine falcon, osprey, upland sandpiper and the state-threatened brook floater (mollusk). The Ammonoosuc River also provides habitat for at least 15 resident cold and warm water fish species.

Many exemplary natural ecological communities exist within the Ammonoosuc River corridor; at least 29 have been identified with most related to special forested or forested wetland environments. The New Hampshire Natural Heritage Inventory lists eight state-endangered plant species as occurring along the Ammonoosuc River: Garber's sedge, chestnut sedge, Bosc's pigweed, green dragon, Kalm's brome-grass, prickly rose, hidden sedge and hairy rock-cress. In addition there are 30 known plant species that are listed at the state level as threatened.

## Recreation

The Ammonoosuc River is a high quality fishery for both cold and warm water species and according to N.H. Fish and Game Department the river is suitable for wild, self-sustaining populations of brook trout. The Ammonoosuc River is stocked annually with Atlantic salmon, rainbow, brook and brown trout.



The Appalachian Mountain Club's *New Hampshire/Vermont River Guide* and the *New England Whitewater Guide* identify the Ammonoosuc River as offering those who canoe and kayak a wide variety of opportunity and skill levels for their sport. Public access for fishing, kayaking, canoeing, and swimming can be found almost anywhere along the Ammonoosuc where there isn't a private residence.

Publicly owned recreation areas include the White Mountain National Forest Zealand Mountain trails in Carroll, the town park in Lisbon, Dells Park in Littleton, the Bath Covered Bridge Picnic Area, and many state and federal snowmobile trails in every town. These areas offer a mix of recreational opportunities including hiking, nature study, picnicking, swimming, river access, recreational fields and snowmobile trails.

## Land Use

The Ammonoosuc River valley is currently experiencing a development boom with increases in commercial and residential users and a population growth exceeding projections. The

presence of Interstate-93 and Route 302, which parallels the river for most of its length, makes the area a desirable location for large and small-scale commercial development. There is growing concern about the impact of development on the river corridor. A rudimentary build-out analysis of the Ammonoosuc River corridor showed the corridor currently consisting of approximately 3,500 lots for an average lot size of 6.7 acres. Based on existing regulations, the number of lots in the corridor could double in the future if every non-protected area was subdivided.

For further information about the N.H. Rivers Management and Protection Program, visit the DES website at [www.des.nh.gov/rivers](http://www.des.nh.gov/rivers), or contact Steve Couture, Rivers Coordinator, PO Box 95, Concord, NH 03302-0095; (603) 271-8801; [scouture@des.state.nh.us](mailto:scouture@des.state.nh.us).



# Eastern Brook Trout: Status and Threats

PRODUCED BY TROUT UNLIMITED FOR THE EASTERN BROOK TROUT JOINT VENTURE





## Eastern Brook Trout: Status and Threats

**Background:** Brook trout (*Salvelinus fontinalis*) are the only trout native to much of the eastern United States. They have inhabited the East's coldwater streams and lakes ever since the retreat of the continental glaciers across New York and New England, and they have thrived in the ancient valleys of the Appalachians for the last several million years. Arguably the most beautiful freshwater fish, brook trout survive in only the coldest and cleanest water. In fact, brook trout serve as indicators of the health of the watersheds they inhabit. Strong wild brook trout populations demonstrate that a stream or river ecosystem is healthy and that water quality is excellent. A decline in brook trout populations can serve as an early warning that the health of an entire system is at risk.

In pre-Colonial times, brook trout were present in nearly every coldwater stream and river in the eastern United States. Sensitive to changes in water quality, wild brook trout began to disappear as early agriculture, timber and textiles economies transformed the eastern landscape by stripping the region's protective forests and filling the streams with sediment and pollution. As streams gained value as highways for log drives, water sources for farming, and prime locations for factories and mills, the resulting loss in brook trout populations mirrored the broader decline in the health of the region's lands and waters.

Many of these threats to water quality and wild brook trout persist today, as our population and resource needs increasingly expand. New challenges associated with urbanization place additional stresses on the eastern landscape and its remaining brook trout habitat.

## A Partnership to Conserve Brook Trout

For many years, the solution to declining brook trout populations was stocking more fish to ensure that fishing opportunities did not suffer. In recent decades, however, state and federal fisheries managers and organizations such as Trout Unlimited have focused on restoring the habitat that brook trout require for their survival. In 2004, in recognition of the need to address regional and range-wide threats to brook trout, a group of public and private entities formed the Eastern Brook Trout Joint Venture (EBTJV) to halt the decline of brook trout and restore fishable populations.

### The Eastern Brook Trout Joint Venture is comprised of:

- Fish and wildlife agencies from 17 states
- Federal support from U.S. Geological Survey, U.S. Forest Service, U.S. Fish & Wildlife Service, National Park Service and Office of Surface Mining
- Conservation organizations including Association of Fish & Wildlife Agencies, Trout Unlimited, Izaak Walton League of America, Trust for Public Land and The Nature Conservancy
- Academic institutions including Conservation Management Institute at Virginia Tech and James Madison University

Members of the Eastern Brook Trout Joint Venture are deeply committed to maintaining and restoring brook trout and the watersheds upon which they depend. This summary report describes the first stage of the Joint Venture's efforts to spearhead a collaborative process to improve brook trout habitat and return one of our most beautiful gamefish to its native range.

The maps and data in this publication are based on "Distribution, Status and Perturbations to Brook Trout within the Eastern United States," a technical report by the Joint Venture's assessment team that will be published later in 2006. This first-of-its-kind assessment paints a comprehensive picture of the condition of brook trout populations across their native range from Ohio to Maine to Georgia. The technical report categorizes a variety of threats to brook trout and their habitat and helps to identify restoration and protection priorities. Using satellite imagery and statistical analysis, the report predicts the status of brook trout in areas that lack population data and identifies different levels of environmental stress that brook trout are able to tolerate before they are likely to disappear.

The technical report identifies where wild brook trout populations remain strong, where they are struggling and where they have vanished. Most importantly, it provides state

and federal agencies, anglers and community leaders with the tools to identify local rivers and streams that are priorities for protection and restoration. Partners in the Eastern Brook Trout Joint Venture are using the technical report and ongoing analyses to develop a comprehensive strategy for state and the federal agencies to protect and restore brook trout on regional and range-wide scales. This will involve advancing data collection, promoting policies necessary for success, and establishing on-the-ground projects to protect and restore brook trout habitat and populations. The data included in the technical report also will serve as a baseline for tracking and measuring the success of protection and restoration efforts over time. This summary report provides an overview of the data and findings included in the full technical report.

## Brook Trout Assessment - Key Findings

The following points summarize the key findings of the technical report:

- Intact stream populations of brook trout (where wild brook trout occupy 90-100% of their historical habitat) exist in only 5% of subwatersheds.
- Wild stream populations of brook trout have vanished or are greatly reduced in nearly half of subwatersheds.
- The vast majority of historically occupied large rivers no longer support self-reproducing populations of brook trout.
- Brook trout survive almost exclusively as fragmented populations relegated to the extreme headwaters of streams.
- Poor land management associated with agriculture ranks as the most widely distributed impact to brook trout across the eastern range.
- Non-native fish rank as the largest biological threat to brook trout.
- Intact subwatersheds of wild brook trout in lakes and ponds are almost exclusively located in Maine, but self-reproducing populations remain in some lakes and ponds in New York, New Hampshire and Vermont.
- More data collection is needed to determine the status of brook trout in various parts of the eastern range, particularly in Maine, New Hampshire, New York, Massachusetts and Pennsylvania.

## Brook Trout Status and Distribution

This summary report presents information on the status of brook trout populations in 17 states in the Appalachian region, an area that represents 70% of the historical range of brook trout in the United States. This report also identifies the principal threats identified by regional experts to the continued viability of brook trout populations on a state-by-state basis.

## Assessment Methodology:

The assessment team collected existing electronic data on brook trout populations from state and federal agencies in 17 states. The team then traveled to each state and met personally with fisheries biologists to review and classify each individual subwatershed. The team used a consistent classification method based on the percentage of historically occupied habitat still maintaining self-reproducing populations of brook trout. Fisheries biologists then used their expert knowledge to list the greatest local threats to wild, self-reproducing brook trout and their habitat.

In total, the assessment team evaluated 11,400 subwatersheds to determine the strength of brook trout populations. While subwatersheds vary in size, they typically contain 25 to 75 miles of streams. Approximately half (5,563) of those subwatersheds historically supported brook trout. The following table presents the current status of brook trout populations in those subwatersheds where brook trout historically thrived.

### Brook Trout Subwatershed Status in the Eastern Range (See following page and pages 18-19 for full map)

Color	Classification	Description	%
	Intact	90-100% historical habitat occupied by self-reproducing brook trout	5%
	Reduced	50-90% historical habitat occupied by self-reproducing brook trout	9%
	Greatly Reduced	1-50% historical habitat occupied by self-reproducing brook trout	27%
	Present, Qualitative Data	Present, but no quantitative data available on populations	19%
	Extirpated	Brook trout have vanished from this subwatershed	21%
	Absent, Unclear History	No brook trout currently present, historical presence unknown	6%
	Unknown, No Data	No quantitative or qualitative data exists	13%

The assessment data tells a somber story of brook trout decline across their range, but the data also offers hope for restoration and recovery in many areas. Strong, healthy subwatersheds do exist, but they are rare. The majority of these intact subwatersheds are located in Maine, New Hampshire, New York, Vermont and Virginia. Pennsylvania, Maryland, West Virginia and the other New England states each possess only a handful of these intact subwatersheds. Brook trout are extirpated from over 20% of the subwatersheds across the Eastern range and have vanished from all streams and rivers within those areas.

Based on scientific, on-the-ground information gathered within the last ten years, the following table shows the states with the greatest percentage of intact and extirpated subwatersheds.

### States with Highest Percentage of Intact and Extirpated Subwatersheds

State	Number of Intact Subwatersheds	Percentage of Total Subwatersheds
Maine	147	14%
Vermont	33	14%
Virginia	36	9%
New Hampshire	21	8%
New York	62*	5%

State	Number of Extirpated Subwatersheds	Percentage of Total Subwatersheds
Georgia	53	58%
Maryland	83	57%
South Carolina	12	44%
North Carolina	95	40%
New Jersey	94	38%

\* New York figure was calculated by multiplying the number of watersheds (5<sup>th</sup> level hydrologic unit) x 2.5, since subwatershed (6<sup>th</sup> level hydrologic unit) data is not yet available for the state. On average, there are 2.5 subwatersheds within any given watershed in New York.

## Threats to Brook Trout and Their Habitat

Eastern brook trout reside in the most heavily populated and intensely industrialized region of the United States. Land use decisions made over the past several hundred years have severely impacted the quality of brook trout streams and rivers--largely by removing streamside trees and increasing sedimentation and nutrient runoff. While some sections of the East have regained forest cover and are healing from the widespread clearing of the eastern forests, other areas are undergoing rapid change as our population, road network and water needs continue to grow.

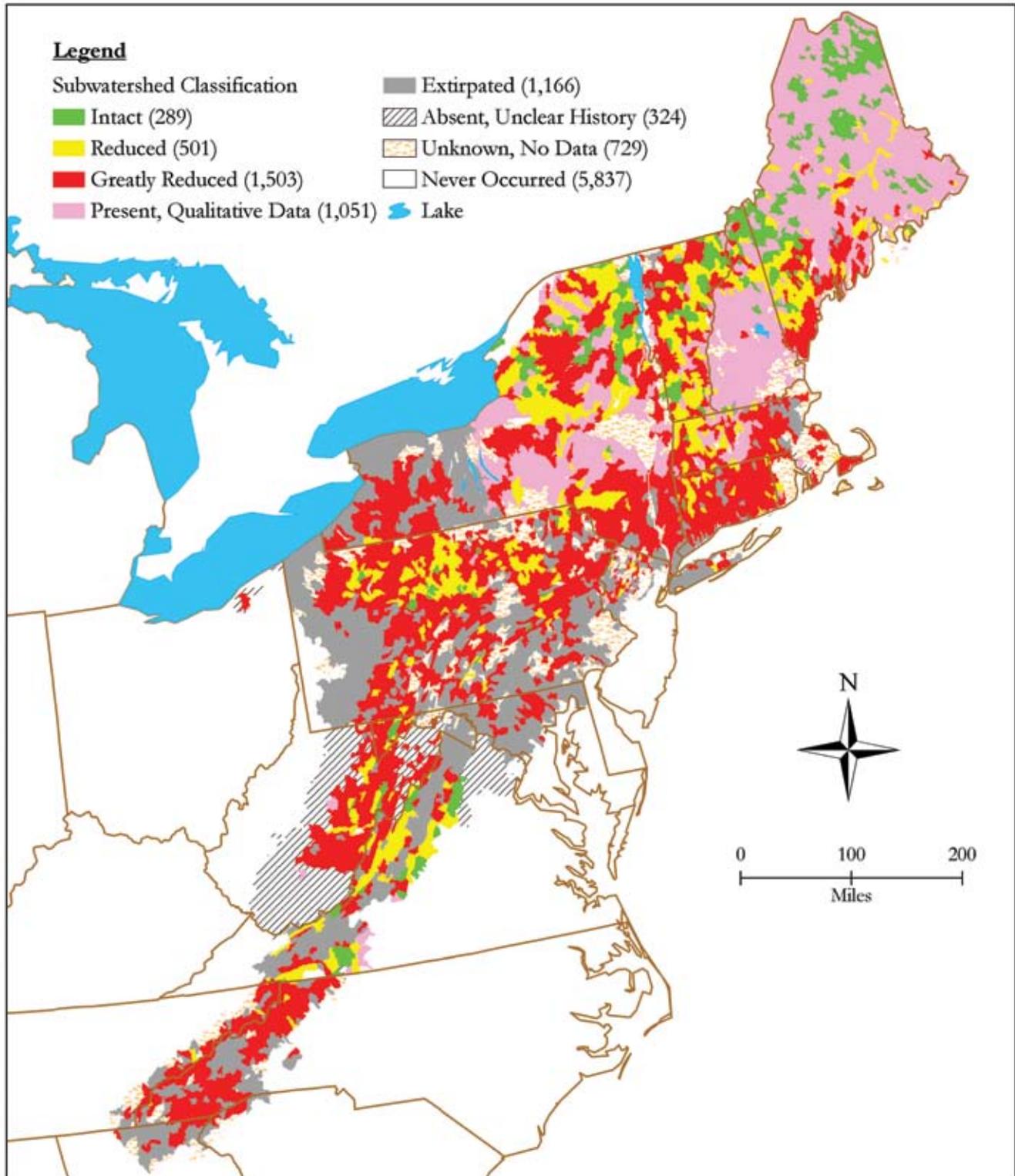
### Primary Threats to Brook Trout

Rank	Disturbances (High or Medium)	Number of Subwatersheds	Percentage of Subwatersheds
1	Poor Land Management	1647	37%
2	High Water Temperature	1629	36%
3	Sedimentation (Roads)	1225	27%
4	One or More Non-Native Fish Species	1189	26%
5	Urbanization	1141	25%
6	Riparian Habitat	1029	23%
7	Brown Trout	853	19%
8	Stream Fragmentation (Roads)	767	17%
9	Dam Inundation/Fragmentation	705	16%
10	Forestry	642	14%

Threats information based on professional opinion of regional experts. Figures do not add to 100% because zero, one, or multiple disturbances may occur in each subwatershed.

# Brook Trout Population Status in the Eastern U.S. Range by Subwatershed

(See pages 18-19 for a larger map)



Map data derived from state and federal data and compiled in EBTJV assessment results titled, *Distribution, status, and perturbations to brook trout within the Eastern United States, 2006*. Authored by Mark Hudy, US Forest Service; Teresa Thieling, James Madison University; Nathaniel Gillespie, Trout Unlimited; Eric Smith, Virginia Tech. Map created on 2/24/06 by Nathaniel Gillespie, Trout Unlimited.

Regional experts listed poor land management associated with agriculture as the most widespread impact on brook trout habitat in the Eastern United States. Poor land management can involve clearing streamside vegetation, over-grazing sensitive areas, ineffectively managing nutrients and ditching small streams. While these practices cause direct damage to water quality, they also contribute to higher water temperatures and degraded streamside areas – the second and sixth greatest disturbances across the study area.

Roads can have a variety of damaging effects on streams. Sedimentation is listed as the third largest impact to brook trout. Runoff of sand and silt from poorly designed or maintained roads can smother brook trout eggs and the aquatic insects that fish eat. In addition, dams and poorly designed culverts or bridges can act as barriers to fish movement. Streams can quickly become fragmented into sections, isolating brook trout populations from each other and limiting their ability to move and find areas of clean gravel to spawn or colder waters in the summer. Dams also increase water temperatures by slowing down flowing water and exposing it to the air and sun.

Non-native species (such as smallmouth bass, rainbow trout and brown trout) are the only disturbance not related to habitat in the top ten regional impacts to brook trout. These fish can out-compete brook trout in high quality habitat by eating them and forcing them out of the more favorable parts of a stream or lake. Non-native fish also can thrive in lower quality waters that once supported brook trout.

Impacts on water quality and stream health are often complex and interrelated. For example, actions such as removing trees from stream banks, allowing livestock in streams or poorly planning urban development can all cause higher water temperatures, increased sediment and impaired habitat. All of these factors make it more difficult for brook trout to reproduce and survive. In most cases, a combination of negative changes to the surrounding land and stream banks--rather than a single disturbance--causes brook trout to decline or vanish from a particular subwatershed.

### Conservation and Restoration Opportunities

Despite their sensitivity to declines in water quality and the introduction of non-native fish, brook trout have managed to persist in countless headwater streams across the eastern United States. Many opportunities currently exist for the restoration of brook trout habitat. For example, working with farmers and other landowners to replant streamside shrubs and trees and fence livestock away from streams can dramatically improve water temperatures and water quality

in a relatively short period of time. Many private landowners are currently partnering with federal and local agencies and non-governmental organizations to protect streams on private land. Because farmers and ranchers own so much land throughout the historical range of eastern brook trout, they have a unique opportunity to be at the forefront of the effort to safeguard water quality and restore brook trout populations through cooperative, incentive-based programs.

A host of other opportunities exist for improving brook trout habitat and restoring populations. Liming and other acid abatement techniques can neutralize acid deposition and abandoned mine drainage and make thousands of miles of streams fishable. Protecting forested watersheds can ensure healthy populations and water quality far into the future. Selective removal of non-native fish where appropriate to protect brook trout is an effective



CLINT FERGUSON

management tool that is gaining increasing popularity among biologists. Replacing poorly designed culverts and removing old dams that block fish movement can reconnect fragmented habitat and strengthen or extend brook trout populations downstream.

People value brook trout not only for their beauty, their delicious taste, and their sportfish qualities, but also as indicators of the broader health of the watersheds where they live. A sentinel of superior water quality, the brook trout will always mirror the health of the Appalachians and the waters that drain from these landscapes. The assessment information summarized in this report provides new perspectives on the status of brook trout and water quality across the East, allowing analysis at range-wide, regional, state and local scales. This assessment sets a benchmark for fisheries managers, policy makers and citizens to track and assess progress in protecting and restoring eastern waters and their native trout. Collective efforts to restore the brook trout will enable us to protect human health, assure clean and sustainable water supplies and preserve our quality of life for generations to come.

The assessment tells a somber story of brook trout decline across their range, but the data also offers hope for restoration and recovery in many areas. Intact stream populations of brook trout (where wild brook trout occupy 90-100% of their historical habitat) exist in only 5% of subwatersheds. Wild stream populations of brook trout have vanished or are greatly reduced in nearly half of subwatersheds. Over 20% of the subwatersheds across the Eastern range are documented to be extirpated, meaning that brook trout have vanished from all streams and rivers within those areas.

Despite their sensitivity to declines in water quality and the introduction of non-native fish, brook trout have managed to persist in countless headwater streams across the eastern United States. Many opportunities currently exist for the restoration of brook trout habitat. For example, working with farmers and other landowners to replant streamside shrubs and trees and fence livestock away from streams can dramatically improve water temperatures and water quality in a relatively short period of time. Liming and other acid abatement techniques can neutralize acid deposition and abandoned mine drainage and make thousands of miles of streams fishable. Protecting forested watersheds can ensure healthy populations and pristine water quality far into the future. Selective removal of non-native fish where appropriate to protect brook trout is an effective management tool that is gaining increasing popularity among biologists. Replacing poorly designed culverts and removing old dams that block fish movement can reconnect fragmented habitat and strengthen or extend brook trout populations downstream.

People value brook trout not only for their beauty, their delicious taste, and their sportfish qualities, but also as indicators of the broader health of the watersheds where they live. A sentinel of superior water quality, the brook trout will always mirror the health of the Appalachians and the waters that drain from these landscapes. This assessment sets a benchmark for fisheries managers, policy makers and citizens to track and assess progress in protecting and restoring eastern waters and their native trout. Collective efforts to restore the brook trout will enable us to protect human health, assure clean and sustainable water supplies and preserve our quality of life for generations to come.

Members of the Eastern Brook Trout Joint Venture are deeply committed to maintaining and restoring brook trout and the watersheds upon which they depend. The information presented represents the first stage of the Joint Venture's efforts to spearhead a collaborative process to improve brook trout habitat and return one of our most beautiful gamefish to its native range.

The maps and data in this publication are based on "Distribution, Status, and Perturbations to Brook Trout within the Eastern United States," a technical report by the Joint Venture's assessment team that will be published later in 2006.

The full summary report (with information on all 17 states in the Eastern range) is available at [www.brookie.org](http://www.brookie.org).

# Eastern Brook Trout:



## Status and Threats New Hampshire



Brook trout (*Salvelinus fontinalis*) are the only trout native to much of the eastern United States. Arguably the most beautiful freshwater fish, brook trout survive in only the coldest and cleanest water. In fact, brook trout serve as indicators of the health of the watersheds they inhabit. Strong wild brook trout populations demonstrate that a stream or river ecosystem is healthy and that water quality is excellent. A decline in brook trout populations can serve as an early warning that the health of an entire system is at risk.

Eastern brook trout reside in the most heavily populated and intensely industrialized region of the United States. Land use decisions made over the past several hundred years have severely impacted the quality of brook trout streams and rivers--largely by removing streamside trees and increasing sedimentation and nutrient runoff. While some sections of the East have regained forest cover and are healing from the widespread clearing of the eastern forests, other areas are undergoing rapid change as our population, road network and water needs continue to grow.

In 2004, in recognition of the need to address regional and range-wide threats to brook trout, a group of public and private entities formed the Eastern Brook Trout Joint Venture (EBTJV) to halt the decline of brook trout and restore fishable populations. The information presented in this brochure represents the first stage of the Joint Venture's efforts to spearhead a collaborative process to improve brook trout habitat and return one of our most beautiful gamefish to its native range from Maine to Georgia. Further background information and data are included in the Joint Venture's summary report "Eastern Brook Trout: Status and Threats."

PRODUCED BY TROUT UNLIMITED FOR THE  
EASTERN BROOK TROUT JOINT VENTURE



# New Hampshire:

The majority of New Hampshire lacks quantitative brook trout population data for streams, and brook trout status is unknown in the vicinity of Concord and Manchester. Much of northern New Hampshire maintains intact brook trout habitat, including portions of the White Mountains. Only 1% of the state's lake subwatersheds are known to be intact, while 90% of subwatersheds have no data on lake populations of brook trout.

Brook Trout Classifications	Number of Subwatersheds	Percentage of Subwatersheds
Intact (>90% habitat occupied)	21	7%
Reduced (50-90% habitat occupied)	13	5%
Greatly Reduced (<50% occupied)	13	5%
Present, Qualitative Data Only	195	70%
Extirpated	0	0%
Absent, Unclear History	0	0%
Unknown, No Data	37	13%
<b>Total</b>	<b>279</b>	<b>100%</b>

**Population Status:** In New Hampshire, 7% of subwatersheds are known to support intact, self-reproducing populations of brook trout. These subwatersheds (including the Upper Connecticut River system and the Magalloway, Dead Diamond and Swift Diamond Rivers) represent most of the intact brook trout habitat remaining outside of Maine. Portions of the White Mountain National Forest also support intact subwatersheds, although other areas are reduced or only qualitative data is available. Throughout the majority of the state (70% of subwatersheds), brook trout are known to be present, but insufficient scientific documentation prevents experts from classifying the status of the populations.

New Hampshire boasts over 279 subwatersheds that historically held lake populations of brook trout. For the majority of these subwatersheds (88%), brook trout population status is unknown. Only 1% of subwatersheds are documented as intact - where more than 90% of historical lake and pond habitat is currently occupied by wild, self-reproducing brook trout.

**Threats:** Like most of New England, New Hampshire suffers from a legacy of intensive timber cutting. Deforestation, associated sedimentation and channelization for log drives degraded stream habitat and depleted many brook trout populations. Regional biologists ranked road sedimentation as the number one threat to brook trout in New Hampshire. Road construction and poorly maintained roads can increase sedimentation and impair water quality. Non-native fish, particularly rainbow trout, were ranked as the second and third most widespread disturbances to brook trout statewide. Smallmouth bass pose a specific threat to lake and large river populations of native brook trout in this state.

Acid deposition impacts are highest in the southern portion of the White Mountain National Forest and west of Concord

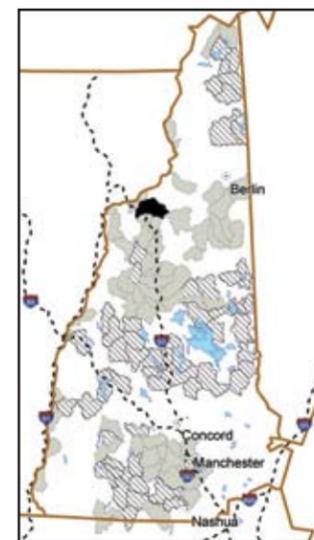
and Manchester. In addition, poorly designed road culverts and dams fragment brook trout habitat and restrict fish movement.

State agencies have been working closely with fish habitat biologists to ensure that best design practices minimize the impact of road culverts on brook trout. In addition, habitat restoration work is ongoing in impacted areas to restore vegetation and instream habitat damaged by historical logging and log drives.

Disturbances (High, Medium or Low)	Number of Subwatersheds	Percentage of Subwatersheds
Sedimentation (Roads)	108	45%
1 or more Non-native Fish	95	39%
Rainbow Trout	74	30%
Acid Deposition	69	28%
Stream Fragmentation (Roads)	66	27%
Dam Indundation/Fragmentation	57	24%

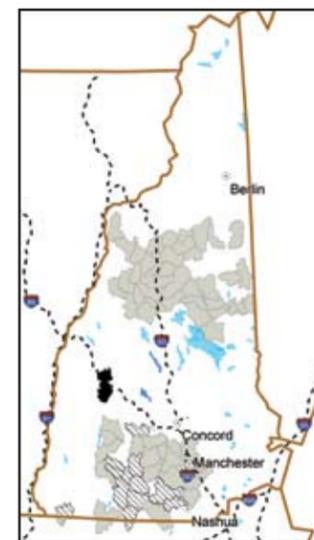
*Threats information based on professional opinion of regional experts. Figures do not add to 100% because zero, one, or multiple disturbances may occur in each subwatershed.*

## Road Sediment Impacts to Brook Trout in New Hampshire by Subwatershed



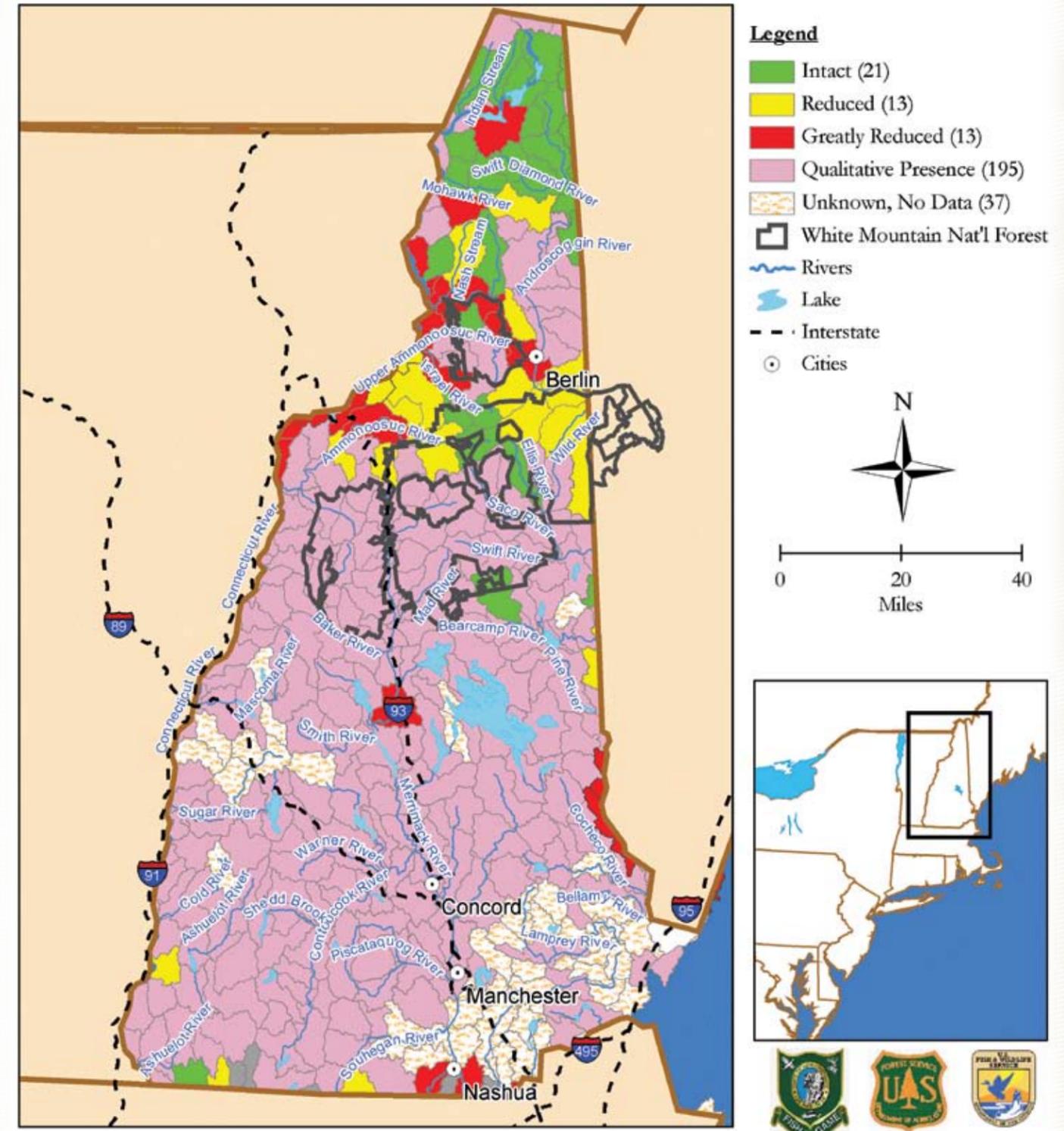
**LEGEND**  
**Sedimentation (Roads)**  
 ■ High Impact (1)  
 ■ Medium Impact (57)  
 ▨ Low Impact (50)  
 --- Interstate  
 ● Cities  
 ○ Lake

## Acid Deposition Impacts to Brook Trout in New Hampshire by Subwatershed



**LEGEND**  
**Acid Deposition**  
 ■ High Impact (1)  
 ■ Medium Impact (56)  
 ▨ Low Impact (12)  
 --- Interstate  
 ● Cities  
 ○ Lake

## New Hampshire Brook Trout Population Status by Subwatershed



Map data derived from state and federal data and compiled in EBTJV assessment results titled, *Distribution, status, and perturbations to brook trout within the eastern United States, 2006*. Authored by Mark Hudy, US Forest Service; Teresa Thieling, James Madison University; Nathaniel Gillespie, Trout Unlimited; Eric Smith, Virginia Tech. Map created on 2/24/06 by Nathaniel Gillespie, Trout Unlimited.





# Eastern Brook Trout: Roadmap to Restoration



# Eastern Brook Trout: Roadmap to Restoration

## Our Brook Trout Heritage

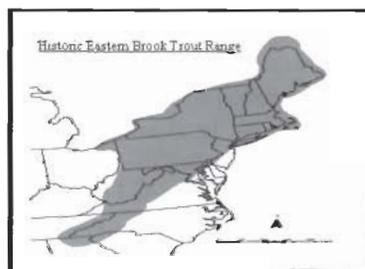
**T**he brook trout is an American symbol of persistence, adaptability, and the pristine wilderness that covered North America prior to European settlement. It is the only native trout that inhabits the cold, clear streams of the eastern United States. It is the state fish in many eastern states and is a prized sport fish by anglers. It is truly a heritage fish species.

Unfortunately, historical land uses have taken a toll on our landscape, greatly diminishing the presence of brook trout throughout its native range. Today it is estimated that less than 9% of the areas that historically supported brook trout are intact. Most brook trout are relegated to headwater streams, where forest cover is still prevalent. Unable to thrive in poor quality water or degraded habitats, brook trout are excellent indicators of clean water and healthy aquatic systems. Their disappearance within a watershed indicates environmental decline. The documented decline of brook trout throughout their eastern range should serve as a warning about the state of our nation's waters.

The situation is certainly not hopeless. Through a coordinated and focused effort, we have a unique opportunity to reverse the trend of brook trout decline by restoring habitat and improving water quality, to benefit both brook trout and human habitat for generations to come.

## The Eastern Range of Brook Trout

**The Joint Venture's Vision: Healthy, fishable brook trout populations throughout their historical range. In 1969** MacCrimmon and Campbell published this map of the pre-European range of eastern brook trout. This area is treated as the boundary of brook trout populations in the East, even though additional brook trout habitat exists in the upper Midwest. The study area represents approximately **70% of** the brook trout range in the US, and about 30% of the brook trout



**Continued on  
next page ▶**

Clint Ferguson



## Status of Eastern Brook Trout within the Study Area:

- ▶ **Watersheds with survey data (62%)**
  - Less than 9% is 'intact'
  - 14% area is 'reduced'
  - 43% is 'greatly reduced'
- 33% shows brook trout have been lost
- ▶ **Other Watersheds (38%):**
  - 50% is predicted present
  - 37% are unknown with no data
  - 12% have an unknown history of presence
- ▶ **Most large rivers no longer support reproducing populations.**
- ▶ **Brook trout largely have been relegated to small headwater streams.**

See the full assessment report at [www.easternbrooktrout.net](http://www.easternbrooktrout.net) or call your state fishery agency to learn more about brook trout status and threats.



## Working Together to Bring Back Brook Trout

The National Fish Habitat Action Plan (National Habitat Plan) is leading a landmark national effort to improve our nation's fish populations, improve water quality of lakes and streams, and increase recreational fishing opportunities. In 2004 state and federal agencies, conservation groups and academics concerned about the decline of eastern brook trout formed the Eastern Brook Trout Joint Venture as a pilot partnership under the National Habitat Plan umbrella. The Joint Venture partnership provides leadership in brook trout conservation at many scales throughout its eastern range. It organizes and builds from the strengths of the individuals, organizations, foundations, businesses and public agencies committed to and active in brook trout conservation and restoration.

◀ Continued from previous page

range in North America. For the purpose of this document, "range-wide" refers to the study area depicted here.

Brook trout have adapted to the broad range of conditions existing from Maine to Georgia. Although severe alterations to its habitat occurred over the centuries, the fish persists in every state within its original eastern range. The map on page 3 describes the findings of the Joint Venture's 2005 brook trout assessment work. Though the fish persists, its overall condition across its range is severely impaired.

---

## Where are we on the Roadmap?

The first step of any journey is to know the starting point. The Joint Venture's first scientific step was to develop the needed information to form a basis for future conservation decisions. Joint Venture scientists worked with fishery professionals from state and federal agencies, private firms and universities to bring together the existing information and professional knowledge concerning brook trout across its eastern range. The Joint Venture scientists, in concert with 17 state fishery agencies, assessed each of more than 11,400 eastern subwatersheds (indicating a stream's drainage boundary- hereafter called 'watersheds') with an average size of about 22,000 acres. The team determined brook trout status, impairments and threats within each of these detailed planning units where information was known. These known watersheds form the foundation for the range-wide conservation strategy.

One major finding of that assessment is that in about 38% of the watersheds, documented information was not available to make definite statements about the condition of brook trout populations. In about half of these undocumented watersheds, models do predict the presence of brook trout. Additional information is needed to fill the gaps in the remaining watersheds. In some, we may never know whether brook trout ever existed.

The watersheds were assessed for population presence, integrity and range within the watershed. They were also assessed for threats and perturbations which could impair or are impairing populations. In the instances where total loss has occurred, the probable cause was identified. The resulting information conveys the condition, threats and causes of impairment to brook trout for all known areas within the historical eastern range.

The condition of brook trout within each watershed is conveyed using the colors on the map. Green, or Intact, means brook trout inhabit more than 90% of their original range within the watershed. Yellow, or Reduced, means that 50-90% of the watershed's original range is inhabited. Red, or Greatly Reduced,

### The Joint Venture Approach

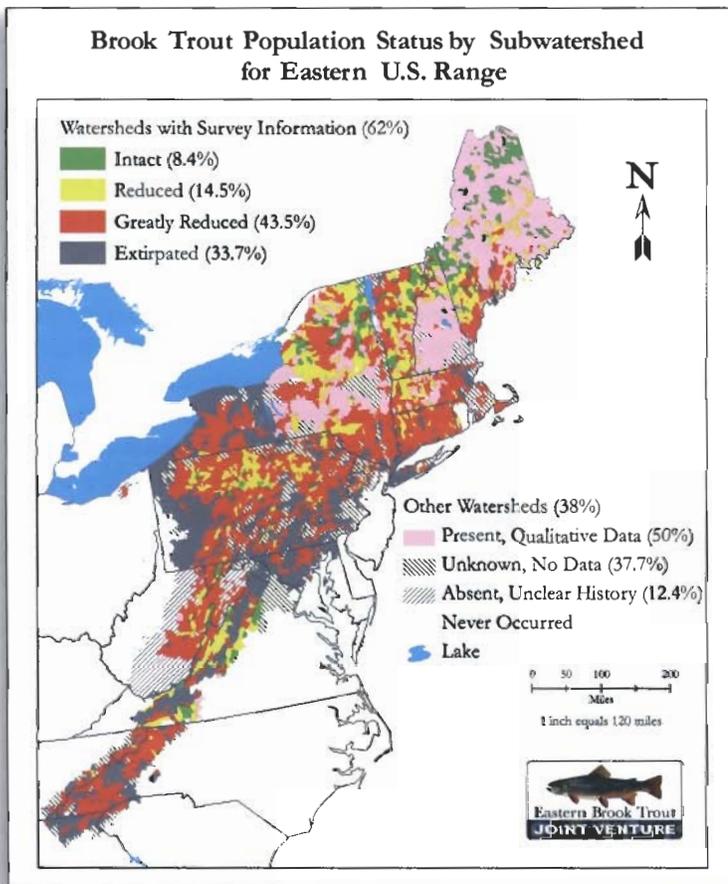
Building from its landmark assessment work, the Joint Venture has developed a Conservation Strategy that provides the blueprint for brook trout conservation and restoration priorities range-wide.

As it moves forward, the Joint Venture and its partners have a roadmap for the conservation and restoration of brook trout based on historical range, population integrity, habitat quality (including water quality) and vulnerabilities.

The Joint Venture has committed to a set of goals that will guide its conservation decisions at all levels of activity.

means that 0-50% is inhabited. Gray, or Extirpated, means total loss of brook trout populations within the watershed. The Joint Venture uses the color coded map to measure its progress throughout the eastern range.

The current status of brook trout by watershed—our starting point—is shown below:



### Conservation Goals

Conserve, enhance or restore brook trout populations that have been impacted by habitat modification, non-native species and other population level threats.

Encourage partnerships among management agencies and stakeholders to seek solutions to regional environmental and ecological threats.

Develop and implement outreach and educational programs to ensure public awareness of the challenges that face brook trout populations.

Develop support for program implementation to perpetuate and restore brook trout populations throughout their historical range. Using the road map, the Joint Venture and its partners encourage interested individuals, local and tribal governments, organizations, foundations and agencies to contribute at the appropriate scale.

### Conservation Scales:

Brook trout conservation occurs at four scales, or levels:

- 1. Range-wide:** The four conservation goals and five range-wide conservation objectives have been identified at this scale to guide activities at more focused scales.
- 2. Regional:** Regional teams, led by state fish management agencies, identify focus areas, set measurable objectives, and determine preferred approaches to contribute to range-wide goals at the regional level.
- 3. State:** States identify target watersheds, develop statewide measurable objectives and identify conservation approaches that will contribute to regional objectives.
- 4. Local:** Local partnerships will develop projects that support the objectives outlined by the states, working with Joint Venture partners to acquire resources to complete projects.

# The Eastern Brook Trout Conservation Strategy

**T**he Joint Venture's Conservation Strategy is directed by range-wide objectives to guide conservation efforts across the eastern range of brook trout. Range-wide objectives are broad statements of expected performance by the year 2025.

Although many issues affecting brook trout are range-wide in scale, conservation issues and needs do vary across the range. The Joint Venture partners divided the 17 states into three distinct regions defined by common conservation challenges and priorities. Each region will be led by a regional fishery team, which will pursue regional objectives in support of the broader range-wide goals. The regional objectives represent expectations to be achieved by 2012.

The regional approach offers several advantages. Its scale supports localized science and technology gains. In addition, the shorter five-year time horizon for goal completion provides a midterm report card. Furthermore, the regional objectives are closely tied to state conservation strategies, creating linkages between the states' practices and the Joint Venture's objectives. The regional scale introduces the idea of 'Healthy' watersheds as a planning component, which combines the Intact (green) and the Reduced (yellow) categories.

Success in meeting these objectives will be a significant stride toward meeting the vision of the Joint Venture. Success will require widespread cooperation among focused efforts on priority watersheds, and will require large resource infusions through public and private sources. The Joint Venture, working with the National Habitat Plan, will use the Conservation Strategy as its blueprint for raising and using resources at the state level. Its success will be measured against the baseline status of brook trout, defined in the 2005 assessment work.

Listed below are the five overarching range-wide objectives, to be completed by 2025. Under each range-wide objective is a specific regional goal or set of goals to be completed by 2012. Current projects related to each objective are pictured.



I.

Heath Brook at Acadia National Park, ME, contains one of the 'best of the best' brook trout populations. The Park

supports brook trout populations known as 'salters' that spend a portion of their life in coastal marine estuaries. However, the culvert shown above prevents fish from moving under the road when returning from the sea.

**I. Maintain the current number of intact watersheds. We will conserve the 289 Intact watersheds.**

**Maintain watersheds as Healthy (defined as green or yellow):**

This regional objective reflects the states' intention to protect the 'best of the best' in each state, including those states which do not contain any Intact watersheds. This will ensure that the 'best of the best' is protected in each region. Most of the Intact watersheds are located in the Northern region, so high value is placed on the rarer 'best of the best' in the other regions. Because the majority of Intact and Reduced watersheds occur in the north, the Northern Region will direct more effort toward accomplishing this objective.

**II. Establish self sustaining brook trout populations in 10 % of the known extirpated watersheds. We will bring back the brook trout, changing 116 gray watersheds to red.**

**By 2012, establish 44 self sustaining brook trout populations in watersheds where none existed in 2005 (remove gray):**

Successful re-establishment of wild populations restores brook trout to their historical areas, connects isolated populations, and provides the foundation for expanding populations, habitat and fishable streams. Fisheries managers will identify appropriate watersheds and stream reaches that could potentially support wild brook trout populations. Managers believe opportunities exist, and this regional objective reflects optimism that almost 40% of the long term goal will be achieved by 2012.

II.

At Aaron's Run, MD the Western Maryland Resource Conservation and Development Council is leading a partnership of state and federal agencies and conservation groups to remediate all sources of habitat degradation, particularly acid mine drainage, to improve water quality and restore four miles of stream. Once completed, brook trout will be reintroduced to the stream, returning a population that was once lost.



**III. Change the classification of 30% of the watersheds. We will strengthen the populations we have, changing red watersheds to yellow and yellow watersheds to green.**

**By 2012, change 45 Reduced (yellow)/Greatly Reduced (red) watersheds to Healthy (yellow or green):** Active conservation applied to watersheds with the potential to improve brook trout population and habitat range is expected to create classification changes in 45 watersheds evenly distributed throughout the regions. Regional fishery professionals agree this objective may be the most difficult to attain with the current resource investment levels. Wholesale, landscape change of this magnitude will require committed resources to accomplish this objective.

**IV. Maintain and improve 70% of watersheds. We will curb the decline of population loss, preventing yellow watersheds from going red, and red watersheds from going gray, while maintaining or strengthening red and yellow watersheds.**

**By 2012, strengthen Healthy watersheds range-wide:** Efforts to improve 'reduced' (yellow) watersheds may fall short of crossing over to the 'Intact' (green) classification, but the work does have immense value in setting the stage for future improvement. The mid-Atlantic region will make the greatest contribution to this objective, since enhancement activities are a priority for healthy watersheds. Overall, 46 watersheds are the target for this objective.

**By 2012, strengthen 45 Greatly Reduced watersheds:** Actively strengthening reduced populations supports the range-wide vision by avoiding vulnerability to extirpation and provides foundation work for classification changes in subsequent planning periods.

**By 2012, maintain 70% Greatly Reduced watersheds in existing condition:** Avoiding loss of condition within the watershed is equally – if not more -- important at the vulnerable Reduced level as it is at the Intact level. To prevent landscape-scale backsliding to extirpation, the regional strategies support maintaining status quo on 'greatly reduced' (red) watersheds.

**V. Determine status of unknown watersheds to validate the model used to predict unknown watersheds. We will improve our knowledge of brook trout population health and distribution by validating the factors used to predict presence of brook trout.**

**By 2012, assess 50% of predicted watersheds to validate model:** Data are lacking to confirm brook trout status for many watersheds in the northern region. To fill the gap in conservation management decisions, models were used to predict status. The validity of predicted values needs to be tested by ground truthing the results.

### III.

Partners are working on the White River, VT to improve stream and watershed conditions to save imperiled populations that we may soon lose if action is not taken. Livestock will be fenced from the stream and floodplain, trees will be planted to shade the stream, and fish friendly crossings will be installed to reduce erosion and decrease water temperatures. This will provide improved habitat for spawning and rearing of brook trout.



### IV.

Upper Kettle Creek, PA currently supports a population of brook trout that is stable but not

thriving. The picture illustrates the long riffle-run complexes that make up most of the stream habitat in north central PA. Physical habitat improvements will create pools, reduce bank erosion, and create more cover for the stream. These improvements will help us meet our objective of maintaining stable populations while working toward growing healthy fishable populations.

### V.

Students at West Virginia University conduct fish surveys to determine the condition of brook trout populations in streams where information is currently unavailable or insufficient. This and other survey efforts will help us 'fill in the gaps' in our understanding of the overall condition of brook trout across its eastern range.



## CASE STUDY

### g habitat fragmentation

#### Stevensville Brook, Mount Mansfield State Forest, Vermont

Habitat fragmentation caused by barriers to fish such as dams, road crossings and culverts has been identified as one of the principal threats to brook trout populations in the northern region. Chris Smith, Partners for Fish and Wildlife Program State Coordinator, U.S. Fish and Wildlife Service, is leading a partnership project to replace an existing failed culvert with a bridge to enable the year-round upstream movement of brook trout on Stevensville Brook. With financial support from the Eastern Brook Trout Joint Venture and other partners, the project was completed in 2007. It will serve as a model for barrier removal in other parts of the northern region and throughout the range of eastern brook trout.

#### Stevensville Brook Project Partners:

- Vermont Fishery
- Partners For Wildlife Program



The top photo shows the culvert in question at Stevensville Brook. Brook trout will pass through the culvert in one direction, but not able to pass upstream. The fish that pass through the culvert are isolated from upstream populations. The lower photo shows the new bridge installation allowing passage in both directions. Road bridges like this allow isolated fish to reconnect and build more robust populations.



## Northern Region

The last, best stronghold for brook trout in the eastern United States is in the northern region. More intact populations are found in this region than in the other two combined. It is the only region that contains all four distinct adaptations of brook trout: riverine, stream, lake dwelling and sea-run. Although the north has large tracts of uninhabited public and private land, brook trout are severely threatened by human impacts.

### Challenges in the North Region:

- Sediment and high water temperature caused by land use changes
- Fragmented populations from dams and culverts
- Exotic species such as smallmouth bass and non-native trout

### Management Priorities:

- Protect intact (green) populations
- Determine status of "predicted" watersheds
- Reduce habitat fragmentation
- Improve water quality
- Build partnerships

### How can you help?

- If you see a possible barrier to fish, contact your local state fish biologist or Partners for Fish and Wildlife Coordinator.
- Before placing culverts, consult with a fisheries professional to ensure the crossing poses no barrier to fish passage.
- Get involved: Work with land managers to identify and document fish passage barriers in favorite brook trout habitat.



Changes in land use affect the streams and fish living there. As urban areas expand into brook trout habitat, land use changes remove forest cover, create storm water erosion problems, and heat the water as it passes over pavement. Consideration of these factors when planning and developing land can minimize the effect on the streams and the brook trout inhabiting them.

# State Conservation Strategies

The Joint Venture is comprised of 17 states within the historical eastern brook trout range. The states address brook trout conservation by identifying priority watersheds for protection, restoration or strengthening. State plans also prioritize the assessment, monitoring and research needs based on the local conditions within the state. Many states included outreach, capacity building and educational strategies that will create awareness, build resources, and provide learning opportunities for students and stakeholders. Some states include economic factors, such as sport fishing benefits, in their brook trout conservation plans.

These 17 state planning efforts serve as the basis for the regional and range-wide conservation objectives and strategies presented in this document. The state level is where most of the watershed restoration and conservation opportunities and work occur. To demonstrate the level of detail and purpose, West Virginia's plan is a good example.

The state of West Virginia established the West Virginia Brook Trout Conservation Group. In 2006, they developed a state conservation strategy to focus resources, build partnerships and promote local action to restore brook trout habitat. Using the Eastern Brook Trout: Status and Threats report, three operational regions with target watersheds were identified for concentrated efforts. Specific streams were then identified for restoration by 2012.

One of the priority areas West Virginia identified is the Upper Potomac Headwaters. In 2005, Trout Unlimited partnered with Dominion to create the Upper Potomac River Home River Initiative, where project partners are coordinating resources to implement a watershed scale restoration of brook trout habitat. To date, riparian forests are being restored by using native riparian plant materials and fencing livestock out of riparian areas. Instream habitat improvements and abandoned mine drainage plans are moving forward. Dominion's contribution provided seed funds to identify and develop project opportunities utilizing existing state and federal programs. These projects are being implemented on public and private land.

The Joint Venture hopes to replicate this kind of public and private partnership throughout the eastern range of brook trout because it is good for the brook trout, habitat and people. It shows results.

## Project Partners:

Local landowners

Dominion

Trout Unlimited

West Virginia Division of Natural Resources

U.S. Forest Service/Monongahela National Forest

Natural Resources Conservation Service

U.S. Fish and Wildlife Service

Farm Services Agency

Office of Surface Mining

WV DEP Non-point Source and AML

WV Conservation Agency

U.S. EPA Non-point Source

Potomac Headwaters Conservation District

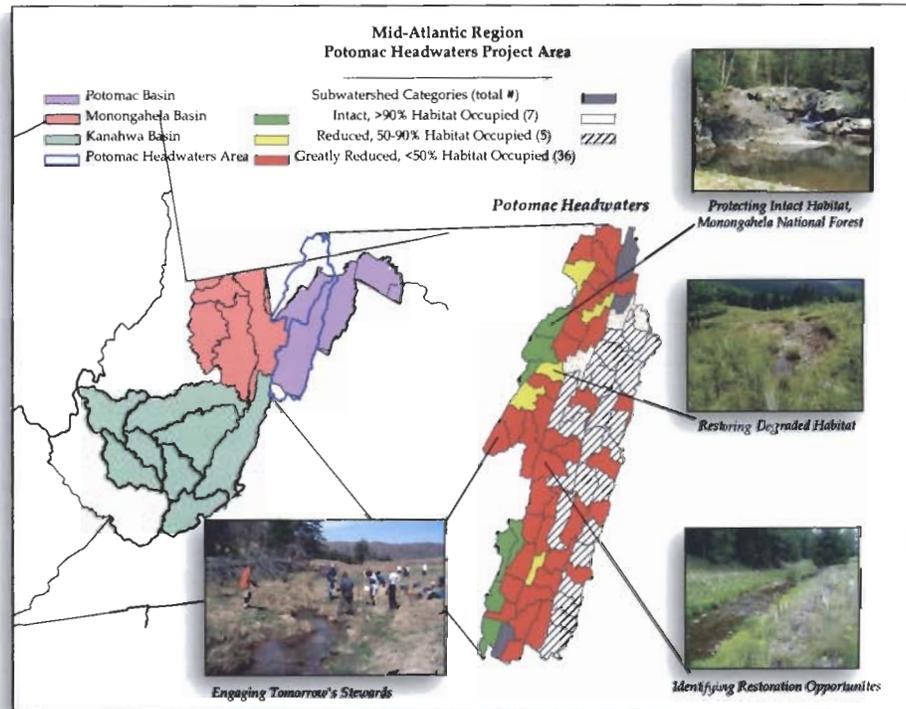
The Mountain Institute

Pendleton County Schools

Harpers General Store

North Fork Watershed Association

West Virginia Conservation Agency





Clint Ferguson

## Call to Action for brook trout restoration:

**T**he Eastern Brook Trout Joint Venture will be successful when people, organizations, businesses, foundations, and scientists work together to conserve and restore brook trout. By doing so, we will promote healthy streams, lands, wildlife and people. This is about handing off a vibrant gift, the brook trout, to future generations.

### **The individual's role:**

**Be the eyes and ears:** Be observant of streams and changes. Sometimes these changes can be subtle, like changes in color. Sometimes they can be overt like channelization, damming and poor land management. Contact your state wildlife agency when you see something that doesn't look right. Being the eyes and ears for the professionals extends and focuses the outreach and education efforts to the right audience.

**Get involved in land use decisions:** Planning boards, conservation districts, townships, counties and most public land management agencies ask for public input. Be there and ask the question "How does this affect brook trout?" Provide support for brook trout and efforts to improve brook trout habitat.

**Educate yourself:** The Joint Venture website contains lots of practical, usable information about brook trout and brook trout conservation. Educate yourself, then use your education to inform, influence and instill brook trout conservation into decisions involving brook trout or its habitat.

**Donate your time to do stream work:** Get involved with monitoring, restoration, watershed planning or resource boards. The website [www.easternbrooktrout.net](http://www.easternbrooktrout.net) has a list of contacts for each state – use it.

### **The conservation organization's role:**

**Support Brook Trout:** Brook trout are a notable keystone species because they indicate other conservation needs are being met.

**Join the Eastern Brook Trout Joint Venture:** The structure of the Joint Venture is designed to allow organizations to participate at the most appropriate level -- from range-wide to project level. Find the niche that best fits your organization.

**Read the Eastern Brook Trout Conservation Strategy:** Many organizations share conservation goals with the brook trout. Knowing how the Joint Venture works at all levels will provide many partnering opportunities for mutual benefits between non-traditional partners.

## **The watershed association's role:**

**Determine if your watershed is within the historical brook trout range:** Contact your state wildlife agency to determine if brook trout are present, or historically were present, within the boundaries of your watershed. If so, then the ultimate success of the organization's goals might be intact populations of wild brook trout.

**Read the Brook Trout Conservation Strategy:** There may be common interests between your watershed goals and the goals of the Joint Venture. In fact, your project could receive funding and resources from the Joint Venture or its partners. Work with your state agencies to take advantage of the resources available.

**Educate the membership:** The motivation and momentum of watershed activity is the membership. The Joint Venture has several educational offerings at the web site available at no cost, including presentation materials.

## **The business' role:**

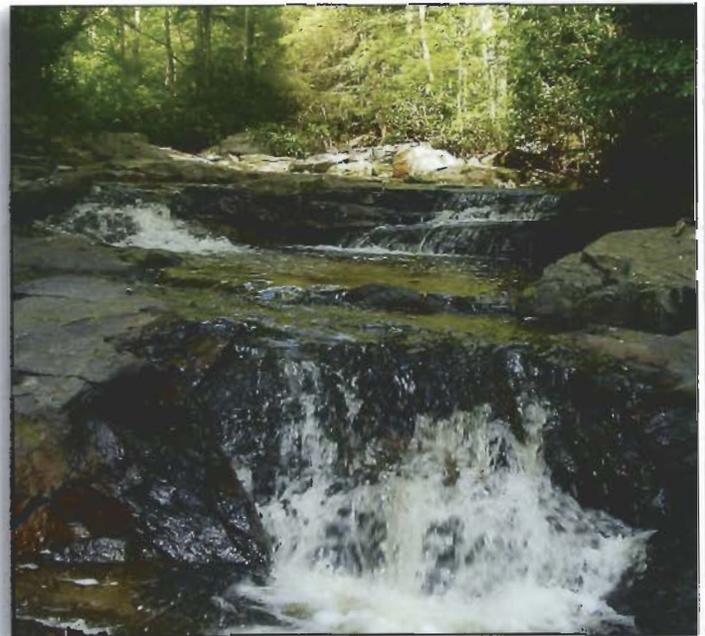
**Implement brook trout friendly policies:** Corporate policies that are brook trout habitat-friendly can make an enormous contribution to success of the restoration of brook trout, and may qualify for tax incentives. Depending on your activity, conscientious business planning can substantially minimize impact and improve brook trout habitat.

**Contribute your expertise or resources:** Businesses have many varied and valuable assets and specialties that could support this program. From public relations talent to equipment rental, conservation easements to corporate volunteer programs, business contributions are needed and highly valued.

**Donate matching funds:** Many grants and federal programs need local private match funds. Business contributions can be leveraged by as much as 900% for certain programs used with the restoration activities surrounding brook trout. Consider donating to this cause, and use the donation for tax reduction purposes.

All individuals, organizations, associations and businesses have the opportunity to make a choice and help this movement meet the vision of healthy, fishable brook trout populations throughout their historical range.

Go to the Joint Venture website, [www.easternbrooktrout.net](http://www.easternbrooktrout.net) and contact your state fishery agency to find out how you can best support eastern brook trout.



Joe Webb

## MAPS

1. Ammonoosuc River Upper Reach
2. WAP Wildlife Habitat Land Cover
3. WAP Highest Ranked Habitat By Ecological Condition
4. Predicted Lynx Habitat
5. Profile of the Ammonoosuc River
6. WAP Upper Ammonoosuc River Watershed
7. Lakes of the Clouds to Lower Falls
8. NH Heritage Natural Bureau Known Location of Rare Species and Exemplary Natural Community
9. Locally Identified Historic Sites

# ATTACHMENTS

- Attachment 1: State of NH Document from Eric Orff, Wildlife Biologist.
- Attachment 2: WAP Scores and Breakdown
- Attachment 3: NH Natural Heritage Bureau-Community Record
- Attachment 4: Village Overlay District, Mount Washington Resort

## STATE OF NEW HAMPSHIRE

## INTER-DEPARTMENT COMMUNICATION

DATE 4February 1985

FROM Eric Griff  
Wildlife Biologist

AT (OFFICE)

SUBJECT STATUS OF NEW HAMPSHIRE LYNX

Game Mgt &amp; Res Division

TO Lynx File

Telephone conversation with Clifton "Matt" Dexter (age 63) of Lisbon on January 31, 1985.

Mr. Dexter hunted lynx with hounds up to 20-25 years ago.

Has killed lynx by Mount Tom, Mount Willey, Mount Avon, Mount Deception and Cherry Mountain.

Good lynx hunting between Mount Moosilauke and Bog Pond - lynx regularly crossed Bog Pond.

Also, crossed Zealand Pond.

When he was about 20 years old (1940's), Bill Green and the Andrews brothers of Chatham killed 14 lynx and 4 bobcat by Bog Pond in about a 2-week time.

Also lynx crossed Beaver Lake.

Base of Mount Washington "good area" just below treeline. He has run cats down by Crawford House.

He remembers running a small lynx (4-inch track) from Cookey Hill (Merrill Mountain) back to Kinsman Notch.

He killed more males than females.

He hasn't seen a lynx track in more than 10 years but he has not gone out looking for them, either.

EPO/eem

# ATTACHMENT 2

WAP Habitat	Acres	% watershed
Alpine	1,282	4.7
Cliff	82	0.3
Rocky ridge/talus slope	192	0.7
Grassland	199	0.7
Floodplain forest	147	0.5
Peatland	21	0.1
Wet meadow/shrub wetland	157	0.6
MATRIX FOREST		
High-elevation Spruce-fir	8,279	30.4
Lowland Spruce-fir	8,075	29.7
Northern hardwood-conifer	8,322	30.6
Hemlock-Hardwood-Pine	600	2.2

Note: total sum of habitat acres may be larger than the watershed area because smaller habitats overlap the matrix forest.

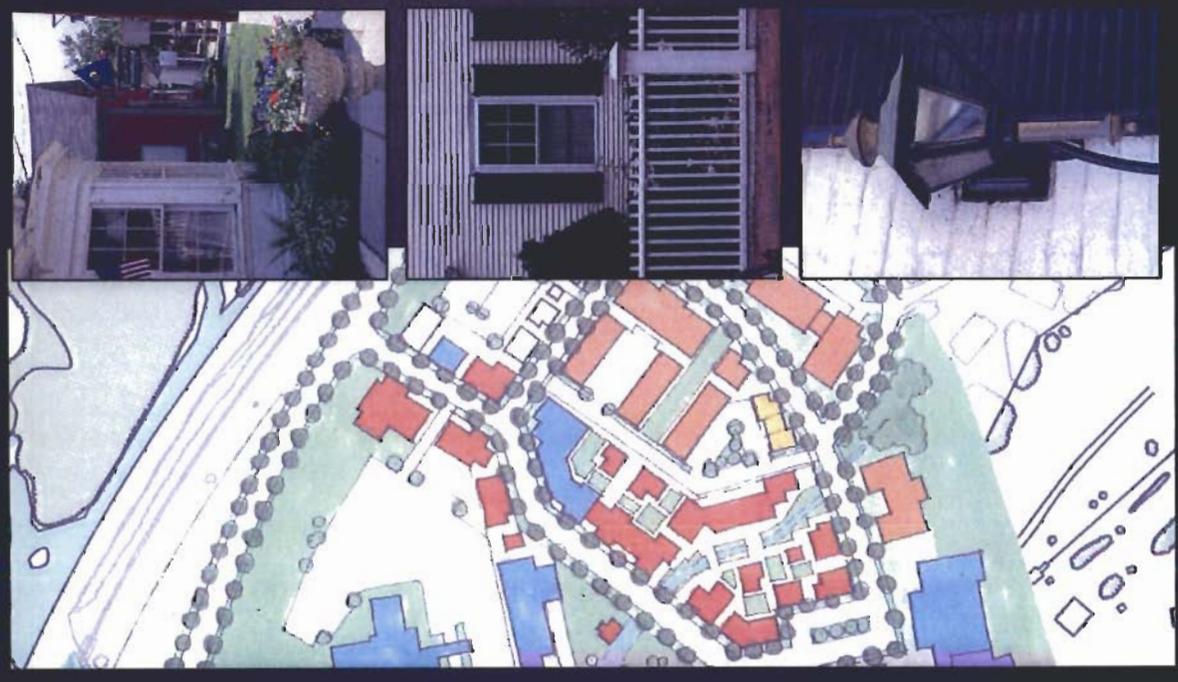
WAP Scores	Acres	% watershed
Highest ranked habitat in NH	17,412	64.0
Highest ranked in biological region	2,337	8.6
Supporting landscape	6,348	23.3
(Total watershed area)	26,097	95.9
	27,217	



# Town of Carroll Twin Mountain Chamber of Commerce

## The Village Overlay District *Overview*

Streets & Access, Parking &  
Mixed-use Buildings



## Village Overlay District Principles of Smart Growth

*Mixed-use activity centers* - enhance civic, social, educational, cultural and economic life as well as transportation.

*Appropriate development patterns* - direct development to areas where municipal services, roads and utilities are already available.

*Green Space* - preserve sensitive areas, create a network of open space, provide natural amenities within communities.

*Walkable communities* - create a safe friendly atmosphere designed with pedestrians and bicyclists in mind.

*Integrated transportation* - link new and existing residential, employment, commercial and recreational areas.

*Enhanced civic realm* - place a priority on the accessibility, architectural compatibility, and preserving what's best of the present and past for enjoyment by future generations.

*Shared benefits* - distribute the benefits of growth to all residents and businesses equally.

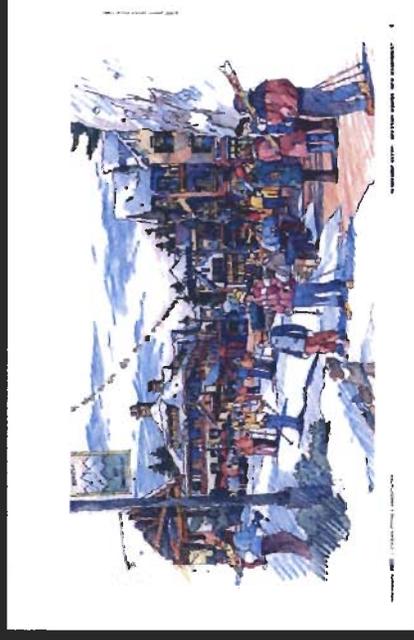
*Community collaboration* - promote involvement of all stakeholders in community decisions.

*Fairness* - ensure development decisions are fair and cost effective.

# Village Overlay District Community Vision & Input

## Village Components

1. Pedestrian friendly- sidewalks, gathering spaces & slow traffic movement
2. Convenient and easily accessible
3. Vibrant and full of energy- programmed with events and festivals
4. Restaurants with outdoor dining
5. Be at a pedestrian scale
6. Programmed for all four seasons
7. Unique mix of uses that makes it a successful village both experientially and financially
8. Balance parking needs and planning goals
9. Overall transportation plan/ system



# The Town of Carroll

## Village Overlay District – Purpose & Benefits

- Applies only to RES 2 Zoning Districts in Bretton Woods
- It is consistent with the 1990 approved Bretton Woods Concept Plan
- Will permit more efficient layout of roads and buildings
- Will promote consolidation of land development instead of sprawl
- Will increase open space
- Encourages pedestrian-friendly village
- Promotes mixed commercial, retail and residential uses
- Encourages innovative transportation alternatives
- Allows the planning board more authority to approve well planned projects
- Ensures that the existing views, public safety, town services and the intent of the Overlay district is preserved
- Will remove the administrative burden on the ZBA on routine design requests
- Allow the planning board to rule on issues that effect aesthetics w/o the hardship burden



# Village Overlay District Location/ Study Area

