

THE OYSTER RIVER

A Report to the General Court



**New Hampshire Rivers Management and Protection Program
Department of Environmental Services
Office of the Commissioner
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A Report to the General Court

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I. INTRODUCTION

The Oyster River is a tributary of the Piscataqua River and part of the Great Bay Estuary watershed in coastal New Hampshire. The Oyster River's headwaters begin in southern Strafford County in the town of Barrington and the river runs east through the towns of Lee, Madbury and Durham where it meets Great Bay. The section of the Oyster River nominated for designation into the Rivers Management and Protection Program (RMPP) is 13.97 miles long. As proposed by the nominating organization, the Oyster River Watershed Association (ORWA) with assistance from Strafford Regional Planning Commission (SRPC), the designation would begin from near the river's source in Barrington at Hall Road, travel through the towns of Lee and Madbury, and ends at the Mill Pond Dam in Durham where the river changes from freshwater to saltwater before entering Great Bay. The nomination does not include the tidal portion of the Oyster River. The Department of Environmental Services (DES) has reviewed the nomination and is recommending the Oyster River for designation into the RMPP.

The Rivers Management and Protection Act (RSA 483) was enacted in 1988. The act states in part that:

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 DES to receive and evaluate nominations for the designation of rivers or river segments into the RMPP to protect outstanding values and characteristics. Nominations approved by the DES 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 Oyster River is hereby forwarded to the General Court.

DES recommends that the Oyster River be designated as a protected river under the RMPP. DES further recommends that segments of it be variously classified as a "rural", "rural-community", or "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 Oyster River for designation are described herein.

II. THE OYSTER RIVER NOMINATION

A. DESCRIPTION

The Oyster River is part of the Great Bay Estuary watershed in coastal New Hampshire. The entire Oyster River watershed is located within New Hampshire. The Oyster River originates in the town of Barrington, and flows through the towns of Lee, Madbury and Durham before becoming tidal. This nomination includes the section of the Oyster River from Hall Road in Barrington, downstream through Lee and Madbury, and through Durham to the Mill Pond Dam where the river changes from freshwater to saltwater. The nomination does not include the tidal portion of the Oyster River.

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 Oyster 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 that qualify the Oyster River for designation include geology, wildlife, vegetation and natural communities, fish, water quality, natural flow, open space, impoundments, water withdrawals, historic and archeological, community river resources, boating, other recreation, public access, scenery, land use, land use controls and scientific resources.

1. Natural Resources

a. Geologic Resources: The Oyster River has geologic resources that provide sites of natural history interest, scenery, and economic resources. Much of the Oyster River watershed is underlain by plutonic and meta-sedimentary rock formations. Similar to most of New Hampshire, the bedrock underlying the Oyster River corridor was covered by unconsolidated stratified drift deposits of till, unsorted glacial sediment, following the last glaciation. Stratified drift aquifers comprise nearly 8.5 percent of the total land area of the Oyster River watershed. The Spruce Hole formation is a sand deposit located in Lee and Durham. In a recent study by the U.S. Geological Survey, Spruce Hole was identified as a potential water supply aquifer. This aquifer is well positioned between the Lamprey and Oyster Rivers. This sand deposit is being actively mined and there have been recent development pressures. In response, the town of Durham has acquired 27 acres of the formation, increasing public ownership to over 50 acres. The Spruce Hole aquifer is also home to one of the few remaining undisturbed kettle-hole bogs in New England and the only one remaining in southeastern New Hampshire. It was classified as a unique ecological area by the U.S. National Park Service and as a registered National Natural Landmark.

b. Wildlife Resources: The Oyster River corridor provides critical wildlife habitat to a wide variety of species that depend on the habitat connectivity provided by the river and large, unfragmented forest areas. The New Hampshire Fish and Game Department's *Wildlife Action Plan* indicates that the Oyster River corridor contains several Core Focus Areas and some of the highest quality habitat in New Hampshire. The Nature Conservancy's *Land Conservation Plan for New Hampshire's*

Coastal Watersheds recognizes five Core Focus Areas and their supporting landscapes located wholly or partially within the Oyster River corridor and watershed. The Oyster River corridor is critical for the movement of wildlife species and its riparian habitats provide the most extensive contiguous habitat in the watershed. Between the Mill Pond dam in Durham and Route 125 in Lee, there are only nine river crossings and over 80 percent of the river has no development within 0.1 mile on either side. Various wildlife species have been observed during all seasons. The New Hampshire Natural Heritage Bureau has documented 12 occurrences of rare, threatened, or endangered wildlife within the Oyster River corridor.

c. Vegetation and Natural Communities: The Oyster River corridor for most of its length is either forest, open and shrub wetlands, or agricultural land dominated by hay fields. Within the Oyster River corridor several exemplary natural ecological communities have been identified by the New Hampshire Natural Heritage Bureau, including herbaceous seepage marsh, hemlock-beech-oak-pine forest, and red maple floodplain forest. A total of 139 plant species have been identified in the river corridor, including five rare or threatened plants known to occur in the river corridor.

d. Fish Resources: The Oyster River provides critical and diverse habitat for many freshwater and anadromous species. Eighteen species of fish are known to use the river, including a mixture of warmwater, coldwater, and anadromous species. The Oyster River has one of the most diverse fish species assemblages in the state, including nine fish species of concern listed in New Hampshire's *Wildlife Action Plan*. Three of these species of concern (the blueback herring, the sea lamprey, and the American eel) are diadromous (fish that migrate between fresh and salt waters). The Oyster River contains the only known population of American brook lampreys in New Hampshire, listed by the state as endangered. The river herring returns to the Oyster River have historically been one of the highest yearly returns among all coastal rivers monitored by DES. The numbers of returning river herring have generally been declining since 1990 and are now roughly ten percent of those seen at the peak from 1990-1992. There is evidence from water quality sampling that dissolved oxygen levels may be affecting survival of juvenile river herring. A small number of brook trout are stocked in the Oyster River each spring and sea lamprey adults have also been sporadically stocked. The fish ladder at the Mill Pond Dam in Durham is monitored by the New Hampshire Fish and Game Department.

e. Water Quality: The Oyster River and all its tributaries in Barrington, Durham, Lee and Madbury from their sources to the crest of the Oyster River Reservoir dam are designated as Class A waters by the New Hampshire General Court. All other portions of the Oyster River downstream of the Oyster River Reservoir dam are designated as Class B. The 2008 *NH Section 305(b)/303(d) Surface Water Quality Report* shows all portions of the Oyster River meet water quality standards after treatment. The entire river, like all other surface waters in the state, is impaired for safe fish consumption due to mercury contamination, and certain sections of the river are impaired for dissolved oxygen and pH for aquatic life. Except for the Oyster River Reservoir, all portions of the river are impaired for E. coli. The Oyster River Watershed Association, University of New Hampshire, and state agencies are working to better understand the components of the river system in order to protect and enhance water quality. A comprehensive program to monitor the Oyster River was initiated in 2001 and continues to the present.

f. Natural Flow Characteristics: The Oyster River is partially free-flowing from its headwaters west of Hall Road in Barrington to the Oyster River Reservoir dam at the University of New Hampshire Water Treatment Plant in Durham, a distance of approximately 10 miles. Below this point, the river is free-flowing for 1.5 miles, to the Mill Pond Dam in Durham. The longest record of daily stream flow in the Oyster River is derived from a U.S. Geological Survey Gage operating since 1935 near Durham. The average daily discharge measured at the gage is 20 cubic feet per second (cfs). The Oyster River has experienced some large flooding events in the past; including the flooding in April 2007 when flows of 1,320 cfs were recorded, the highest on record. The lowest daily flow ever recorded was in September 1999 with flows of 0.01cfs.

The Oyster River serves as one of the main water supplies for Durham and the University of New Hampshire (UNH), with the water withdrawal and the water treatment plant being located at the Oyster River Reservoir Dam. Durham and UNH also withdraw water from the Lamprey River and pipe it directly into the town's water treatment plant. It should be noted that this water transfer is allowed under RSA 483 because it occurs within a single drainage basin.

g. Open Spaces: There are 1,287 acres of protected land in the river corridor, constituting nearly 33 percent of the total land area. These lands are comprised of a combination of federal, state, municipal and private owned properties, with some easements held by non-profit organizations. The predominant land use type is forested and open wetlands with areas of residential development. The river corridor includes a large portion of the Samuel A. Tamposi Water Supply reserve and the UNH-College Woods, a 240 acre state protected easement.

2. Managed Resources

a. Impoundments: There are two active dams and three dams in ruins or breached condition located in the Oyster River corridor. Of the two active dams, one is operated for recreational purposes (Mill Pond Dam) and the other, the Oyster River Reservoir Dam, impounds one of the public water supplies for Durham and the University of New Hampshire. The Mill Pond Dam reservoir is approximately 24 acres and the Oyster River Reservoir Dam impounds approximately eight acres.

b. Water Withdrawals and Wastewater Discharges: There is only one registered water withdrawal from the Oyster River. This withdrawal is for the Durham/UNH public water supply. The UNH Arthur Rollins Water Treatment Plant removes approximately 220 million gallons from the Oyster River reservoir annually for use by Durham and UNH. The Oyster River withdrawal is one of main public drinking supply sources for Durham/UNH, which use the Lamprey River and Lee Well as additional sources. (A possible fourth source at the Spruce Hole Bog is being explored.) The greatest water resource management challenge is meeting demand in the critical period from August to October during typical low river flows while there is concurrent high demand due to the fall UNH session. There are no known point source discharges to the nominated section of the Oyster River; however, the Durham Wastewater Treatment Plant does discharge wastewater to the tidal section of the river below the Mill Pond Dam.

c. Hydroelectric Resources: There are no existing hydroelectric power production facilities on the Oyster River. A potential hydroelectric power site has been identified on the river at Mill Pond Dam.

3. Cultural Resources

a. Historic and Archaeological Resources: The Oyster River corridor has an extensive history starting with Native American occupation around 11,000 years ago with the use of the river for its extensive natural resources. Called the Shankhassick by Native Americans, the Oyster River, renamed by the Europeans for its shellfish beds, fulfilled the requirements of a desirable river location and settlement began in the 1630s. Several mill sites have been located along the Oyster River contributing to the development of the area, and many of these mill sites still contain stone work visible today. The Oyster River is neither the largest nor the most commercially important river in the Great Bay watershed. However, it has played a significant role in the establishment and support of the region. The region's continuing growth and development pressures make the river's value for water supply, significant natural communities, education, research and recreation, and sense of place worthy of the highest level of protections for current and future generations. Within the nominated river corridor the John Sullivan House is listed as a National Historic Landmark, and Durham also has a historic downtown district.

b. Community River Resources: The importance of the Oyster 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 master plan update for each community. All four riverfront communities have identified the Oyster River as a priority for protection efforts for their communities.

4. Recreational Resources

a. Fishery: The Oyster River corridor contains several popular fishing spots, including several locations upstream of Route 155A in Durham where both wild and stocked brook trout are popular with anglers. Wheelwright Pond, located within the river corridor, contains an excellent warmwater fishery for largemouth bass, yellow perch, and sunfish (including black crappie).

b. Boating: The Oyster River has boating opportunities located in the lower portion of the river with limited access by canoes and kayaks to the Mill Pond in Durham.

c. Other Recreation: The Oyster River offers an abundance of recreational opportunities within the river corridor and the watershed. Multiple areas exist within each of the riverfront towns that provide terrain for hiking, fishing, wildlife viewing, winter activities, field sports and passive recreational activities.

d. Public Access: There are eight public access sites that can be found along the Oyster River in Barrington, Lee, and Durham. There are state and/or town-owned public access sites in three of the four riverfront towns and some informal access to the Oyster River.

5. Other Resources

a. Scenery: Several viewing points are available within the Oyster River corridor. However, an extensive portion of the corridor passes through farmland and forests, removed from public access and viewing. The casual viewer must take advantage of public road crossings to see the river and riparian features. Some of the areas from which to view the river are within the Samuel A. Tamposi Water Supply Reserve in Barrington as the river leaves the reserve, at any of the 11 road crossings, or along walking trails in Barrington, Lee and Durham.

b. Land Use: The Oyster River flows through four towns and a mixture of land uses ranging from very rural areas to areas with a mixture of agriculture, forests and residential uses to more developed areas with industrial and commercial uses. Residential development patterns along the river follow a gradient, with the headwaters in Barrington being the least developed and downtown Durham being the most developed. Madbury has little development within the Oyster River corridor. Lee has a mixture of agriculture and forested areas, small areas of dense development, in particular at the NH Route 4 traffic circle, and large areas of open space.

c. Land Use Controls: All corridor communities have master plans, subdivision regulations and zoning ordinances.

d. Water Quantity: The longest record of daily stream flow in the Oyster River is derived from the U.S. Geological Survey gage that has operated since 1934 near Durham. The U.S. Geological Survey estimates that there are 12.1 square miles of drainage basin upstream from this discharge monitoring station.

e. Riparian Interests/Flowage Rights: Under New Hampshire common law, owners of frontage on surface waters have riparian rights to use surface waters as long as the use is reasonable with respect to uses of other riparian landowners and has no undue effect on public trust uses of surface waters. The University of New Hampshire is a riparian landowner that has such rights; they also have a registered water withdrawal from the river with the Department under RSA 488, the Water Management Act. There are no known significant flowage rights on the Oyster River.

III. CONSIDERATION FOR PROTECTION OF INSTREAM FLOW

A. INSTREAM FLOW RULE STATUS

RSA 483 directs DES to implement instream flow protection on all designated rivers, and to adopt administrative rules for this purpose. In 2002, additional legislation authorized a pilot project to be developed on the Lamprey and Souhegan Rivers. Rules were promulgated for these two rivers in 2003. No protected instream flows can be developed on other designated rivers until these pilot assessments are completed and the results assessed by the legislature. Although excluded from instream flow protection by existing rules, future rules will include other designated rivers in the development and implementation of protected instream flows. The result will be water management plans for each affected water user and dam owner in a designated river watershed. These water management plans describe specific actions to be taken under certain river flow conditions so that the protected flows are maintained. Water management plans have three main components to protect flow: 1) conservation, 2) water use changes, and 3) operation of impoundments.

B. INSTREAM FLOW ASSESSMENT

The existing instream flow rules include a requirement for assessing monthly water use in relation to mean monthly stream flow for all designated rivers. The method uses a general standard to compare the water use uniformly among all the designated rivers. The general standard is determined from the monthly stream flow and sets a standard for aggregate water use depending on that flow. The general standard is not a protected flow, but instead is a means for comparing the level of water use and identifying the locations of intense water use within a watershed and among the designated river watersheds.

The entire Oyster River system, including both the nominated section of river and the upstream tributaries, water use assessment identified two registered sources (with one in the nominated river section) reporting water withdrawals and no registered discharges reporting returns of water to the environment in 2006. There are no hydropower uses. During 2006, water use exceeded the general standard on the Oyster River during every month except May, June, November and December.

The general standard is not a limitation. Although the apparent exceedance of the general standard understandably raises concerns in the respective communities, an important point to understand is that the general standard only provides a framework for prioritizing watersheds through which designated rivers flow that are in need of additional study for establishing watershed-specific instream flow standards and development of a water use management plan. Based on the analysis completed for the nomination, it is apparent that the Oyster River would be one of many designated river watersheds that does not meet the general standard under existing rules. Any changes in water usage by the Oyster River corridor communities would not occur immediately upon designation, but in the future only after full study and public input.

IV. LOCAL SUPPORT

The communities of the Oyster River watershed have expressed strong support for the river's ecological functions and services in their master plans as well as in ordinances and regulations that require river setbacks and buffers, limited uses and development disturbance near the river, and water quality standards. There is strong local support for the designation of the Oyster River into the Rivers Management and Protection Program (RMPP). The Oyster River Watershed Association (ORWA), with assistance from the Strafford Regional Planning Commission (SRPC), initiated the effort to designate the Oyster River into the RMPP. The SRPC and ORWA notified the municipal officials of the river communities of the merits and intent to nominate the Oyster River as a designated river in the RMPP. These efforts culminated in June 2010, when the SRPC and the ORWA submitted the nomination to the Department of Environmental Services. Throughout the process all of the public testimony and letters have supported the nomination with the exception of one letter of opposition. At the public hearing on the nomination, which was held in Madbury on August 17, 2010, the testimony was overwhelmingly supportive.

V. SUMMARY AND RECOMMENDATIONS

The Oyster 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 Oyster River for inclusion in the Rivers Management and Protection Program and designates the Oyster River as follows:

1. As a rural-community river immediately downstream of the Hall Road bridge in Barrington to the upstream side of Old Mill Road in Lee (4.6 miles);
2. As a rural river from the upstream side of Old Mill Road in Lee to the upstream side of Route 155 crossing in Lee (3.07 miles);
3. As a rural-community river from the upstream side of Route 155 crossing in Lee to the upstream side of the Oyster River Dam in Durham (4.5 miles);
4. As a community river from the upstream side of the Oyster River Dam in Durham to the Mill Pond Dam in Durham (1.8 miles).

Under the provisions of RSA 483, designation of the river will provide increased protection with respect to the construction of new dams, damaging channel alterations, and the location 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. The local river management advisory committee 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.

The Oyster River is being recommended for the “rural river”, “rural-community river”, and “community river” classifications. “Rural-community rivers” are defined under RSA 483:7-a, I (c) 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. Such rivers are readily accessible by road or railroad and may include impoundments or diversions.” The Oyster River as it flows from Hall Road in Barrington to Old Mill Road in Lee and from Route 155 in Lee to the Oyster River Dam in Durham is flanked by landscape ranging from open spaces and residential use to more developed areas along the river.

Rural rivers are defined under RSA 483:7-a, I (b) 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 Oyster River as it flows from Old Mill Road in Lee to Route 155 travels through forests, scattered housing, agricultural fields and open spaces, and the largely undeveloped areas of the river corridor, all of which typify the definition of a rural river.

Community rivers are defined under RSA 483:7-a, I (d) 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 have mixed land uses in the corridor reflecting some combination of open space, agricultural, residential, commercial and industrial land uses. 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.” The Oyster River in downtown Durham is seen as a vital community resource with recreational trails and parks allowing residents to enjoy the river within the developed landscape through which it flows. The Oyster River 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”, “rural-community river” and “community river” classifications meet the applicable definitions and should be so designated.

Designation of the Oyster River under the Rivers Management and Protection Program will express the intent of the General Court regarding the river’s 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 Oyster River for designation.

Recommendation 2: The towns of Barrington, Lee, Madbury and Durham should continue to work together toward the protection of the Oyster River through the adoption and implementation of a local river corridor management plan.

While legislative designation of the Oyster 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 (the river and the land area located on each side of the river within a distance of 1,320 feet of the normal high water mark or to the landward extent of the 100 year floodplain). A growing recognition by local citizens and officials of the Oyster 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 Oyster River will endure to be enjoyed by the people of New Hampshire for many years to come.

VI. MAPS

OYSTER RIVER WATERSHED LOCUS MAP

Designated River Classification

Quarter Mile Buffer

-  Rural Classification
-  Rural Community Classification
-  Community Classification

Waterbodies

-  Ocean, Lakes, Ponds
-  Oyster River Watershed
-  Designated Rivers
-  County
-  Town Boundaries

0 3.5 7 14 21 28
Miles



The coverages presented in this map are under constant revision. They may not contain all of the potential or existing data available. NHDES is not responsible for the use or interpretation of this information. Not intended for legal purposes. October 2010
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OYSTER RIVER WATERSHED BASE MAP

