

THE SOUHEGAN RIVER

A Report to the General Court

**New Hampshire Rivers Management and Protection Program
Department of Environmental Services
Water Division - Watershed Management Bureau
January 2000**

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Prepared by

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I. INTRODUCTION

The Souhegan River is located in south central New Hampshire. It rises at the confluence of its south and west branches in New Ipswich and flows northeast approximately 31.8 miles through the towns of New Ipswich, Greenville, Wilton, Milford, Amherst and Merrimack before emptying into the Merrimack River. A group known as the Souhegan Watershed Association nominated the Souhegan River for designation into the New Hampshire Rivers Management and Protection Program (RMPP) in June 1999. The Department of Environmental Services has reviewed the nomination and is recommending the Souhegan River for designation into the RMPP.

The New Hampshire General Court passed the Rivers Management and Protection Act (RSA 483) in 1988. The Act states in part: *"It is the policy of the state to ensure the continued viability of New Hampshire rivers as valued economic and social assets for the benefit of present and future generations. The state shall encourage and assist in the development of river corridor management plans and regulate the quantity and quality of instream flow along certain protected rivers or segments of rivers to conserve and protect outstanding characteristics including recreational, fisheries, wildlife, environmental, cultural, historical, archeological, scientific, ecological, aesthetic, community significance, agricultural, and public water supply so that these valued characteristics shall endure as part of the river uses to be enjoyed by New Hampshire people."*

The Act directs the Department of Environmental Services to receive and evaluate nominations for the designation of rivers or river segments into the Rivers Management and Protection Program to protect outstanding values and characteristics. Nominations approved by the Commissioner must be forwarded to the next session of the General Court for review and approval. In fulfillment of this statutory directive, the nomination of the Souhegan River is hereby forwarded to the General Court.

The Department of Environmental Services recommends that the Souhegan River be designated into the Rivers Management and Protection Program. The Department further recommends that it be classified as a "rural", "rural-community" and "community" river as described in the recommendations contained in this report, thereby affording it the full benefit of the applicable protection measures outlined in RSA 483. The outstanding statewide and local resource values and characteristics that qualify the Souhegan River for designation are described herein.

II. THE SOUHEGAN RIVER NOMINATION

A. DESCRIPTION

The Souhegan River begins at the confluence of its south and west branches in New Ipswich. From there the River flows approximately 31.8 miles through the communities of New Ipswich, Greenville, Wilton, Milford, Amherst and Merrimack before reaching its confluence with the Merrimack River. The Souhegan River Watershed drains an area encompassing about 171 square miles. From the confluence of its south and west branches, at an elevation of about 930 feet above sea level, the Souhegan River drops at an average slope of about 26 feet per mile to its confluence with the Merrimack River where the elevation is about 100 feet above sea level. Along the way, the River drops over numerous cascades and rapids and passes through broad. In most places the grade is relatively gradual, but at others -- most notably Wildcat Falls -- the grade is quite steep.

Land use along the Souhegan River is mixed. In the upper reaches of the River, from the confluence of the south and west branches in New Ipswich to the village of Wilton, land use is primarily rural and much the river corridor is forested with scattered residential housing, the major exception being the village of Greenville. Through the towns of Wilton and Milford land use becomes more intensive especially in the town centers where there is a mix of commercial, industrial and residential use. Downstream of the village of Milford into Amherst land use again becomes more rural and includes a mix of agriculture, golf courses and single-family homes. Approaching the confluence with the Merrimack River, scattered residential housing and forests dominate the landscape until the River passes east of the Everett Turnpike and commercial and industrial development becomes more prevalent.

B. RIVER VALUES AND CHARACTERISTICS

The Rivers Management and Protection Program identifies a number of river-related values and characteristics that may qualify a river for designation. The Souhegan River supports many of these including a variety of natural, managed, cultural, recreational and other resource values. Some are significant at the local level; others are significant at either the state or national level. The resource values which qualify the Souhegan River for designation include geology, wildlife, vegetation and natural communities, fish, water quality, natural flow, open space, impoundments, water withdrawals, wastewater discharges, hydroelectric, historic and archeological, community river resources, boating, other recreation, public access, scenery, land use, land use controls, and water quantity.

1. Natural Resources

a. Geologic Resources: The Souhegan River Valley contains rich deposits of glacial sand, gravel and silt. During the last Ice Age, glacial Lake Merrimack extended up the Souhegan River Valley to Milford center. When it retreated, Lake Merrimack left behind fine sands and silts. Streams flowing from the melting glaciers also deposited layered sediments consisting primarily of sand and gravel. Such deposits can be excellent sources of groundwater. The most notable of these in the region -- the Souhegan Aquifer -- is potentially one of the most productive in the area and the current water supply source for three riverfront communities.

Other significant geologic resources include scenic areas, particularly the gorge in Greenville and Wildcat Falls in Merrimack. The bedrock geology of the Valley is dominated by three major formations that were laid down during the Ordovician, Silurian and Devonian periods.

b. Wildlife Resources: The Souhegan River supports a moderately diverse habitat comprised of forest, wetlands, and open space that is home to a variety of wildlife. The relatively undeveloped western reaches of the river corridor provide a link among a number of large protected habitat areas. In addition, the Souhegan River and its adjoining riparian lands serve as a travel corridor for wildlife species in the more developed parts of the region. The River and its watershed provide habitat for most of the mammals that are commonly found in southern New Hampshire including, raccoons, skunks, muskrats, beavers, porcupines, white tail deer, woodchucks, squirrels, mice, bats, rabbits and other species that are accustomed to living in close proximity to humans. Moose, black bear and bobcat may be found in the more rural parts of the watershed. The watershed is also home to a wide diversity of bird species including gulls, doves, woodpeckers, chickadees, jays, warblers, sparrows, wrens, swallows, robins, raptors, ducks, geese and herons.

The New Hampshire Natural Heritage Inventory reports the presence of seven threatened or endangered wildlife species in the Souhegan River Watershed. At least two of these species can be found within the river corridor. They are the state-threatened eastern hognose snake and the state-endangered Woodhouse's toad. Other rare and endangered species present in the watershed include the blue spotted salamander, Blanding's turtle, spotted turtle, marbled salamander and great blue heron.

c. Vegetation and Natural Communities: There is a great diversity of plant species found in the Souhegan River corridor. Typical species are those commonly found in southern New Hampshire. These include white pine, hemlock, red maple, red oak, sycamore, mountain laurel and numerous species of shrubs and grasses.

The New Hampshire Natural Heritage Inventory lists nine state-endangered plant species as occurring along the Souhegan River. They are Long's bitter cress, wild lupine, bird's foot violet, Siberian chives, wild garlic, skydrop aster, goat's rue, stiff tick-trefoil, and giant rhododendron. Another twelve threatened or endangered plant species that are listed at the state or federal level occur elsewhere in the Souhegan River Watershed. These are wild sienna, Maryland tick-trefoil, northern blazing star, sweet goldenrod, fall witch-grass, blunt-leaved milkweed, Virginian mountain mint, burgrass, butterfly-weed, slender bush-clover, climbing fumitory and sweet coltsfoot. Two exemplary natural ecological communities are associated with the Souhegan River corridor, Southern New England High-energy Riverbank and Southern New England Floodplain Forest.

d. Fish Resources: The Souhegan River provides habitat for at least six resident cold and warm water fish species. Naturally reproducing fish species include small mouth bass, banded sunfish, pumpkinseeds, yellow perch, suckers and dace. Introduced game species include brown, brook and rainbow trout. The New Hampshire Fish and Game Department River stocks the River annually with more than 5,000 trout as part of a "put and take" angling program. The River is also stocked annually with an average of about 100,000 Atlantic salmon frye as part of an ongoing anadromous fish restoration effort. The US Fish and Wildlife Service's identification of the river as the best Atlantic salmon nursery habitat in the region highlights the importance of the Souhegan River for fishery habitat.

e. Water Quality: The Souhegan River has been designated as a Class B water by the New Hampshire General Court. The River is currently fully supporting the standards of this water quality goal. The Department of Environmental Services monitors the water quality of the Souhegan River, as does the Souhegan Watershed Association's volunteer water quality monitoring program at seventeen locations. The significance of maintaining a high level of water quality in the Souhegan River is evidenced by the use of wells in close proximity to the River for public drinking water supplies and by the presence of a high quality fishery.

f. Natural Flow Characteristics: From the confluence of its south and west branches, the Souhegan River is largely free-flowing. Some low dams are present on the main stem. Elsewhere in the watershed, flows are modified by twelve flood control structures. There are no diversions, channel alterations, or interbasin transfers. Historic flows at the USGS gauging station located just above Wildcat Falls in Merrimack have ranged from a high of 818 cubic feet per second in April to a low of 39 cubic feet per second in September.

g. Open Space: Despite the rapid pace of development in southern New Hampshire, there are numerous parcels of protected open space within the Souhegan River corridor including at least one in each riverfront community. Protected open space within the river corridor includes a large, forested parcel in Greenville owned by the NH Fish and Game Department that contains a scenic gorge, a municipally owned parcel in Merrimack that encompasses Wildcat Falls, various municipally owned conservation and park lands in Milford, a town forest in Wilton, and a 3.2-mile scenic easement on Route 31 in Wilton and Greenville along the Souhegan River that is owned by the New Hampshire Department of Transportation.

2. Managed Resources

a. Impoundments: There are eleven active or historic dams on the Souhegan River that are maintained for purposes other than hydropower production. Of these, three are now inactive or breached. They include two municipally owned dams in Milford and one in Merrimack that is owned by Pennichuck Water Works.

b. Water Withdrawals and Discharges: There are nine registered water withdrawals from the Souhegan River or from nearby wells. Of these, one is for aquaculture, two are for commercial or industrial purposes and three are for irrigation. The three remaining withdrawals meet public water supply needs in the Towns of Greenville, Wilton and Milford. There are five permitted direct discharges of wastewater to the Souhegan River; two are municipal wastewater discharges and three are industrial wastewater discharges. The municipal discharges are located in Greenville and Milford. The industrial discharges are from Souhegan Wood Products in Wilton, Hitchner Manufacturing in Milford, and Harcros Chemicals in Merrimack.

c. Hydroelectric Resources: There are four existing hydroelectric power production facilities on the Souhegan River, one in New Ipswich, two in Greenville, and one in Wilton. All of the facilities are regulated by the Federal Energy Regulatory Commission and are operated in a "run-of-the-river" mode. This means that the water used to spin the turbines is typically returned virtually instantaneously to the riverbed downstream of the project and is not stored for later release.

3. Cultural Resources

a. Historic and Archaeological Resources: There are a number of sites of historic interest along the Souhegan River. Many buildings in the area were constructed during the mid to late 1700s and early to mid 1800s. Notably, three buildings located within the river corridor are listed on the National Register of Historic Places; they are the Milford Cotton and Woolen Manufacturing Company, the Milford Town Hall and the Wilton Public Library. Numerous other buildings in the area are either eligible for listing or considered to be architecturally or historically significant. Seven archaeological sites containing evidence of the presence of Native American populations have been documented in the river corridor. Native Americans are known to have used the Souhegan River Valley as an important link between the Merrimack River valley and the upper Contoocook River valley. One of the more interesting recent discoveries was that of the first documented Native American cemetery in New Hampshire.

b. Community River Resources: The importance of the Souhegan River as a community resource is reflected in the local planning and protection efforts of the communities along the River. The river is discussed in each municipal master plan and is recognized as a significant community resource in the most recent update of each. In addition, all of the communities in the watershed appointed representatives to participate in the development of the *Souhegan River Watershed Study*.

4. Recreational Resources

a. Fishery: The Souhegan River offers a mix of warm and cold water fishing opportunities. The River is stocked annually with brook, brown and rainbow trout and is managed by the New Hampshire Fish and Game Department primarily as a “put and take” fishery.

b. Boating: The Appalachian Mountain Club’s New Hampshire/Vermont River Guide and the New England Whitewater Guide identify the western sections of the Souhegan River as good intermediate whitewater. This stretch of the Souhegan is very popular because it provides good training runs, is easily accessible and the ice melts early in the spring. The Class II, III and IV rapids here are best run in the spring months at medium to high water. Another popular stretch of the River is found downstream of the Route 122 Bridge in Amherst. The River here is relatively flat and shallow with a sandy bottom; the numerous spots to picnic and wade make it ideal for family canoe outings. Due to its shallow depth, other parts of the Souhegan River offer limited opportunities for canoeing and kayaking.

c. Other Recreation: There are more than a dozen publicly owned recreation areas in the river corridor. These areas offer a mix of recreational opportunities including hiking, nature study, picnicking, swimming, river access, recreational fields and summer concerts. Publicly owned recreation areas include the New Hampshire Fish and Game Department’s Taft Land in Greenville, the Town Forest in Wilton, the New Hampshire Department of Transportation’s Souhegan River Scenic Easement in Greenville and Wilton, Keyes Field and Kaley Park in Milford, the Sherburne site in Amherst, and the Eighty Acres and Turkey Hill Bridge sites in Merrimack.

d. Public Access: There is a variety of access to the Souhegan River, some publicly owned

and some private. There is also informal, publicly owned access for fishing and canoeing at various bridge crossings along the river including the Captain Clark Bridge in Wilton, Green Bridge in Milford, Route 122 Bridge in Amherst, and the Turkey Hill and Seaverns Bridges in Merrimack. Other publicly owned access sites include the Taft Land in Greenville, Keyes Field in Milford, Kaley Park in Milford, and the Amherst Canoe Port.

5. Other Resources

a. Scenery: There are numerous scenic views along the Souhegan River. In the upper reaches of the River there are scenic vistas at Water Loom Pond and High Bridge in New Ipswich as well as at the gorge in Greenville. Farther downstream, one may find the remaining stone abutments of an abandoned railroad bridge. The river corridor along Route 31 in Greenville and Wilton is protected by a 3.2-mile scenic easement that was donated to the New Hampshire Department of Transportation. In Milford, fly fishermen can often be seen casting their lines near the historic Green Bridge. Scenic areas in Merrimack include Indian Ledges and the permanently protected Wildcat Falls.

b. Land Use: The Souhegan River flows through a populated area of the state; there is considerable variation in land use within the river corridor from one community to the next. Much of the land is undeveloped, especially in the upper reaches of the River. But there are pockets of more intensive development, especially in and near the village centers. In New Ipswich, land use in the river corridor is primarily forested with scattered housing. Land use in Greenville is mostly undeveloped with the exception of the village center. In Wilton, land use is sparse along the Route 31 scenic corridor but gradually intensifies toward the village center where there is a mix of residential and commercial/industrial use. Land use in Milford is quite diverse. The river corridor in the western part of Milford especially to the north of the River is lightly developed with a mix of open space, agriculture, commercial and residential uses. Downstream and to the east of the Milford downtown, land use is predominantly commercial. Much of the land in Amherst is floodplain and undeveloped but there are three golf courses in the western part of the river corridor. In Merrimack, land use to the west of the Everett Turnpike is very low density residential and undeveloped. East of the highway, land use is highly developed for commercial and industrial use.

c. Land Use Controls: Many of the towns along the Souhegan River have established land use or other regulatory controls, which afford some protection to the Souhegan River. The Town of New Ipswich has a 100-foot setback from rivers, streams and brooks and also has a floodplain district and steep slope district. The Town of Greenville does not have any overlay districts. The Town of Wilton has floodplain conservation, wetland conservation and aquifer protection districts. The Town of Milford has floodplain management, wetland protection and aquifer protection districts (the wetland protection district includes surface waters). The Town of Amherst has floodplain conservation, wetland conservation and aquifer protection districts as well as a watershed (shoreline) protection district. The Town of Merrimack has floodplain, wetland and aquifer conservation districts.

d. Water Quantity: Streamflow information for the Souhegan River is collected by the US Geological Survey (USGS) at a stream gauge located just above Wildcat Falls in Merrimack. The USGS operated the gauge as a "full-record" station from July 13, 1909 until September 30, 1976 when it was converted to a "partial record" station. It is now used only during periods of

extreme weather to estimate flooding conditions or drought severity.

e. Riparian Interests/Flowage Rights: Pennichuck Water Works withdrew water from the Souhegan River from 1965 until 1984 at a maximum rate of 10.8 cubic feet per second. Pennichuck no longer uses the Souhegan for public water supply but maintains the right to withdraw water in the future. Flowage rights likely exist for some of the impoundments along the Souhegan River but are not documented.

III. LOCAL SUPPORT

There is strong local support for the designation of the Souhegan River into the Rivers Management and Protection Program (RMPP). The Souhegan Watershed Association -- with the help of the Nashua Regional Planning Commission and the New Hampshire Rivers Council -- initiated the effort to designate the Souhegan River into the RMPP. The Association held a series of public informational meetings to discuss the merits of the nomination and to present information about the Rivers Management and Protection Program. The widely publicized workshops were held in the Towns of Merrimack, Milford and New Ipswich. These efforts culminated in June 1999 when the Souhegan Watershed Association submitted its nomination to the Department of Environmental Services for the designation of the Souhegan River into the Rivers Management and Protection Program.

The Souhegan Watershed Association also met with local boards and commissions in the six towns along the Souhegan River to discuss the nomination with local officials and to determine the level of local support. As a result of these meetings, the Department of Environmental Services received sixteen letters of support from local officials. Five of these letters came from boards of selectmen, five were from planning boards, and six came from conservation commissions. The Department received nine additional letters of support and petitions from interested individuals and organizations. There were no letters of opposition. At the public hearing on the nomination, which was held in Milford on August 31, 1999, the testimony was overwhelmingly supportive. All of those who testified spoke in favor of the nomination.

IV. SUMMARY AND RECOMMENDATIONS

The Souhegan River supports a variety of significant state and local resources. To better protect and manage these resources, the Department of Environmental Services recommends the following actions:

Recommendation 1: The General Court should adopt legislation that designates the Souhegan River into the Rivers Management and Protection Program and classifies the Souhegan River as follows:

1. As a rural-community river from the confluence of its south and west branches in New Ipswich to a point 0.5 miles above the Otis Dam in Greenville;
2. As a community river from the point 0.5 miles above the Otis Dam in Greenville to a point 0.5 miles below to Otis Dam;
3. As a rural river from the point 0.5 miles below the Otis Dam to the Label Arts Dam located approximately 0.3 miles above the confluence with Stony Brook in Wilton;
4. As a community river from the Label Arts Dam to the Wilton Road bridge near the Pine Valley Mill in west Milford;
5. As a rural-community river from the Wilton Road bridge to a point 0.5 miles above the route 13 bridge in Milford;
6. As a community river from the point 0.5 miles above the route 13 bridge to a point 0.5 miles below the route 13 bridge;
7. As a rural river from the point 0.5 miles below the route 13 bridge to the Everett Turnpike bridge in Merrimack; and
8. As a community river from the Everett Turnpike Bridge to the confluence with the Merrimack River in Merrimack.

Under the provisions of RSA 483, designation of the River will provide increased protection against the construction of new dams, damaging channel alterations, water quality impairment, and the siting of solid and hazardous waste facilities in the river corridor. Designation will also require the establishment of a protected instream flow to maintain water for instream public uses including water quality, fisheries, recreation, and scenic values. A local river management advisory committee will be established to coordinate management and protection of the River at the local and regional levels, and will provide the residents in the riverfront communities with a direct avenue for formal input into state decisions affecting the River. Finally, designation will result in the development of a long-range management plan for the River that coordinates State planning and management of fisheries, water quality and quantity, and recreation.

Much of the Souhegan River is being recommended for "rural river" classification. Rural rivers are defined under RSA 483 as "...those rivers or segments adjacent to lands which are partially or predominantly used for agriculture, forest management and dispersed or clustered residential development. Some instream structures may exist, including low dams, diversion works and other minor modifications." The Souhegan River as it flows through the forests, wetlands, scattered housing and open space of the upper river corridor, and the largely undeveloped broad floodplains of the lower river corridor typifies the definition of a rural river. The Souhegan Watershed Association, the Rivers Management Advisory Committee and the Department of Environmental Services have all determined that the river segments recommended above for "rural river" classification meet the definition of a rural river and should be so designated.

The remaining segments of the Souhegan River are being recommended for either “community river” classification or “rural-community river” classification. Community rivers are defined under RSA 483 as “...those rivers or segments which flow through developed or populated areas of the state and which possess existing or potential community resource values, such as those identified in official municipal plans or land use controls...Such rivers are readily accessible by road or railroad, may include existing impoundments or diversions, or potential sites for new impoundments or diversions for hydropower, flood control or water supply purposes, and may include the urban centers of municipalities.” Rural-community rivers are defined under RSA 483 as “...those rivers or segments which flow through developed or populated areas of the state and which possess existing or potential community resource values such as those defined in official municipal plans or land use controls. Such rivers have mixed land uses in the corridor reflecting some combination of open space, agricultural, residential, commercial and industrial land uses.” The segments of the Souhegan River being recommended for “community river” or “rural-community river” classification are those that are generally more developed or where existing hydropower facilities or village centers are located. In each case, the Souhegan Watershed Association, Rivers Management Advisory Committee and Department of Environmental Services have determined that these segments meet the definition of either a community or rural-community river and should be so designated.

Designation of Souhegan River under the Rivers Management and Protection Program will express the intent of the General Court regarding its future management and protection, and will focus attention on the River as a natural resource of both statewide and local significance. This attention will help to ensure greater scrutiny of plans or proposals that have the potential to significantly alter or destroy those river values and characteristics that qualify the entire Souhegan River for designation.

Recommendation 2: The towns of New Ipswich, Greenville, Wilton, Milford, Amherst, and Merrimack should continue to work together toward the protection of the Souhegan River through the adoption and implementation of a local river corridor management plan.

While legislative designation of the Souhegan River will improve the protection and management of the River itself, continuing efforts at the local level will be needed to address the use and conservation of the river corridor. A growing recognition by local citizens and officials of the Souhegan River’s valuable contribution to the overall quality of life in their communities is evidenced by their desire to see it designated into the Rivers Management and Protection Program. Citizen appreciation and concern for the River should be reflected in the decisions and actions of local officials. The Department of Environmental Services will provide technical assistance to the local river management advisory committee and to the local officials in the riverfront communities on the development and implementation of a local river corridor management plan.

In summary, the establishment of a clear policy and specific instream protection measures by the General Court, and a continuing commitment on the part of local governments and residents to protect and manage the river corridor through sound land use decisions will ensure that the outstanding resources of the Souhegan River will endure to be enjoyed by the people of New Hampshire for many years to come.