

ISINGLASS RIVER MANAGEMENT PLAN



Prepared for the
Isinglass River Local Advisory Committee

by the Strafford Regional Planning Commission

June 30, 2008
Revision 1 – March 2018

ISINGLASS RIVER MANAGEMENT PLAN

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The Isinglass Local Advisory Committee (IRLAC) prepared the River Management Plan with assistance from the Strafford Regional Planning Commission and the NH Department of Environmental Services Rivers Management and Protection Program. The Plan was initially completed in June 2008.

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The Isinglass River Local Advisory Committee recognizes the professional contributions to this plan of Steven Couture, NH Rivers Coordinator 2002 – 2011 (NHDES, Rivers Management and Protection Program), and the stakeholders and partners that provided technical and editorial assistance in development of this document.

MISSION STATEMENT

The Isinglass River, the river corridor and the greater Isinglass watershed have experienced and continue to experience effects of increased development and population growth in the coastal watershed of southeast New Hampshire. Although development immediately adjacent to the river has been minimal, there remain a large number of undeveloped parcels within the river corridor. In addition, development adjacent to the river's tributaries has resulted in construction of numerous road crossings, and loss of forested lands and open space within the watershed.

The Isinglass River Management Plan (the Plan) proposes a management approach focused on protecting and conserving the river's many resources, protecting riparian and aquatic habitat, advocating for water quality and quantity to sustain aquatic and recreational uses, and balancing the development of land and water uses for recreation with other public needs within the river corridor and watershed.

The Isinglass River Local Advisory Committee (IRLAC) advocates for implementation of the Plan and supports integration of its goals and strategies by the corridor communities in their planning initiatives and land use decisions.

The mission of the Isinglass River Local Advisory Committee is to carry out its duties and responsibilities established by the New Hampshire River Management and Protection Program (NH RSA Chapter 483) to protect and maintain the resources, values and characteristics of the Isinglass River.



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CHAPTER I. INTRODUCTION

A. Background, History and Accomplishments

Isinglass River Protection Project

In 2000, Ann Schulz of Barrington NH formed the Isinglass River Protection Project (IRPP). She had been active since 1998 doing water quality monitoring on the Isinglass River with the Cocheco River Watershed Coalition (CRWC) for the New Hampshire Department of Environmental Services (DES) Volunteer River Assessment Program (VRAP). Ann was impressed with the excellent water quality of the Isinglass River and wanted to maintain it. After consultation with Lorie Chase, then Chair of the CRWC, Ann contacted the Barrington, Strafford and Rochester Conservation Commissions to request assistance in nominating the Isinglass River into the NH Rivers Management and Protection Program in order to gain more protection for the river. She and her husband Jim protected their land that bordered the Isinglass River with a conservation easement. Jim and Ann Schulz had created the Barrington Natural Heritage Committee in 1999 to create an inventory of Barrington's special places and protect them. While Jim worked on protecting land, Ann worked on protecting the Isinglass.

Member volunteers of the IRPP at that time included:

- Ann Schulz – Project Coordinator, Barrington Natural Heritage Committee
- George Bailey, Rochester Conservation Commission
- Alan Davis, Waste Management Inc.
- Ken Edwardson, Hydrologist, Barrington
- Liz Evans, Strafford Conservation Commission
- Peter Keefe, Trout Unlimited, Barrington
- Anne Melvin, Barrington Conservation Commission
- Cal Schroeder, Strafford Conservation Commission
- Darren Scopel, UNH graduate student, Barrington
- Melinda Shofner, Barrington school counselor
- Pamela Skeffington, Barrington Kids of the River project
- Bruce Smith, NH Fish & Game Department, Strafford
- Bob Stock, Barrington Selectman

Participating Consultants to the IRPP:

- Lorie Chase, Executive Director, CRWC
- Beth Malcolm, VRAP, NHDES
- Dave Neils, NH Rivers Management and Protection Program, NHDES
- Carl Paulsen, NH Rivers Council
- Judith Spang, NH House of Representatives
- Margaret Watkins, National Park Service, Rivers, Trails and Conservation Assistance

The IRPP was formed to work toward nomination of the Isinglass River, with a long term purpose of protecting the river from the pressures of development. The group organized a strong network of support through educational outreach programs, petitions and public meetings. Their

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members included the “Kids of the River”, a group of Barrington Middle School students guided by Pam Skeffington and John Pontius. The Kids of the River committed themselves to learning about the river and promoting its protection. The students were exceptionally well received during their testimony before the NH House of Representatives committee considering the Isinglass nomination for designation. Designation was received in 2002. The nomination showcased the river’s values and importance to the local communities as a valuable environmental, historical and recreational resource. Following designation of the river, several members of the IRPP were appointed as members of the Isinglass River Local Advisory Committee (IRLAC).

Isinglass River Management Plan: Building Public Awareness and Support (January 2006)

The Isinglass River Local Advisory Committee (IRLAC) began work under a grant from the NH Coastal Program, "Isinglass River Management Plan: Building Public Awareness and Support" during the spring of 2004 which was completed by December 2005. The project goals were to increase public awareness of the Isinglass River as a special natural resource and to increase public support for protection measures and river management planning in the region. In order to develop public support for the Isinglass River, IRLAC focused its efforts to raise public awareness of the river and to publicize the successful nomination of the river into the State of New Hampshire's Rivers Management and Protection Program (RMPP).

The IRLAC began by introducing themselves to the local land use boards in the three riparian communities – the Towns of Strafford and Barrington, and the City of Rochester. IRLAC members and the NH Rivers Coordinator, Steve Couture, met with the Planning Boards of these communities in the spring of 2004 to inform them about the need to refer land development applicants to IRLAC early in the site plan development process under NH RSA 483-A. The process generally has been followed successfully, and over the years, IRLAC has reviewed and provided formal comments on numerous site plan applications. In addition, all three communities have adopted extra protection measures for the Isinglass River into their respective local zoning ordinances. The IRLAC also completed a landowner survey, which was mailed to all riparian households, accompanied by a letter of introduction and the DES Isinglass River fact sheet. The survey was undertaken in coordination with the Isinglass River Protection Project, the citizen's group that came together to forward the nomination of the Isinglass River into the RMPP. Members of the former IRPP remain active in river protection, stream assessment, and water quality testing. The survey results have indicated that the public recognized the importance of the Isinglass River as a special natural resource and conservation area.

To publicize the Isinglass River and promote stewardship, the IRLAC participated in several area festivals in 2004, 2005 and 2007. The IRLAC booths at these events focused on wildlife information (including NH Fish & Game's fur collection), and provided a variety of Isinglass River maps, fact sheets, Shoreland Protection stewardship information sheets, and maps of hiking trails near the river. Finally, the IRLAC produced a promotional brochure for the Isinglass River. The brochure has been widely disseminated, and has helped get the word out about the special nature of the river as a unique regional natural resource.

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Between 2007 and 2017 IRLAC continued to actively participate in development plan reviews and land use hearings; supported efforts to preserve properties and increase public awareness of fluvial geomorphic hazards; and participated in public events such as trout stocking and a 5k run at Waste Management's Gonic Trails. IRLAC continued water quality monitoring, conducted river cleanups, worked with New Hampshire Department of Environmental Services to close an unpermitted wastewater discharge into the river, and developed a website (www.isinglassriver.us)

Harlan Calef Isinglass Preserve in Barrington

In 2014, the Trust for Public Land (TPL), the US Department of Agriculture Natural Resource Conservation Service, New Hampshire Land and Community Heritage Investment Program (LCHIP), and the Town of Barrington conserved 300 acres of forest located off of Town Farm Road that includes 2.2 miles of Isinglass River shoreline. The land is being managed by the Town of Barrington as a community forest and will include opportunities for hiking, biking, hunting, fishing and exploring in the forest and along the river.

Isinglass River Conservation Reserve in Strafford

In early 2008, a proposal by the Trust for Public Land (TPL), the Town of Strafford, and Bear-Paw Regional Greenways to conserve almost 300 acres along the Isinglass River was ranked first in the nation out of 44 projects eligible for federal Coastal and Estuarine Land Conservation Program (CELCP) funding. The New Hampshire congressional delegation also lent their support to the proposal. TPL led the effort by negotiating with the landowner and preparing the grant application. The Strafford Conservation Commission agreed to contribute to the project. The project partners worked to secure the \$1.3 million CELCP grant as well as support from NH Fish and Game, the Land and Community Heritage Investment Program (LCHIP), the Strafford School Administrative Unit, and private landowners.

This project, located off of Pig Lane in Strafford protected 7,800 feet of frontage along the Isinglass, property that was originally slated and approved for a 58-unit housing development. This is an extremely valuable conservation effort since the Isinglass at the time, was one of only 15 rivers in NH that are officially recognized as having outstanding natural and cultural resources. It is also home to vital habitat for a variety of wildlife species and a popular recreational destination for fishing, hiking, and for canoeing and kayaking.

The Isinglass River corridor possesses some of the highest quality wildlife habitat in the state and the presence of six threatened or endangered species at either the state or national level have been reported in the area.

B. The River Management Plan

In June 2002, the Isinglass River became one of 15 rivers designated at that time by the Governor and Legislature of the State of New Hampshire as deserving of extra protection under the state's Rivers Management and Protection Program (RMPP). The designation recognized the special qualities of the Isinglass River and, under the provisions of RSA 483, the designation

provides 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.

While designation of the Isinglass River improved the protection and management of the river itself, ongoing efforts at the local level are needed to address the use and conservation of the river corridor and watershed. Recognition by local citizens and officials of the Isinglass River's valuable contribution to the overall quality of life in their communities is evidenced by the twenty-four letters of support submitted in conjunction with the Isinglass designation into the RMPP.

River Management Plan Purpose and Goals

The primary purpose of the Isinglass River Management Plan is to incorporate the goals of the IRLAC, the corridor communities and the river users; and to protect the rivers natural, recreational, cultural and historic resources in the following ways:

1. Identify existing resources and current conditions
2. Identify priority management issues
3. Prioritize management issues and develop strategies to address them
4. Develop, implement, and periodically update an action plan to achieve the management priorities

The primary goal of the plan is to establish a unified framework from which river corridor communities and watershed communities can work together to achieve protection of the Isinglass River and its resources. Priority management issues identified in the plan include the following:

1. Water Quality and Quantity Protection
2. Flood Management and Remediation
3. Land Protection - Resource and Habitat Conservation
4. River Corridor and Watershed Planning
5. Stewardship, Education and Outreach

Scope of the River Management Plan

The River Management Plan focuses on the river corridor as described above and considers the character, resources, land use and development within the greater Isinglass River watershed in order to comprehensively evaluate linkages between river and watershed resources and uses, and to assess any potential threats to the river.

The River Management Plan identifies short-term, intermediate and long-term goals for river and watershed protection along with strategies to address them. An Implementation Plan organized the goals and strategies in a timeframe to allow for effective and timely implementation. With this Plan revision, many of the goals have been met or determined to be unnecessary for ongoing river protection, and IRLAC continues to work toward achieving the longer term goals.

Plan Development Process and Participants

The IRLAC worked with the Strafford Regional Planning Commission to develop the Isinglass River Management Plan. Tasks completed in development of the Plan included: mail surveys sent to property owners and elected officials; interviews with the Conservation Commissions in the Towns of Barrington and Strafford and the City of Rochester; key person interviews with representatives from local governments and agencies and nonprofit groups active in the watershed; and public informational meetings for review and comment on the draft and final river management plans.

Public Participation Process

Participants: Key Person Interviewees; elected officials and town administrators of Strafford, Barrington and Rochester; Strafford, Barrington and Rochester Planning Offices, Planning Boards and Conservation Commissions, and the Cocheco River Watershed Coalition.

1. Notified participants and watershed stakeholders of the opportunity to review and comment on the Final Draft River Management Plan to Participants.
2. Made available Final Draft River Management Plan to the general public for review and comment on the Strafford Regional Planning Commission website.
3. Notified elected officials, town and city staff, local land use boards, conservation commissions, stakeholders and other interested parties in the river corridor and watershed of the Community Meeting scheduled for June 2, 2008.
4. Submitted the Final River Management Plan to NH DES Rivers Coordinator for review and comment.
5. Met with IRLAC at their June 2008 meeting to finalize the River Management Plan.
6. Distributed the River Management Plan to IRLAC, watershed communities and other stakeholders in the region.
7. Posted the River Management Plan on the SRPC website for access to the public
8. Distributed press release to regional media outlets to notify the public of River Management Plan completion and where the Plan can be accessed.

Plan Revisions

For the 2017 plan review and 2018 revision, IRLAC met over a period of two year to review goals, objectives, and strategies for achieving them and to update the plan, including updating maps in consultation with Strafford Regional Planning Commission. IRLAC also contacted town officials, conservation commissions, and other interested parties (e.g., Trout Unlimited, Waste Management) to maintain open communication on conservation and preservation issues pertaining to the Isinglass River.

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CHAPTER II. THE ISINGLASS RIVER DESIGNATION

A. Summary

As part of its designation as a protected river, the Isinglass River was divided into three segments based on the land use and environmental characteristics of the river and river corridor – a natural segment and two rural segments. Following is a detailed description of each segment and a map showing their locations along the river corridor.

Table 1. Location and Length of Designated River Segments

Segment Designation	Location	Segment Length (linear miles)
Rural River	In the Town of Stafford from the outflow of Bow Lake Dam to immediately downstream of the Route 202A bridge	0.54
Natural River	From immediately downstream of the Route 202A bridge in the Town of Strafford to immediately upstream of the Route 126 bridge in the Town of Barrington	5.75
Rural River	From immediately upstream of the Route 126 bridge in the Town of Barrington, to the confluence with the Cocheco River in the City of Rochester	11.64
Total Miles		17.93

The middle reach of the Isinglass River from immediately downstream of the Route 202A bridge in the Town of Strafford to immediately upstream of the Route 126 Bridge in the Town of Barrington, a distance of 5.75 miles, is designated as a "natural river". Natural rivers constitute outstanding natural resource waters and are defined under RSA 483 as *"free-flowing rivers or segments characterized by the high quality of natural and scenic resources. River shorelines are in primarily natural vegetation and river corridors are generally undeveloped. Development, if any, is limited to forest management and scattered housing."* The lack of development, free flowing nature of the river, wetland complexes, and undisturbed riparian land that exists through this section clearly meets the requirements of this classification.

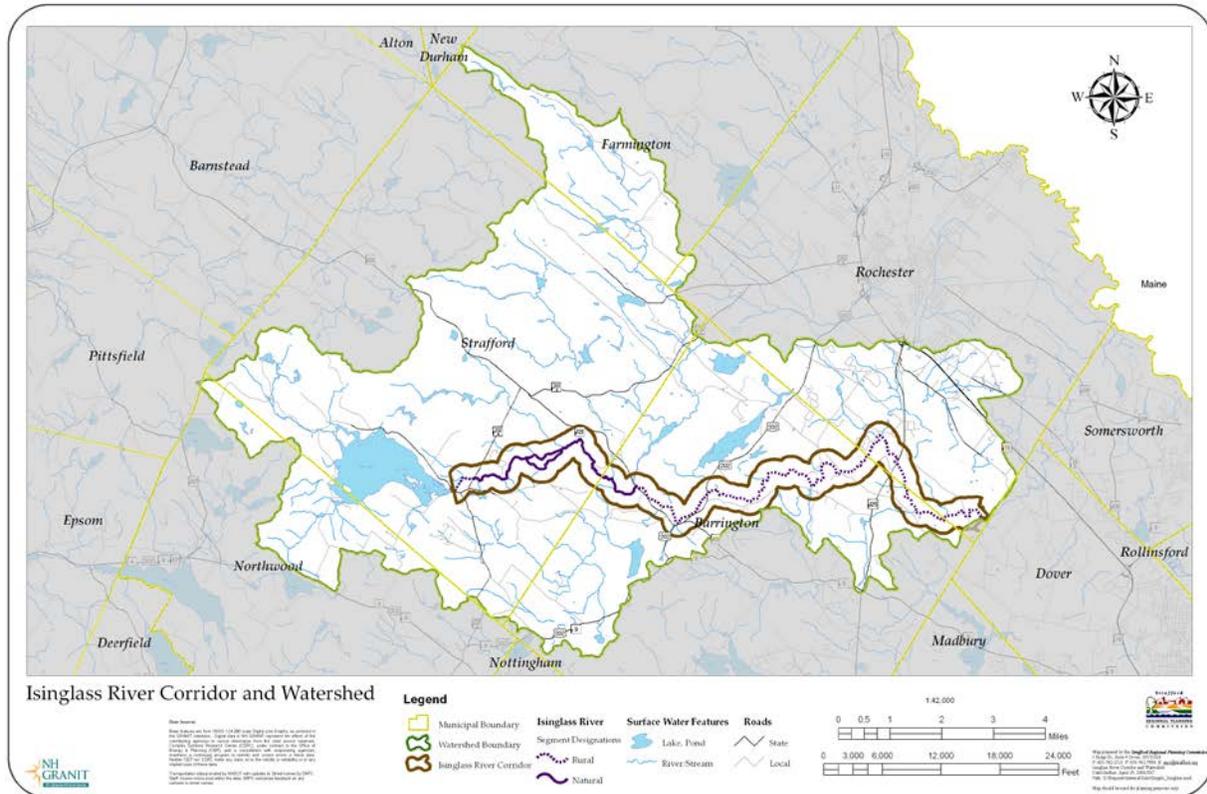
The River is a "rural river" in the Town of Stafford from the outflow of Bow Lake Dam to immediately downstream of the Route 202A bridge, a distance of 0.54 miles; and from immediately upstream of the Route 126 bridge in the Town of Barrington, to the confluence with the Cocheco River in the City of Rochester, a distance of 11.64 miles.

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 Isinglass River, as it flows through these sections, travels under numerous bridges and a combination of extensive forested uplands and

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wetlands, limited commercial development, and scattered residential housing. The result is a predominantly undeveloped section of river that clearly meets the definition of a rural river.

Figure 1. Watershed and Designated Segments Map



Shoreland Water Quality Protection Act

As compiled by NH Office of Energy and Planning, the Isinglass River is a fourth order river from its juncture with Nippo Brook in Barrington to its confluence with the Cocheco River in Dover. Fourth order rivers and streams are subject to the requirement of the Shoreland Water Quality Protection Act (SWQPA, formerly the Comprehensive Shoreland Protection Act or CSP A). However, with the 2007 changes to the statute, the entire designated length of the Isinglass River – from Bow Lake Dam to its confluence with the Cocheco River- is now subject to the requirements of the Shoreland Act and implementing regulations (Env-Wq 1400) as a designated river (see <http://des.nh.gov/organization/divisions/water/wetlands/cspa/>).

B. River Corridor and Watershed Characteristics

River Corridor

As defined by RSA 483, the Isinglass River Corridor includes the river and the land area located within a distance of 1,320 feet (one quarter mile) of the normal high water mark or to the landward extent of the 100 year floodplain as designated by the Federal Emergency Management Agency (FEMA), whichever distance is greater. The Isinglass River corridor is located within the communities of Strafford, Barrington and Rochester consisting of 4,768 acres of land and water. Refer to the river corridor and designated river segments shown in Figure 1.

Watershed

The Isinglass River watershed spans more than 10 times the area of the river corridor, spanning 51,399 acres of land and water and twice as many communities. However, the three river corridor communities (Strafford, Barrington and Rochester) represent nearly 86 percent of the total watershed area. The Isinglass River watershed (Table 2, Map 1 Appendix D) includes all or portions of the following communities: Barrington, Dover, Farmington, Northwood, Rochester, and Strafford. The Isinglass River corridor (land within 1,340 feet of the river’s banks) extends through the communities of Strafford, Barrington and Rochester.

Table 2. River Corridor and Watershed Acreage by Community

Community	% Community in Watershed	Corridor Acres	Watershed Acres	% Watershed Area
Barrington	44	2,612.7	13,638.2	26.5
Dover	0.1	0	13.1	0.03
Farmington	17	0	3,925.3	7.6
New Durham	<0.1	0	0.5	<0.1
Northwood	17	0	3,252.3	6.4
Rochester	24	812.7	7,078.5	13.8
Strafford	72	1,342.2	23,487.0	45.8
Total		4,767.6	51,398.6	

The Isinglass River is a tributary to the Cochecho River in the Piscataqua River Basin of southeast New Hampshire. The Isinglass River watershed comprises one-third of the Cochecho River watershed. The confluence of the Isinglass and Cochecho Rivers is near the City of Rochester and City of Dover boundaries.

Cochecho River Watershed Coalition

The Cochecho River Watershed Coalition (CRWC) - a non-profit advocacy group - was founded in 1998 (and disbanded in 2014) to maintain a healthy watershed by identifying and protecting important natural resources, by forming a water quality monitoring network, and by educating and engaging citizens in these efforts. The Coalition completed several comprehensive studies of the watershed including: *Cochecho River Watershed Environmental Quality Report*, February

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2005 (prepared for Cocheco River Watershed Coalition, Dover, NH by Thomas R. Fargo and Danna B. Truslow, D.B. Truslow Associates, Rye, NH), *Watershed Restoration and Implementation Plan for the Cocheco River*, June 2006 (prepared for Cocheco River Watershed Coalition, Dover, NH by Danna B. Truslow, D.B. Truslow Associates, Rye, NH). These studies include detailed information about water quality monitoring results on the Lower Isinglass River.

The *Watershed Restoration and Implementation Plan for the Cocheco River* recognized the Isinglass River as an integral component to achieving the goals of the Plan. The Plan included the following recommended actions relating to water quality in the Isinglass River subwatershed:

- Meet NH Class B water quality standards by 2015
- Reduce stormwater runoff volume and improve treatment at existing and future stormwater structures
- Increase use of best management practices and low impact development and innovative stormwater technology at 3 or more sites per year for no increased and/or reductions of pollutant loads

In May 2008, the Cocheco River Watershed Coalition submitted a nomination for designation of the Cocheco River to the New Hampshire Department of Environmental Services, Rivers Management and Protection Program and received designation in 2009. Indeed, designation of the Cocheco River enhances protection and management of resources for both rivers and throughout the greater Piscataqua watershed.

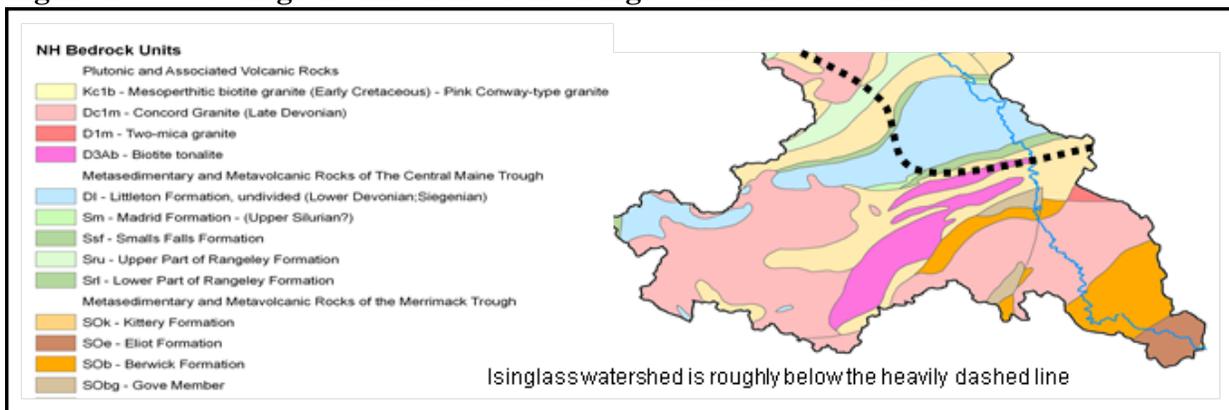
CHAPTER III. RESOURCE IDENTIFICATION

A. Natural Resources

Geologic Resources

Similar to most of New Hampshire, the bedrock underlying the Isinglass River corridor was covered by unconsolidated stratified drift deposits of till deposits following the last glaciation. These course-grained deposits are the basis for stratified-drift aquifers that are common and productive water sources in the watershed. These deposits also provide significant sources of gravel and sand for construction purposes. Much of the Isinglass watershed is underlain by plutonic and metasedimentary rock formations. Plutonic, or igneous, formations include coarse-grained granitic rocks. Figure 2 shows the distribution and description of these rock types. Topography is shown in Map 2, and soils are shown in Map 3 in Appendix D.

Figure 2. Geologic Formations of the Isinglass River Watershed



[Source: USGS, *Water Resources of New Hampshire and Vermont*, Pembroke, NH]

In areas where the underlying bedrock protrudes, unique rock formations are visible and account for the scenic cascades and waterfalls over which the river flows. A study of the river corridor's surficial geology concluded that the contemporary Isinglass riverbed is a remnant of a much larger river channel, known as the Mallego Channel, that was anywhere from 40 to 70 feet deep.

A valuable mineral - known as mica - was mined from the Town of Strafford during the early 1900s from igneous and volcanic bedrock formations (course grained granitic types) that are exposed on the land surface and underlay the watershed. Mica, also referred to as "Isinglass", was used commercially to make windows, lampshades, clock faces, and other goods and accounts for the river's name.

Aquifers

In New Hampshire, aquifers are classified into two major types: bedrock and stratified drift.

Bedrock Aquifers

Bedrock aquifers consist of fractured bedrock and ledge (highly fractured shallow bedrock). Interconnected fractures form fracture systems, which are highly variable in their occurrence, connectivity and potential water yield. Groundwater may be stored within fractures, and wells drilled into large fractures or extensive fracture systems may yield high amounts of groundwater. However, wells that do not hit a fractured area are likely to yield little, if any, water. One of the most reliable but often costly methods for locating fractures and fracture systems is by conducting geophysical mapping of the subsurface bedrock. Test wells are necessary to quantify potential water yield. The Isinglass watershed is underlain by bedrock, which provides sufficient yield for residential and some commercial uses.

Stratified Drift Aquifers

Stratified drift aquifers are composed of layers of sand and gravel deposited by retreating glaciers. These layers are partially or fully saturated by groundwater below the land surface. Water yield from stratified drift aquifers is highly affected by groundwater recharge from precipitation and snowmelt and atmospheric conditions (drought). These sand and gravel deposits are widespread in large river valleys and form broad gently to steeply sloping hills on the landscape. Stratified drift aquifers comprise nearly 14 percent of the total land area of the Isinglass watershed (Table 3).

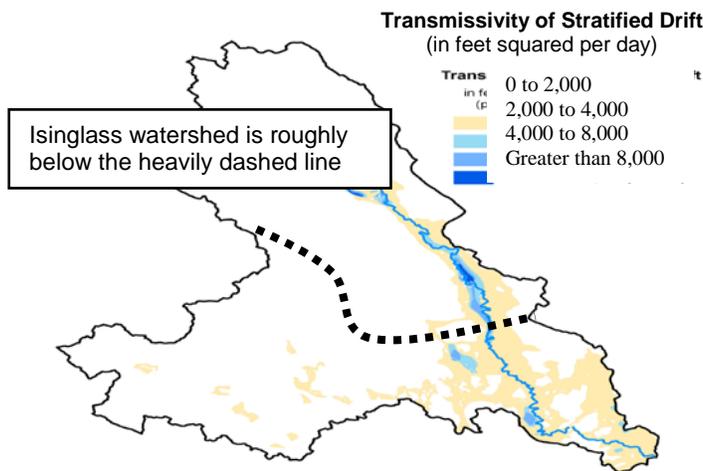
Table 3. Acreage of Stratified Drift Aquifers by Community

Community	Corridor Acres	Watershed Acres	% Watershed
Barrington	1,047.7	2,149.4	4.2
Rochester	579.4	4,238.3	8.3
Strafford	145.7	666.4	1.3
Total	1,772.8	7,054.1	13.7

Transmissivity

Transmissivity of stratified drift aquifers is estimated to be largely 0 to 2,000 feet squared per day, with isolated areas of 2,000 to 4,000 feet squared per day and 4,000 to 8,000 feet squared per day. Figure 3 illustrates the distribution and estimated transmissivity of stratified drift aquifers in the Isinglass River watershed.

Figure 3. Estimated Transmissivity of the Stratified Drift Aquifers of the Isinglass River Watershed



[Source: USGS, *Water Resources of New Hampshire and Vermont, Pembroke, NH*]

Local Protections of Groundwater Resources

Barrington has a Groundwater Protection Overlay District (Zoning Ordinance Article 12) that consists of the entire area within the municipal boundaries of the town and requires town-wide implementation of best management practices for all regulated development and development performance standards.

Rochester has an Aquifer Protection Zone (Zoning Ordinance Chapter 42.21) that limits impervious surface to 40 percent (up to 60 percent with sufficient treatment and recharge), and prohibits on-site disposal of solid wastes (other than brush or stumps), liquid or leachable wastes (other than from septic systems) or any materials or substances classified as hazardous by the State or the EPA.

Wildlife Resources

The Isinglass River corridor supports a diversity of habitats including wetlands, forests, and open space that is home to a wide variety of wildlife. Especially important are the large tracts (>500 acres) of unfragmented land that extend northward from the river corridor. Similarly, the wetland complexes scattered throughout the river corridor, such as those where Nippo Brook and the Mohawk River drain into the Isinglass, serve as important wildlife refuges and travel routes. A total of seven wildlife species listed as threatened or endangered at either the state or national level, have been reported in the Isinglass River corridor. These include the bald eagle, common loon, osprey, Cooper's hawk, common nighthawk, whippoorwill, and the small-footed bat. According to the New Hampshire Fish and Game Department, the wildlife habitat in the river

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corridor is rated as moderately diverse to very diverse depending on the potential for human encroachment. Map 4 in Appendix D shows New Hampshire's Wildlife Action Plan identified habitat types.

NH Wildlife Action Plan

The New Hampshire Fish and Game Department collaborated with partners in the conservation community to create the state's first Wildlife Action Plan (WAP). The plan, which was mandated and funded by the federal government through the State Wildlife Grants program, provides New Hampshire decision-makers with important tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern. It is a pro-active effort to define and implement a strategy that will help keep species off of rare species lists, in the process saving taxpayers millions of dollars. The WAP was updated in 2015 and is available at <http://www.wildlife.state.nh.us/wildlife/wap.html>.

The New Hampshire plan is a comprehensive wildlife conservation strategy that examines the health of wildlife. The plan prescribes specific actions to conserve wildlife and vital habitat before they become more rare and more costly to protect. The 2015 WAP reported that the Isinglass River corridor and watershed contain several Core Conservation Focus Areas and highest quality habitat in NH and in a biological region (as defined in the plan, Tables 4 and 5, Map 5 and Map 6 in Appendix D).

Table 4. Habitat Types as Identified in the NH Wildlife Action Plan [2015]

Habitat Type	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Appalachian Oak-Pine	2258.9	47.4%	14376.7	30.3%
Cliff and Talus	0.0	0.0%	53.8	0.1%
Floodplain Forest	155.2	3.3%	151.5	0.3%
Grassland	254.1	5.3%	2637.1	5.6%
Hemlock-Hardwood Pine	900.4	18.9%	19873.8	41.9%
Northern Swamp	0.0	0.0%	1.7	0.0%
Open Water	7.1	0.1%	1684.5	3.6%
Peatland	24.1	0.5%	568.6	1.2%
Rocky Ridge	0.0	0.0%	91.8	0.2%
Temperate Swamp	357.5	7.5%	1904.3	4.0%
Wet Meadow/Shrub Wetland	206.7	4.3%	2283.9	4.8%
*TOTAL	4767.6	87.3%	47393.5	92.1%

* The overall totals include the habitat type NLCD Developed Classes (603.0 acres within the corridor and 3765.8 acres within the watershed) and make up the remaining percentages.

Vegetation and Natural Ecological Communities

The vegetation occurring within the Isinglass River corridor is consistent with that found in the coastal drainage of New Hampshire and reflects a diversity of upland, lowland, and wetland plant species. New Hampshire's Natural Heritage Inventory (NHI) reports 11 plant species from the municipalities that the Isinglass flows through that are rare, of special concern, or threatened at the state level. As of the 2015 state listing, they are:

- American ginseng
- American water-awwort
- Canada shore quillwort
- climbing hempvine
- Engelmann's quillwort
- large yellow lady's slipper
- resupinate bladderwort
- smooth black sedge
- wild lupine

Black gum/red maple and northern New England rich mesic forest types have also been identified as "exemplary natural communities", as defined by NHI, that occur within the Isinglass corridor. It is important to note that much of the riparian zone immediately adjacent to the river is largely forested and acts as an important buffer providing shade and filtering of potential pollutants.

The Land Conservation Plan (LCP) for New Hampshire's Coastal Watersheds

To advance the long-term protection of exceptional and irreplaceable natural, cultural, recreational and scenic resources, the State of New Hampshire, acting through the NH Coastal Program and the NH Estuaries Project, developed a comprehensive, science-based land conservation plan - *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (2007). The overarching goal of the Plan is to focus conservation on those lands and waters that are most important for conserving living resources - native plants, animals, and natural communities - and water quality in the coastal watersheds. The Plan offers regional strategies for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and outstanding recreational opportunities into the future. The Plan identifies Conservation Focus Areas – areas where several resource values coincide and overlap, identifying locations with multiple conservation values and potentially higher priority for protection. *Conservation Focus Areas* are considered to be of exceptional significance for the protection of living resources and water quality in the coastal watersheds and consists of two parts: a Core Focus Area and a Supporting Landscape Area. *Core Focus Areas* contain the essential natural resources for which the focus area was identified, with the boundary fitted to the real world of roads, forest edges, rivers and wetlands. *Supporting Landscape Areas* comprise the natural lands that buffer and sometimes link core areas and help to maintain habitat and ecological processes. The Core Focus Areas and their habitat types identified in the Isinglass River corridor and watershed are shown in Table 5 and Appendix D, Map 6 – Conservation Focus Areas. Note that Map 6 includes 2010 Wildlife Action Plan Focus Areas in striped areas, 2006 Conservation Focus Areas in yellow,

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and permanently protected conservation parcels as of 2017 in green.

Table 5. Core Focus Area Habitat Types Identified in the NH Wildlife Action Plan [2015]

Habitat Type	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Appalachian Oak-Pine	16.8	0.4%	4028.0	8.5%
Cliff and Talus	0.0	0.0%	4.0	0.0%
Grassland	5.3	0.1%	677.9	1.4%
Hemlock-Hardwood Pine	14.1	0.3%	5395.1	11.4%
Northern Swamp	0.0	0.0%	1.7	0.0%
Open Water	0.0	0.0%	58.1	0.1%
Peatland	0.3	0.0%	295.0	0.6%
Rocky Ridge	0.0	0.0%	46.1	0.1%
Temperate Swamp	9.5	0.2%	396.8	0.8%
Wet Meadow/Shrub Wetland	26.8	0.6%	730.6	1.5%
Habitat Type Totals	72.8	1.5%	11633.3	24.5%
*TOTAL	4767.6	N/a	47393.5	N/a

* The overall totals include the habitat type NLCD (National Land Cover Database) Developed Classes (7.0 acres within the corridor and 443.1 acres within the watershed) and make up the remaining percentages.

Forests

Forested lands comprise 88 percent and 92 percent of the river corridor and watershed, respectively. Forested lands include a network of interspersed tributary streams and wetland complexes, including 2,946 acres of forested wetlands. The high percentage of forested conditions indicates a very low development density in the river corridor and watershed overall. As shown in Table 6 and Appendix D, Map 4 – Wildlife Action Plan Habitat Types, many tributaries, wetlands and other surface waters are buffered by forest cover.

Table 6. Forest Cover by Acreage and Type [NLCD, 2011]

Forest Cover Type	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Barren Land	52.2	1.1%	204.6	0.4%
Cultivated Crops	42.8	0.9%	156.3	0.3%
Deciduous Forest	201.6	4.2%	6192.1	13.1%
Emergent Herbaceous Wetlands	31.7	0.7%	415.5	0.9%
Evergreen Forest	831.8	17.4%	6026.6	12.7%
Hay/Pasture	158.7	3.3%	2282.8	4.8%
Herbaceous	61.3	1.3%	184.9	0.4%
Mixed Forest	1971.2	41.3%	20013.2	42.2%

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Forest Cover Type	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Open Water (ponds and lakes only, excludes rivers and streams)	3.6	0.1%	1844.0	3.9%
Shrub/Scrub	153.0	3.2%	1921.7	4.1%
Woody Wetlands	683.8	14.3%	4538.8	9.6%
*TOTAL	4767.6	87.9%	47390.4	92.4%

* The overall totals include all developed land (526.5 acres within the corridor and 3609.9 acres within the watershed) and make up the remaining percentages.

Wetlands

Within the watershed, wetlands identified by the U.S. Fish and Wildlife, National Wetlands Inventory (NWI) are located primarily adjacent to the Isinglass River and the major tributaries. Wetland types include freshwater emergent (seasonal or permanent open water), forested and shrub, riverine, lake, and pond environments. These freshwater wetlands constitute important riparian habitats within the watershed drainage system. Tables 7 and 8 report the acreage of wetlands by type and by community within the corridor and watershed.

Table 7. Wetlands by Type and Acreage in the River Corridor and Watershed

NWI Wetland Type	Corridor Acres	% Corridor Area	Watershed Acres	% Watershed Area
Freshwater Emergent	44	0.9	676	1.3
Freshwater Forested/Shrub	429	9.0	2,946	5.7
Freshwater Pond	16	0.4	283	0.6
Lake	1.1	0.02	67	0.1
Riverine	20	0.4	35	0.1
Total	510	10.7	4,006	7.8
Very Poorly Drained Soils (Hydric A)	177	3.7	2,742	5.3
Poorly Drained Soils (Hydric B)	411	8.6	5,068	9.9

[Source: National Wetlands Inventory (NWI)]

As shown in Appendix D, Map 1, Strafford, Barrington and Farmington have numerous isolated wetland complexes interspersed among large forested areas and within large blocks of undeveloped and agricultural lands. Wetlands are also prevalent within the riparian areas of the Isinglass River and many of the smaller tributaries.

In Dover and Rochester, the majority of wetlands are located on undeveloped forested lands, agricultural lands, within the riparian corridors of the Isinglass River and the Cocheco River and smaller tributaries. Several isolated wetland complexes are interspersed among large forested areas within large blocks of undeveloped lands.

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Table 8. Wetland Acreage in the River Corridor and Watershed by Community

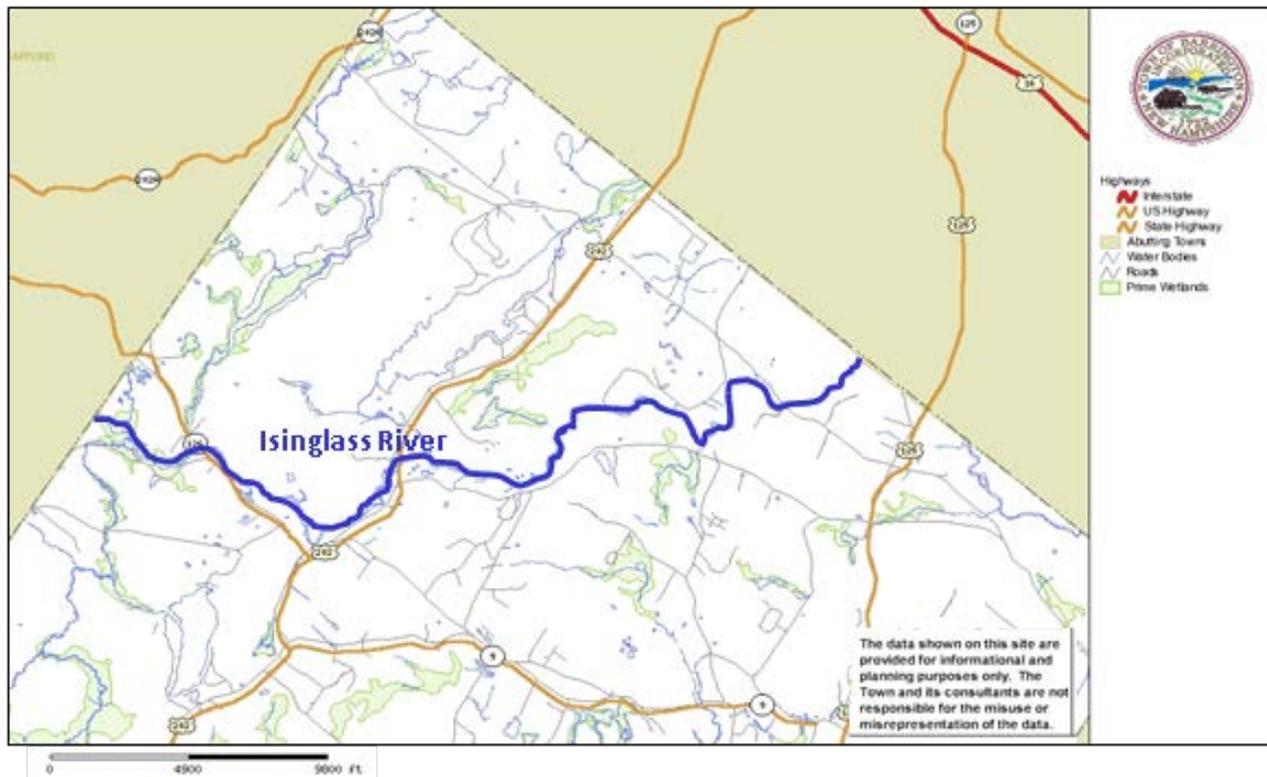
Community	Corridor Acres	Watershed Acres
Barrington	257.2	1,315.0
Farmington	0	287.6
Northwood	0	264.4
Rochester	73.7	423.9
Strafford	172.2	1,715.1
Total	503.1	4,006.1

[Source: National Wetlands Inventory (NWI)]

Prime Wetlands of Barrington

The Town of Barrington has designated Prime Wetlands (Figure 4), some of which are located within the Isinglass River corridor and all are within the watershed. The Barrington Zoning Ordinance, Article 9 Wetlands Protection District Overlay requires that a minimum buffer of one hundred (100) feet be maintained from the edge of a designated Prime Wetland. The ordinance provides that Planning Board may require a larger buffer around a Prime Wetland if an assessment of its functions indicates that such an increase is warranted to protect the roles the wetland serves that of value to the public or the environment.

Figure 4. Designated Prime Wetlands Adjacent to the Isinglass River in Barrington



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Streams and Rivers

As reported in the table below, the Isinglass River flows for 17.4 miles within the watershed. Tributary streams and rivers comprise 24.9 miles within the Isinglass corridor and 135.3 miles within the watershed. The Isinglass mainstem represents 13 percent of the total stream and river miles in the watershed.

Table 9. Miles of Tributary Streams and Rivers in the River Corridor and Watershed

Resource	Type	Watershed Miles	% Watershed Miles	Corridor Miles	% Corridor Miles
Isinglass River and River Segments				17.4	--
	Rural 1	11.1	8.2	11.1	44.5
	Natural	5.8	3.5	5.8	23.2
	Rural 2	0.5	0.4	0.5	2.1
Cocheco River		5.8	4.3	--	--
Streams/Rivers	Intermittent	58.1	42.9	3.1	12.3
	Perennial	77.3	57.1	21.9	87.7
	First Order	73.5	54.3	5.0	38.6
	Second Order	26.3	19.5	2.0	14.8
	Third Order	15.5	11.5	5.9	43.5
	Fourth Order	20.0	14.8	12.1	3.2
	Fifth Order	0.02	0.01	0	0
Total Miles		135.3		24.9	

[Source: National Hydrography Dataset (NHDES) November 2006]

Primary headwater streams - first order streams - comprise 54 percent of the total tributary stream miles within the watershed. Headwater streams having a watershed area less than one square mile are considered primary headwater streams, and can be ephemeral, intermittent or perennial. The health of larger streams, rivers, and other surface waters in the watershed depend upon an intact primary headwater stream network. In particular, the stream network in the upper parts of the watershed greatly affects downstream water quality.

The importance and benefits provided by primary headwater streams include: reduction of sediment delivery downstream, reduction in nutrient loading (nitrogen and phosphorous), flood storage and control, and wildlife habitat corridors and aquatic habitat. The economic reasons to protect and improve primary headwater streams include: protection of public drinking water sources; maintenance of recreational uses of lakes, ponds and rivers; minimizing damage to infrastructure (bridges, culverts, dams) and property; and maintaining channel morphology and land stability.

Fishery

Although the Isinglass River is naturally a warm water fishery, the river is managed by the NH Fish & Game as a put-and-take coldwater fishery that provides habitat for approximately 20 resident warm and coldwater fish species. Naturally occurring game species include the small and largemouth bass. Naturally occurring nongame fishes include common species such as bluegill, common shiner, fallfish, brown bullhead, and the common sucker. An uncommon nongame species, known as the blacknose shiner, is found in the Isinglass River and has very limited distribution in New Hampshire. Introduced game species include brook trout and rainbow trout. The river is stocked annually with these trout species. Last stocked in the Isinglass River in 1994, brown trout was recently reintroduced. Much of this stocking occurs in the Town of Barrington between routes 126 and 202.

The New Hampshire Fish and Game Department reports a diverse range of fish habitats in the Isinglass River. The free flowing nature, an extensive riparian buffer, high water quality (see below), and varied substrate types of the Isinglass River are the primary factors that account for the diverse habitats in the river.

Although the Isinglass has no dams, culverts for road crossings may act as barriers to fish passage particularly during periods of low flow, because of inadequate size, shape, design, installation, and/or maintenance. Barriers may occur due to excessive culvert height, accelerated stream velocity, and other factors such as excess sediment deposition. Assessment of inadequate culverts would need to be included as part of a feasibility study for fish passage improvement. In some cases, correction of one or more inadequate culverts may be required to improve passage upstream.

Water Quality

The Isinglass River has been designated a Class B water by the General Court. The Department of Environmental Services monitors the water quality of the Isinglass River at two trend stations, upstream of the Route 202 Bridge in Barrington and Rochester Neck Road Bridge in Rochester. In the summer of 2000, the IRPP first conducted volunteer monitoring on the Isinglass River and since then IRLAC members and volunteers have continued the water quality monitoring program. Based on sampling results from 1990 through 2017, the river generally fully supports the standards of this water quality goal. However, portions of the Isinglass River remain on the state's List of Impaired Waters primarily due to naturally occurring low pH and potentially for mercury caused by atmospheric deposition (all fresh waters in NH are listed for mercury). Occasionally under low flow conditions, dissolved oxygen concentrations can be low as well.

The significance of maintaining a high level of water quality in the Isinglass River is evidenced by the use of the river for recreational purposes, by the presence of a cold water fishery, and its use as a public water supply for the City of Dover. Water quality of the Isinglass River is also a significant contributing factor to the water quality observed in the Cocheco River downstream of their confluence. Refer to Chapter III Resource Assessment for a summary of water quality data.

Natural Flow Characteristics

From its headwaters at the Bow Lake dam in the Town of Strafford, the Isinglass River is one hundred percent free flowing. The Isinglass watershed is approximately 75 square miles and flows for 17.4 miles. The major tributaries of the Isinglass River include the Mohawk River, Nippo Brook, Berry's River, Green Hill Brook, and the outlets of Hanson and Ayers Ponds. Refer to Chapter IV, Section C for discharge data from the Isinglass River gage station.

Open Space

The Isinglass River corridor is predominantly undeveloped. From its beginning at the Bow Lake Dam, the river flows through a short section of moderately dense development in Bow Lake Village before crossing under route 202A. From this point to the route 126 crossing in the Town of Barrington (approximately 6 miles) the river flows through a large tract of undeveloped land consisting of forested uplands and wetlands. Only one distant residential development is contained within the river corridor in this section of river. Access to the river through this stretch is limited to fishing access at bridges (Rt 202A and Rt 126) and at the 300-acre Isinglass River Conservation Preserve.

Though some development is present below the Route 126 bridge downstream to the Route 202 bridge, the river is best characterized as rural, with minimal impact caused by roadways and scattered residential housing. Below the Route 202 bridge, the nearest roadway to the river is Scruton Pond Road. From here downstream to the Green Hill Road Bridge, high banks covered with a mix of deciduous and coniferous forests and a few seasonally wet floodplain areas buffer the river. Through this section of the river corridor, much of the land abutting the river is privately owned and remains undeveloped. In addition, the 300-acre A. Harlan Calef Isinglass Preserve which can be accessed from Town Farm Road and the River Walk (Kids of the River) along Scruton Pond Road provide river access.

A majority of the development within the Isinglass corridor occurs from the Green Hill Road Bridge downstream to the river's confluence with the Cochecho River. This development, however, is limited to small cluster housing, small commercial development on NH Route 125, and bridge crossings. In fact, one of the largest pieces of land dedicated to open space in the Isinglass corridor occurs within the City of Rochester and is owned by Waste Management of New Hampshire, known as the Turnkey Recycling & Environmental Enterprises facility. Waste Management of New Hampshire has dedicated over 100 acres of riverfront property from this operation to publicly accessible open space. Although no permanent development restrictions are placed on it, this parcel of land has a network of forested streamside trails, a picnic area, and a site for a canoe launch.

Additional information on open space is provided below in Section D. Recreational Resources, in Table 10 below, and on Map 8 in Appendix D.

Conserved Lands

The most effective way to ensure river protection in perpetuity is by putting lands into conservation easement. Nearly 14% of the Isinglass River corridor and nearly 13% of the watershed are protected under permanent conservation easements (Table 10, Map 7 in Appendix D).

Table 10. Permanently Protected Lands within the Isinglass River Corridor and Watershed

Municipality	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Farmington	0.0	0.0%	490.8	1.0%
Strafford	314.3	6.6%	3915.6	8.3%
Northwood	0.0	0.0%	25.5	0.1%
Barrington	347.6	7.3%	1396.8	2.9%
Rochester	3.1	0.1%	201.1	0.4%
TOTAL	665.0	13.9%	6029.8	12.7%

This analysis only calculated the acreage of lands that were classified as permanently protected

B. Managed Resources

Impoundments

There are no man-made impoundments on the Isinglass River. Six breached dam sites have been identified from a database maintained by the Department of Environmental Services. Several dams do exist on tributaries to the Isinglass River. Several beaver dams also exist in the Natural section of the river.

Water Withdrawals and Discharges

The City of Dover maintains the only registered water withdrawal (>20,000 gallons per day) on the Isinglass River. Dover withdraws an average of 830,000 gallons of water per day from the Isinglass River from a point just downstream of the Rochester Neck Road Bridge in the City of Rochester. The water is pumped to a recharge well and serves as public water supply. One additional withdrawal point is known within the watershed, on the Berry's River, a main tributary to the Isinglass River. Water is diverted from the Berry's River to the City of Rochester's water supply reservoir. However, because the city only reports the total amount of treated water they produce it is not possible to know how much of that water comes from the Berry's River. Currently no permitted point source wastewater discharges exist on the Isinglass River.

U.S. Geological Survey maintains a stream gage station on the Isinglass River at Rochester Neck Road. In addition, the City of Rochester maintains gages on the Berry's River, a main tributary to the Isinglass which supplies drinking water to the City. Refer to Chapter IV. Resource Assessment, Section C. Instream Flows for information and discharge statistics.

Instream Flows

As outlined in the Isinglass River Nomination, the Department of Environmental Services assisted the IRPP in an assessment of registered water withdrawals (>20,000 gallons per day) in relation to the proposed draft instream flow rules dated June 1, 2001 ("proposed rules"). The assessment identified two active registered water users within the Isinglass watershed, namely the Cities of Rochester and Dover. Both communities utilize surface waters within the watershed as municipal water supplies. The originally proposed instream flow rules would only be utilized: 1) as 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 2) for development of a water use management plan. NHDES conducted an instream flow pilot program on two rivers – the Lamprey and Souhegan and in 2015, developed a set of recommendations to the NH Legislature for expanding the program to protected rivers across the state.

Based on the analysis completed for the river nomination, it is apparent that the Isinglass would be one of many watersheds through which designated rivers flow that do not meet the General Standard under the proposed rules. Under the proposed rules, NHDES would create a priority list for those designated rivers or sections of designated rivers that require additional water use planning. Any further action on the priority list would be subject to legislative oversight, funding appropriation, an intensive river-specific study to determine the flows that are protective of the all the river's uses, including public water supply; and a negotiated water management plan that outlines each user's allocation of available water.

Riparian Interests and Flowage Rights

The only known dam flowage rights on the river belong to the New Hampshire Water Resources Board and were granted by the Public Service of New Hampshire in 1962 at all historic mill sites on the river. These rights do not detail any specific flooding elevation, rather "all rights of the grantor are transferred to the grantee".

Hydroelectric Resources

There are no existing hydroelectric power production facilities on the Isinglass River. Although potential hydroelectric power sites have been identified on the river, none have been pursued. Under the state's Rivers Management and Protection Program, establishment of new dams (such as for new hydroelectric facilities) is prohibited in Natural and Rural designated river segments. This restriction applies to the entire designated length of the Isinglass River.

C. Cultural and Historic Resources

Historic or Archaeological Resources

Similar to many of the waterways of New Hampshire, there is ample evidence of pre-European settlement in the Isinglass River corridor and watershed. Both artifacts and written histories of riverside trails suggest that native inhabitants of this region utilized the Isinglass River as a food and water source, as well as a travel way. Colonization of this region by European settlers led to more intense use of the resources contained within the river corridor and surrounding watershed,

including wood harvesting for ship masts and subsequent utilization of the river to transport the materials downstream to a more accessible seaport. At least nine historic mill sites are known to exist on the Isinglass River. These were used to produce a variety of goods ranging from flour to lumber. The remnants of these mill sites are still visible at several locations along the river, with perhaps the most impressive being the Locke Mill site in the City of Rochester. Other notable historic resources contained within the riverfront communities include the Ayers Lake Campground, eligible for historic listing at the state level; and the Squanamagonic Community, an example of pre-European development and a potential historic district.

Community Resources

The importance of the Isinglass River as a community resource is reflected in the local planning and protection efforts of the three communities along the River. The river is recognized extensively by the Town of Barrington and has been included in its *Regional Environmental Planning Report* and the Town's *Master Plan*. Strafford and Rochester have also recognized the importance of the river as a community resource through the lease or purchase of riverfront lands that ensure public access and protect the undeveloped nature of riparian lands.

D. Recreational Resources

Fishery

The Isinglass River is stocked annually with approximately 5,800 brook trout, and rainbow trout in the Strafford and Barrington sections of the river, and is managed by the New Hampshire Fish and Game Department as a "put-and-take" coldwater fishery. There are additional angling opportunities for warm water fish, including species such as bass. The Isinglass is considered an important seacoast trout stream by local anglers and is heavily utilized as such during May and June. Most of the fishing is done along Routes 126 and 202 in the Town of Barrington.

Boating and Other Recreational Uses

The free-flowing nature of the Isinglass River provides both challenging whitewater and relaxing flat-water boating opportunities for canoeists and kayakers. Below the Route 126 Bridge to the Route 202 bridge the river provides excellent access for anglers and paddlers. The rapids beginning along Route 126 and are best run in the spring at medium to high water. Published river guides rate the river as Class II whitewater recreational site. Less challenging stretches of the river provide paddlers with opportunities for wildlife and scenic viewing.

Swimming, hiking, and bird watching are other recreational activities that people enjoy in or near to the Isinglass River. The multipurpose recreational facility (Gonic Trails) owned by Waste Management of New Hampshire provides opportunities for hiking, swimming, and picnicking. Recent efforts by the Town and volunteer groups in Barrington resulted in the establishment of a riverside park with walking trails. The Pig Lane Road access is a popular walking trail and affords excellent opportunities to see upland wildlife species such as deer and owls. Table 11 and Map 8 in Appendix D describe these areas.

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Table 11. Recreational Areas in the Isinglass River Watershed

Town	Site Name	Primary Use	Activities
Barrington	Camp Fireside	Campground	Archery Range, basketball, playground, swimming, fishing, boat launch
Barrington	Ayers Lake Campground	Campground	Vacation camp, playground, fishing, swimming, boat launch, horseshoe pits
Barrington	Nippo Lake Country Club	Golf	Golf course (9/18 holes), driving range, horseshoe pits
Barrington	Calef's Field	Field Sports	Baseball, softball
Barrington	Stonehouse Pond	Field Sports	Fishing, access point, hiking, walking, natural area
Barrington	Bow Lake Public Boat Ramp	Water Sports Area	Fishing, access point, natural area
Barrington	Barrington Youth Association	Field Sports	Baseball, softball
Barrington	Kids of the River	Hiking	Hiking, walking, swimming
Barrington	A. Harlan Calef Isinglass Preserve	Hiking	Hiking, walking
Northwood	Mary Waldron Beach	Water Sports Area	Swimming, fishing, access point, picnicking, canoeing
Northwood	Bennetts Bridge Beach	Water Sports Area	Fishing, access point, picnicking, canoeing, swimming
Northwood	Coe-Brown Northwood Academy	Field Sports	Basketball, baseball, softball, gymnasium
Rochester	Paradise Park	Field Sports	Baseball, softball, disc golf
Rochester	Gonic Trails	Hiking	Hiking, walking, natural area
Rochester	Rochester Country Club	Golf	Golf, weddings
Strafford	Crown Point Camping Area	Campground	Campground
Strafford	Center Strafford Elementary School	Field Sports	Basketball, baseball, softball, playground, gymnasium
Strafford	Bow Lake Town Beach	Water Sports Area	Swimming, canoeing, picnicking
Strafford	Isinglass R. Conservation Reserve	Hiking	Hiking, walking
Strafford	Strafford Town Forest	Hiking	Hiking, walking

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Public Access

There are 13 public and private access points to the Isinglass River (Table 12), some publicly owned and some privately owned. Refer to Appendix D, Map 8 for locations of these areas.

Table 12. Public and Privately-Owned Access to the Isinglass River

Town Name	Site Location	Type of Access
Barrington	Route 126 Isinglass Bridge*	Path to river edge for viewing, fishing, or canoe carry-in
Barrington	Route 126 just west of Province Road*	Walk to river edge for viewing, fishing, or canoe carry-in
Barrington	Route 202 Bridge*	Walk to river edge for viewing, fishing, or canoe carry-in
Barrington	Keliher Road to Town Farm Road*	Walk in approximately one mile for viewing or fishing
Barrington	White Bridge off Scruton Pond Road to west side of bridge*	Walk to river edge for viewing, fishing, or canoe carry-in, walk in from road 1/4 mile
Barrington	White Bridge off Brook Road	Canoe access by walking to bridge
Barrington	Green Hill Bridge with informal access to Barr Farm*	Walk to river edge for viewing, fishing, or canoe carry-in
Rochester	Boston & Maine railway bed off Flagg Rd	Walk to river edge for viewing, fishing, or canoe carry-in
Rochester	Route 125 Bridge	Walk to river edge for viewing or fishing
Rochester	Rochester Neck Road at Turnkey Recreational Area	Off-road parking, trails, swimming, fishing, cross-country skiing, viewing of Locke Mills
Strafford	Province Road Bridge	Walk to river edge for viewing, fishing
Strafford	Route 202A Bridge	Walk to river edge for viewing, fishing
Strafford	Foss Mill (Off Pig Lane)	Rough terrain for bank viewing of mill site

* Indicates informal access. Access information acquired locally and from NH Office of State Planning (OSP), January 6, 1998 and from local residents. The table showing public access points has been expanded from the OSP list by local sources.

Scenery

Scenic opportunities abound in the Isinglass River corridor including at the following locations:

- The Isinglass River Conservation Reserve provides a variety of scenic amenities throughout its trail network including riparian forests, beaver bogs, former mill sites and stone cellar holes, and views of the river itself.
- Immediately upstream of the Route 202 Bridge crossing the remains of Twombly's Grist Mill can be viewed as well as the narrow sluice that the river flows through.
- The Barrington Isinglass River Walk (Kids of the River trail) offers a trail system (for non-motorized use) with scenic views of the Isinglass River and riparian forests.
- The Locke Mill site provides, perhaps, the most spectacular view along the river. At this location, visitors are able to observe a 25-foot waterfall and in the springtime, when water levels are high, get a sense for the power of the river.

Bow Lake Dam



Pig Lane



Route 202 Bridge



Locke Falls



CHAPTER IV. RESOURCE ASSESSMENT

A. Water Quality and Biological Monitoring

Water Quality Monitoring

Water quality measurements repeated over time create a picture of the fluctuating conditions in rivers and streams and help to determine where improvements, restoration or preservation may benefit the river and the communities it supports. Water quality results are also used to determine if a river is meeting state and federal surface water quality standards. Volunteer monitoring results, meeting DES Quality Assurance and Quality Control (QA/QC) requirements, supplement the efforts of DES to assess the condition of New Hampshire surface waters. Along with data collected from other water quality programs, specifically the State Ambient River Monitoring Program, applicable volunteer data are used to support periodic DES surface water quality assessments. Assessment results and the methodology used to assess surface waters are published by DES every two years (i.e., Section 305(b) Water Quality Reports) as required by the federal Clean Water Act.

Volunteer River Assessment Program

The Isinglass Volunteer River Assessment Program (VRAP) has conducted annual volunteer water quality monitoring on the Isinglass and within the watershed since 2002. Field sampling is conducted for air and water temperature, turbidity, pH, dissolved oxygen (in mg/l and % saturation) and specific conductance. Sampling conducted on a monthly basis occurs at six locations on the Isinglass mainstem and baseline monitoring was conducted at tributary locations. As time and resources allow, limited sampling is also conducted of *E. coli*, chloride, and total phosphorous and submitted for laboratory analysis. The monitoring program uses a field metering kit donated by Waste Management of New Hampshire, laboratory analysis conducted by NHDES and donations of both time and materials/supplies from a core group of Isinglass volunteers.

Current and historical water quality data has been analyzed and presented by NHDES in their annual “Isinglass River Watershed Water Quality Reports” available on the DES website at <http://des.nh.gov/organization/divisions/water/wmb/vrap/isinglass/index.htm>. This data will be used for future river and tributary water quality assessment and for purposes of prioritizing IRLAC’s future direction and activities within the watershed. In general, pH in the river is lower than state standards, primarily due to the influence of beaver flowages in tributaries. Dissolved oxygen remains within water quality standards except possibly during very dry periods of low flow. Temperature follows ambient air temperature and is moderated slightly (keep cooler) by the presence of vegetative cover in many sections of the river. River water is generally very clear with very low turbidity, and specific conductance is generally low, increasing in downstream sections of the river due to increased runoff loading from roads and developed lands. Bacteria (*E. coli*) primarily from wildlife, and constituents indicative of agricultural and developmental runoff, are generally low except after heavy rain events where temporary increases are common. Overall the Isinglass River remains one of the cleanest in southeast New

Hampshire.

Biological Monitoring

Although the Volunteer Biological Assessment Program (VBAP) was established in 2005 to supplement biological data collected by the New Hampshire Department of Environmental Services Biomonitoring Program it is no longer funded by the State of New Hampshire. Data from that time period was collected by state staff and IRLAC volunteers. Biotic scores with corresponding narrative categories to describe general water quality were formulated based on macroinvertebrates found in the samples collected. Before collecting macroinvertebrates, an assessment of in-stream and riparian habitat was completed at each station and a representative sampling reach was identified and measured. Macroinvertebrates were then collected, identified and counted to compute a biotic score (estimated abundance and percentage of EPT - Ephemeroptera, Plecoptera, Trichoptera – pollution intolerant species indicative of high water quality) with a corresponding narrative category describing general water quality. Additional chemical parameters were measured using VRAP Standard Operating Procedures and handheld meters provided by NH DES. Biotic scores range from “good” to “excellent” throughout the Isinglass River watershed.

Lay Lakes Monitoring Program

The Bow Lake Campowner’s Association has participated in the New Hampshire Lakes Lay Monitoring Program (LLMP) since 1983. Volunteer water quality data are collected in Bow Lake between June and September. Generally speaking, Bow Lake is an “aging” lake, meaning it is transforming through the process of eutrophication, a natural process by which all lakes age and progress from clear, pristine lakes to green, nutrient enriched lakes over thousands of years. However, low dissolved oxygen concentrations near the lake bottom suggest Bow Lake is better characterized as a borderline unproductive/moderately productive “transitional” nutrient lake. Bow Lake water quality data reports are available at http://extension.unh.edu/resources/tag/llmp%40bow_lake.

B. Watershed Stream Assessments

During the fall of 2007, a small group of IRLAC members reviewed published approaches to stream assessment and different examples of field data sheets. The group developed a four-page field data sheet to assist volunteers in assessing conditions and collecting data within 100 feet of the river’s edge, as well as on both sides of the riverbank. Seven Isinglass volunteers gathered for an informal training session on using the new data sheets; approaches to field work; considerations for accessing the river via private property; and personal safety precautions to take while conducting stream assessments. The group then split up into two groups to perform their first assessments of two river segments on the Isinglass mainstem: one along Route 126 upstream of the junction of Routes 126 and 202; and one segment upstream of the Route 125 bridge.

This program was superseded by the NH Geological Survey’s 2009 comprehensive fluvial geomorphological flood hazard investigation of the Isinglass River. The purpose of the survey

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was to assess the river condition to identify areas at greatest risk for future erosion and channel adjustment. The survey used geomorphic assessment protocols developed by the Vermont River Management Program adapted for use in New Hampshire.

The survey included mapping of erosion hazards along the entire river, taking of thousands of photographs, and scientific analysis of the potential for flood-related impacts from river channel changes, bank collapse, severe erosion, bridge and culvert washouts, stream habitat health, and the compatibility of existing stream crossings with the natural flow and sediment transport dynamics of the river. The Isinglass survey identified several areas with very high to extreme fluvial erosion hazards primarily in the downstream reach in Barrington and Rochester, with more limited hazard potential in the area downstream of the Route 126 bridge (Table 13, Map 10 in Appendix D). This information was shared with riverfront municipalities for use in local land use and hazard mitigation planning.

Described below are the reaches in which the fluvial erosion hazard sensitivity was extreme or very high and for which specific issues were identified in the field that increase the risk of further bank and bed erosion and potential property impacts during floods.

Table 13. Isinglass River Fluvial Erosion Hazard Zones

Fluvial Erosion Hazard Zones	Corridor Acres
Strafford	
Moderate	40.6
High	55.5
Very High	14.9
Isinglass River Corridor	1342.2
Wetlands	167.7
100-Year Floodplain	161.2
Barrington	
Moderate	42.7
High	185.7
Very High	83.7
Extreme	74.4
Isinglass River Corridor	2611.8
Wetlands	271.5
100-Year Floodplain	302.9
Rochester	
Extreme	125.8
Isinglass River Corridor	795.8
Wetlands	63.5
100-Year Floodplain	123.9

Reach 1 - Barrington-Rochester town line downstream to Cocheco River confluence: The river flows by the Waste Management facility in Rochester and bank erosion is present. Erosion hazards are high since the river banks are naturally composed of considerable quantities of sand which is easily erodible by the force of the river during floods. Riprap is present along the banks at two locations which tends to transfer river energy to locations downstream. This can further increase erosion in areas of loose bank material such as sand. It appears that the river in this reach has downcut (eroded downward) over time.

Reach 2A - Barrington-Rochester town line to a point 4,550 feet upstream: River banks in this reach are steep, largely composed of loose sand, and have many undercut locations in which hollow areas exist behind moss-covered, exposed tree roots extending outward from the banks. Sections of this reach are unnaturally straight, suggesting that portions of the reach were straightened at some time in the past, though the reasons, timeframe, and agent are unknown. The result has been downcutting and erosion. The river meanders through well-developed side bars indicating that the river is forming new floodplain within the area in which it is downcut. This is a typical response to past river straightening, and indicates that the river has been under adjustment.

Reach 2B – Upstream of Reach 2A: The channel divides into a primary path to the left of an island, and a secondary path to the right. At the time of the 2009 survey, there were six pieces of large woody debris in the secondary channel. Some sediment buildup was also noted. Also in this reach, surveyors noted a large flood chute (path that the river occupies during very high flows) along the left bank (looking downstream) that is connected to the top of the bank and appears to carry water at very high flows (likely higher than the 100-year event). This shows that the river is capable of flowing onto the floodplain with erosion capacity.

Reach 4A – From upstream of the Stillwater Circle subdivision downstream to a waterfall: At the powerline crossing located just downstream of Stillwater Circle, there is a mass failure that has occurred on the outside of the meander bend on the approach to the area. Numerous stormwater inputs exist in this area, including a road ditch, a tile drain, an urban stormwater input, a culverted natural outfall and a 9-inch corroded steel pipe. Woody debris jams were also observed throughout the reach with deposition of sediment upstream of the jams.

Reach 4B – Upstream of Stillwater Circle: Similar to Reach 2A, the river here has been straightened which has led to downcutting and the formation of side bars and meanders. Also, minor flood chutes crossing the inside of meander bends suggest some potential for the channel jumping its path during a very high flow.

Reach 5 – From 4,190 feet upstream of the Green Hill Road bridge crossing to 1,090 feet downstream of the crossing: The extreme sensitivity assigned to this reach is the result of the level of downcutting and cross-sectional data collected during the survey.

Reach 11 – Route 126 crossing downstream to wetland: Channel riffles are eroded and incomplete. Flood chutes are present including one located behind a house. There is evidence that some flood chutes may have been part of the main river channel at some point in the past.

C. Water Withdrawals

There are currently two active registered water users within the Isinglass watershed, namely the Cities of Rochester and Dover. Both communities utilize surface waters within the watershed as municipal water supplies. The City of Dover maintains the only registered water withdrawal (>20,000 gallons per day) on the Isinglass River. Water is diverted from the Isinglass River just downstream of the Rochester Neck Road Bridge in the City of Rochester and pumped to a recharge well, located in the greater Cocheco River Watershed, and which serves as a public water supply. The City of Rochester has a registered water withdrawal for diversion of water from a main tributary of the Isinglass River, the Berry's River, to the City's water supply reservoir in Farmington and further downstream, to the water supply reservoir located on Route 202A. The City of Rochester maintains stream gages at Kristie Lane in Strafford and at Crown Point Road on the Strafford/Rochester town line. Both the Rochester and Dover withdrawals represent significant inter-basin transfers of water out of the Isinglass River subwatershed.

C. Instream Flows

Annual observations confirm that the Isinglass River is flow limited during the summer months in response to management of water levels at Bow Lake. Annual observations also confirm that the Berry's River is flow-limited during the summer months, which may signal a response to direct water withdrawals.

Isinglass River Discharge

Since 2003 the US Geological Survey has maintained a stream gage in the Isinglass River just upstream of its confluence with the Cocheco River (USGS Gage Station # 01072870) as listed in Table 14.

Table 14. Calendar Year Discharges of the Isinglass River

Year	Annual Average Discharge (cfs)	Annual Peak Discharge (cfs)
2003	128.7	862
2004	130.0	1,740
2005	210.9	1,780
2006	214.3	4,370
2007	Not reported	6,160
2008	215.5	1,140
2009	162.8	1,190
2010	156.6	3,020
2011	175.8	1,310
2012	99.2	976
2013	102.7	635
2014	132.7	1,160
2015	82.2	1,060
2016	Not yet reported	947

[Source: USGS gage data http://waterdata.usgs.gov/nh/nwis/inventory/?site_no=01072870&agency_cd=USGS.]

D. Water Quality

Point Source Pollution

Currently no permitted point source wastewater discharges exist on the Isinglass River. A comprehensive inventory of potential point sources of contamination has not been developed for the Isinglass River corridor and watershed. The NHDES maintains a database of Potential Contamination Sources within wellhead and water supply protection areas as well as a database of property owners and businesses that contain point sources of pollution such as hazard waste generators, and underground and above ground storage tanks. One unpermitted point source discharge was discovered by IRLAC during a river cleanup and NHDES was notified. DES worked with the property owner to close the discharge and replace a commercial septic system. IRLAC continues to monitor the river during water quality testing and river clean ups and has notified Waste Management on several occasions about illegal dumping of construction debris, construction chemical containers and window air conditioners that are occasionally found at the Rochester Neck Bridge water quality monitoring site.

Non-Point Source Pollution

Stormwater

Storm water is generated by precipitation, surface runoff and snow melt from land, pavements, building rooftops and other impervious surfaces. Studies conducted in the northeast and by the Center for Watershed Protection (Maryland) have documented that by converting as little as ten percent of a watershed to impervious surfaces, stream water quality, stream channel structure, and species habitat begins to deteriorate. Above 25 percent impervious surface cover, water quality is seriously degraded. The 2005 report *The Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*¹, found that, at sites with between 8 to 14 percent impervious surface, the watershed generally showed changes in stream quality as measured by reductions in the combined water quality, habitat condition and biological condition score for these sites.

Other Sources

Other potential sources of non-point source pollution include: subsurface waste disposal systems, road salt and maintenance, underground and aboveground storage tanks, agriculture, forestry, silviculture, and resource extraction. There is no comprehensive inventory or estimate of pollutant contribution from these types of potential nonpoint sources of pollution in the Isinglass watershed. Agriculture, forestry, silviculture, and resource extraction are regulated by federal and state laws and require implementation of best management practices to protect water quality on active sites. New and replacement subsurface waste disposal systems are permitted by the state; however, malfunctioning and failing septic systems can go undetected as there are no routine inspection procedures in most communities.

¹ Deacon, Jeffrey, R., Soule, Sally A., and Smith, Thor E., *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*, U.S. Geological Survey Scientific Investigations Report 2005-5103.

CHAPTER V. LAND USE ASSESSMENT

Map 9 – Zoning and Land Use Assessment Map (in Appendix D) graphically summarizes land use elements for each corridor community including: protected lands, locally regulated buffers, setbacks and overlay districts, state regulated buffers and setbacks, and local land use and zoning districts. The following sections of this Chapter will describe in detail each of these elements.

A. Assessment of Land Use in the River Corridor and Watershed

Land Use in the River Corridor

Developed land within the river corridor is predominantly residential (Table 15, Map 9 in Appendix D). Two residential subdivision developments are situated along the Isinglass: one just below Route 202A in the Town of Strafford and a second off Flagg Road in the City of Rochester. The remaining residential development is scattered throughout the river corridor on individual lots. Industrial and commercial land use within the corridor is limited to a motel, a construction equipment rental company, an auto body business, and an inactive gravel pit. The Waste Management of New Hampshire landfill facility in Rochester represents by far the largest industrial activity within the corridor. However, it is set back from the river and has an extensive forested riparian corridor between the landfill and the river.

In comparison, undeveloped lands represent approximately 3,800 acres or nearly 81 percent of the total area of the river corridor. Approximately 217 acres – a mere 5.7 percent - of these undeveloped lands are within regulatory buffers and setbacks from the river where development is restricted or prohibited altogether. Ultimately, there remains great potential for conversion of undeveloped lands within the river corridor.

Land use throughout the watershed follows similar trends as the river corridor, with residential uses accounting for 10 percent or 4,853 acres of developed lands. Although the percent of undeveloped lands increases only slightly to nearly 86 percent at the watershed scale, the amount of land available for potential development is far greater – 40,695 acres within the watershed.

Table 15. Land Use by Acreage and Type [SRPC, 2015]

Land Use Classification	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Residential (single family/duplex, multi-family, low rise apartment and townhouses, mobile home parks)	573.7	12.2%	4853.6	10.2%
Commercial (retail, wholesale, services, lodging, office park, government, institutional, educational, indoor cultural/public assembly)	51.2	1.1%	212.4	0.4%
Industrial (industrial, mining)	5.7	0.1%	44.0	0.1%
Transportation, communication, utilities	184.4	3.9%	972.2	2.1%

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Land Use Classification	Corridor Acres	Corridor Area (%)	Watershed Acres	Watershed Acres (%)
Municipal (outdoor recreation, cemeteries, maintained open areas, vacant land)	96.5	2.0%	613.8	1.3%
Undeveloped Land (agricultural, brush or transitional, forest land, water, wetlands, disturbed land, other barren lands)	3806.5	80.7%	40694.8	85.9%
TOTAL	4718.0	100.0%	47390.8	100.0%

B. Local Zoning Districts and Use Regulations

Nearly 66 percent of the river corridor and watershed are zoned for agricultural and residential uses only (Table 16, Map 9 in Appendix D).

Table 16. Area of Zoning Districts in the Watershed by Community

Community	Zoning District	Corridor Acres	% Corridor Area	Watershed Acres	% Watershed Area
Barrington	General Residential	2,295	48.2	11,571	22.5
	Neighborhood Residential	205	4.3	701	1.4
	Village	0	0	217	0.4
	Regional Commercial	32	0.7	528	1.0
Dover	Rural	0	0	13	0.1
Farmington	Agricultural Residential	0	0	3,872	7.5
New Durham	Residential/Agricultural	0	0	0.5	negligible
Northwood	General	0	0	3,194	6.2
	Agricultural	337	7.1	4,303	8.4
	Residence 1 and 2	0	0	1,112	2.0
	Industrial 2, 4, 4A	193	4.1	1,558	1.5
Rochester	Business 1 and 2	0	0	106	0.01
	Agricultural/Residential	1,342	28.2	22,205	43
Zoning District Totals by Type					
Agricultural		337	7.7	4,303	8.7
Agricultural/Residential		3,842	87.2	32,475	65.8
Village		0	0	217	0.5
Commercial/Industrial/General*		225	5.1	5,386	10.9

* General District includes residential and nonresidential uses

Environmental and Resource Based Overlay Districts

Each community has adopted environmental and resource based Overlay Districts that apply within the river corridor and/or watershed.

Barrington

Wetlands Protection District Overlay (Article 9). Requires a 50-foot buffer from the edge of any wetland and a minimum 100-foot buffer from prime wetlands.

Shoreland Protection District Overlay (Article 11). Requires a 75-foot setback for structures from the shoreline of perennial streams and lakes or ponds greater than 2 (two) acres, and a 100-foot setback for structures from the mean high water mark of the Isinglass River.

Groundwater Protection District Overlay (Article 12). Consists of the entire area within the municipal boundaries of the town; requires town-wide implementation of best management practices for all regulated development and performance standards for uses including storage of manure, fertilizers, and regulated substances; requires performance standards for uses within the Stratified Drift Aquifer Area, including implementation of a stormwater management plan for uses that render impervious more than 15 percent or more than 2,500 square feet of any lot, and any additional studies necessary to protect the quality of groundwater.

Floodplain Management District Overlay (Article 13). All new construction or substantial improvements must be designed to prevent flotation, collapse or lateral movement of structures; constructed by methods and practice that minimize flood damage; and designed to minimize or eliminate discharges from water and sewer systems to flood waters. This Article also requires that all new construction or substantial improvements be elevated to, or above the 100-year flood elevation and flood proofed below the 100-year flood elevation.

Rochester

Conservation Overlay District (Chapter 42.19). Requires buffers for protected rivers, perennial streams and wetlands, and identifies specific high-risk uses and activities that are prohibited within the District.

Regulatory Floodway Zone (Chapter 42.20). Prohibits any development or encroachment resulting in an increase in flood levels during the base flood discharge. New and replacement water and sewer systems proposed in flood prone areas will be designed to minimize or eliminate infiltration of flood waters and located to avoid impairment or contamination during periods of flooding. Documentation of certification of flood-proofing and the as-built elevation of all new or substantially improved structures must be provided. All new construction and substantial improvements of residential and non-residential structures shall have the lowest floor and basement elevated at or above the 100-year flood level (non-residential structures and utility/sanitary facilities can alternatively be flood-proofed).

Aquifer Protection Zone (Chapter 42.21). Limits impervious surface to 40 percent (up to 60 percent with sufficient treatment and recharge); and prohibits on-site disposal of solid wastes (other than brush or stumps), liquid or leachable wastes (other than from septic systems), or any materials or substances classified as hazardous by the State or the EPA.

Cluster Development (Chapter 42.24). Restricted to the Agricultural Zone with a minimum lot size of 10,000 square feet for single family and 7,500 square feet for each dwelling unit in a multi-family dwelling. All lots must connect to public water and sewer. All land not part of lots or streets shall be designated common land. Density shall not exceed one and a half (1.5) times the number of lots permitted in the Agricultural Zone, however density may be increased up to two times the permitted number of lots when state certified affordable housing is provided;

Strafford

Shoreland Protection (Article 1.4.1.J). The Town adopted the State Comprehensive Shoreland Protection Act (CSPA, now the SWQPA) as a local ordinance, giving the Town authority to enforce the provisions of the Act.

Conservation Development (Article 1.4.3). Development density as permitted by conventional zoning requirements (minimum lot size of 2 acres) but awards a maximum 10 percent density bonus for additional and innovative protection of viewscales, meadows, water bodies, wetlands, wildlife habitat and corridors, creation of central greens or common lands, or protection of mature well-stocked forest land.

Wetland Conservation Overlay District (Article 1.4.4). Requires setbacks for structures and septic systems from the river, and buffers to wetlands, perennial streams and vernal pools.

Minimum Lot Size

State Requirements -

As required by the Comprehensive Shoreland Protection Act (CSPA now the SWQPA) within the 250-foot protected shoreland, minimum lot size in areas dependent on septic systems shall be determined by soil type and suitability.

Local Requirements

Minimum lot size requirements vary widely by community and by zoning district. Lot size requirements by community and zoning district are summarized in Table 17 below.

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Table 17. Minimum Lot Size for Local Zoning Districts in Watershed by Community

Community	Zoning District	Minimum Lot Area
Barrington	General Residential	80,000 sf ¹ (1.84 acres)
	Neighborhood Residential	
	Regional Commercial	40,000 ² (0.92 acres)
Dover	Rural	n/a
Farmington	Agricultural/ Residential	3 acres
New Durham	Residential/ Agricultural	60,000 sf ³ (1.4 acres)
Northwood	General	2 acres
Rochester	Agricultural	40,000 sf (0.92 acres) without services, 30,000 sf (0.69 acres) with water or sewer, 20,000 sf (0.46 acres) with water + sewer
	Industrial I2, I4, I4A	
Strafford	Agricultural/ Residential	2 acres

¹ Minimum lot sizes and frontage may be reduced as part of a Conservation Subdivision in accordance; minimum lot size for one dwelling unit is 80,000 sq. ft. and must include at least 60,000 sq. ft. free of Hydric A soils, open water, bogs, marshes, rivers, streams, or exposed ledge; additionally, the 60,000 sq. ft. must contain at least 35,000 sq. ft. of contiguous upland soils (these requirements are applied for each dwelling of 2 or more bedrooms in a multi-family dwelling)

² Minimum lot sizes for residential dwelling units in the RC district; minimum lot size for nonresidential uses in the RC district is 40,000 sq. ft. which must include an area of contiguous upland soils of not less than 35,000 sq. ft.

³ Minimum lot sizes within all subdivisions shall meet the lot size requirements as specified in Table 1A, "Minimum Lot Size by Soil Type-H.I.S.S.", or as specified in Table 1B. "Minimum Lot Size by Soil Type-U.S.D.A. Soil Survey"

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Permitted Uses

Table 18 describes the general uses permitted within the zoning districts in the watershed. Several communities may allow additional uses by grant of a Special Exception from the Zoning Board of Adjustment.

Table 18. Permitted Uses for Zoning Districts in the Watershed by Community

Community	Zoning District	Permitted Uses
Barrington	General Residential	Low density residential development allowed in traditional subdivisions; cluster Conservation Subdivisions permitted to encourage preservation of natural resources and open space; regulations promote continuation of the historical land development patterns identified in the 2004 Master Plan; small-scale business uses or establishments allowed, if uses operated in conjunction with residential uses and developed in compliance with specific standards
	Neighborhood Residential	Permits medium density residential development in the central area of the town; regulations provide incentives for developing larger tracts to promote efficient land use and create open space for public recreation and conservation; primary goal identified in the 2004 Master Plan to create trail linkages to public and commercial activities in Village District and surrounding districts; regulations allow small-scale business uses or establishments if operated in conjunction with residential uses and developed in compliance with specific standards
Dover	Regional Commercial	Mixed-Use; Residential dwelling units, excluding accessory dwelling units, as part of a mixed-use development
Farmington	Agricultural Residential	Non-commercial keeping of animals, commercial agriculture including animal husbandry, sale of agricultural products raised on site, aquaculture, forest management, timber harvesting, commercial processing of wood, logging, non-commercial mineral extraction, dog kennels, agricultural uses not specified
New Durham	Residential/Agricultural	Single- and two-family dwellings with garages and accessory buildings, in-law apartment contiguous with primary single-family residence, home occupations, sale of home food and garden produce, farm and garden activities, 75-foot development setback from cemeteries
Northwood	General	Single- and two-family dwellings, forestry and agriculture, church, home occupation, telecommunication antenna, school, accessory use; other residential and non-residential uses permitted in compliance with certain performance criteria
Rochester	Agricultural	Single- and two-family dwellings, cluster development, mobile home, mobile home park or subdivision, modular home, accessory building or use, temporary structures

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Community	Zoning District	Permitted Uses
	Industrial I2, I4, I4A	Temporary structures, wireless communication facilities, industry, research testing, wholesale or storage warehouse, truck terminal, bus garage, contractor's storage yard, feed and fuel storage/sales, sawmill, accessory building or use (industrial); I4 solid waste facility; I2 bottling works, ice cream manufacture
Strafford	Agricultural/ Residential	Buying, selling, exposing for sale of home produce and products; office of a professional person; boarders or leasing/renting of rooms or buildings; home occupations in a residence; single-, two- and three-family residences including accessory buildings and building for agricultural purposes; convalescent and nursing homes for elderly, churches, schools, and recreational facilities. Although not specifically zoned, establishment of business or industry enterprises that are an asset to the town is encouraged.

Prohibited Uses and Activities

Certain uses that pose a high risk for impact to, or contamination of, resources; or a threat to public health are commonly prohibited in sensitive areas such as aquifer and wellhead protection zones and riparian and wetland buffers. Each of the corridor communities specifically prohibits some of these uses either within the river corridor or throughout their community.

Barrington prohibits the following uses and activities in all zoning districts:

- Storage, reprocessing, recycling, treatment or disposal of chemicals, hazardous substances, wastes or materials, municipal or industrial or medical waste, or metals;
- Slaughtering and processing of animals and animal byproducts, as a principal or significant accessory use.

Rochester prohibits the following uses and activities in the Conservation Overlay District (75 foot river buffer):

- Expansion of motor vehicle recycling and junkyards;
- Storage of petroleum products, hazardous chemicals or materials;
- Accessory structures constructed with any of the following materials- asphalt shingles or pressure treated or chemically treated/preserved wood;
- Parking or storage of unregistered vehicles.

Strafford prohibits the following uses and activities:

- Stockpiling and land spreading of Class B sewage sludge containing disease causing pathogens, heavy metals, parasites, and hazardous organic chemicals, and stockpiling and land spreading of industrial paper mill sludge containing toxic substances.

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C. State and Local Setback and Buffer Requirements

For all three river corridor communities, the local requirements for structure setbacks or river buffers from the Isinglass River exceed the requirements of the NH Shoreland Water Quality Protection Act (SWQPA, formerly the Comprehensive Shoreland Protection Act or CSPA). (Refer to Tables 19 and 20 for state and local setback requirements). Except in Rochester, which requires a 75-foot no disturbance buffer, the SWQPA requirements for a 50-foot naturally vegetated buffer provides the primary protection against disturbance to riparian vegetation and habitat along the Isinglass River. In addition, the SWQPA includes limitations on impervious surface coverage within the 250-foot shoreland and restricts the use of pesticides and fertilizers within 25 feet of the reference line, with only low phosphorus, slow release nitrogen fertilizer permitted beyond 25' from the reference line.

Table 19. State and Local Requirements for Setbacks and Buffers from the Isinglass River

Resource	Requirement	SWQPA	Strafford	Barrington	Rochester
Isinglass River	Structure Setback	50 ft	75 ft	100 ft	---
	Septic System Setback	75 ft or more ¹	100 ft	---	---
	River Buffer	50 ft ²	---	---	75 ft
	Impervious Surface Cover	25-30%	---	See note ⁺	---
Tributary Streams	Structure Setback	N/A	50 ft	---	---
	Stream Buffer	N/A	25 ft ³	75 ft	50 ft ⁵
Wetland	Wetlands Buffer*	N/A	25 ft ³	50 ft ⁴	50 ft ⁶
Vernal Pool	Septic System Setback		100 ft		
	Structure Setback		75 ft		
Prime Wetlands	Buffer	---	---	100 ft	---

¹ Depends on soil type.

² Limited clearing of trees based on grid and point system; no land disturbance or removal of ground cover

³ Wetlands >3,000 square feet and vernal pools; no disturbance allowed except by Conditional Use Permit

⁴ Grandfathered lots require 35-foot wetland buffer

⁵ From named streams and surface waters (see Table 1 in Conservation Overlay District)

⁶ Also from poorly and very poorly drained soils and vernal pools; the land surface within 25 feet of the edge of the wetland shall not be altered. Herbicides and heavy equipment are prohibited within 25 feet of the edge of the wetland. New lawns may be established beyond 25 feet from the edge of the wetland

* Buffers – no land disturbance or clearing of natural vegetation permitted

⁺ Impervious surface cover limited to 15 percent in the Stratified Drift Aquifer Area in the Groundwater Protection District Overlay

Other Local Requirements

Strafford

- Wetlands - structure setback of 50 feet; septic setback of 75 feet from poorly drained soils and 100 feet from very poorly drained soils.
- Septic setback of 100 feet from all perennial streams and abutting wetlands.
- Regulate development of lands designated as special flood hazard zones as defined in the flood insurance study completed for the Town.

Rochester

- Solid Waste Facilities setback 100 feet from 100-year floodplain of the Isinglass River.
- Within Aquifer Protection District, impervious surface limited to 40 percent (up to 60 percent with sufficient treatment and recharge).

Definition of a Structure

Barrington

Anything constructed, installed, placed or erected, whether above or below grade; unless otherwise stated, signs, stonewalls, septic systems, driveways, parking lots, home propane and heating oil tanks, and fences are not subject to setback requirements.

Rochester.

Anything constructed or erected, the use of which requires location on the ground, or attachment to something having location on the ground.

Strafford.

A combination of materials to form a construction that is safe and stable, including among others but not limited to dwellings and shall include any part thereof.

Table 20. Requirements within the Setbacks and/or Buffers to the Isinglass River

Community	Zoning District/Overlay Zone	Conditional Uses/Exemptions
Barrington	<p><i>Shoreland Protection Overlay Zone – Isinglass River Overlay Zone</i> Consists of all properties located within one hundred (100) feet of the mean high water mark of the river; no structure of any type including by way of example and not by way of limitation, all buildings, garages, sheds, parking lots, and driveways, may be constructed.</p>	None specified.
Strafford	<p><i>Wetland Conservation District</i> Buffer means the protected upland adjacent to wetlands and surface waters Note: not a no-disturbance buffer.</p>	<p><i>Exemptions</i> Repair or replacement of an existing building provided the new or repaired structure, including any impermeable surfaces, shall not extend further into the buffer area than the footprint of the</p>

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Community	Zoning District/Overlay Zone	Conditional Uses/Exemptions
		original structure; Forest management activities (conducted in accordance with the BMPs for Erosion Control on Timber Harvesting Operations in New Hampshire 2004) and agriculture; Construction of an unpaved road by the property owner for land access purposes; Replacement of failing septic systems.
Rochester	<i>Conservation Overlay District</i> The required 75-foot river buffer means the protected upland areas adjacent to wetlands and surface waters Note: buffer disturbance permitted if qualify and receive approval for Conditional Use or Buffer Reduction.	<i>Conditional Uses:</i> Roads and other access ways; drainage ways; pipelines, power lines and other transmission lines; docks, boat launches, and piers; domestic water wells and associated ancillary pipes/equipment, replacement septic tanks and leach fields <i>Buffer Reductions:</i> may be permitted for expansion of existing structures and construction of a new structure for lots located in the Industrial I, Industrial 2, Industrial 3, Business 1, and Business 2 districts

State of New Hampshire

The revised SWQPA encompasses the entire protected Isinglass River and includes requirements for a 50-foot setback from the reference line for all primary and accessory structures; limited tree removal based on a grid and point system from 0-50 feet of the reference line with no disturbance of ground cover permitted; and limits on impervious surface coverage from 50-150 feet of the reference line. See

http://des.nh.gov/organization/divisions/water/wetlands/cspa/documents/summary_standards.pdf.

D. Effectiveness of Local Land Use Requirements

Land Use and Population Trends

Land use decisions have a profound impact on the environmental and economic sustainability of communities. Both need careful consideration in order for both humans and their environment to thrive. The undeveloped nature of the river corridor and watershed and its proximity to the rapidly developing urban and suburban areas of Strafford County and the seacoast region make the protection of Isinglass River and watershed a high priority.

Impervious Surface Cover

The Complex Systems Research Center at the University of New Hampshire conducted the study *Impervious Surface Mapping in Coastal New Hampshire* (2006)², which evaluated impervious

² *Impervious Surface Mapping in Coastal New Hampshire* (2006) by David Justice and Fay Rubin, Complex Systems Research Center at the University of New Hampshire.

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surface coverage and population trends from 1990 to 2005 for communities in the coastal watershed. Study data was compiled for the watershed communities to evaluate impervious surface coverage and population trends for the Isinglass river corridor and watershed. This data has since been updated in NH GRANIT and is presented below in Table 21 and shown in Map 11 in Appendix D.

Table 21. Impervious Surface Coverage Statistics for the Isinglass-Nippo Brook Watershed from 1990 to 2015 [GRANIT, 2015]

Isinglass River Subwatersheds (HUC12)	Acres					
	Area	1990	2000	2005	2010	2015
Bow Lake	9125.0	121.0	184.7	216.7	200.0	205.9
Long Pond	10153.0	148.0	220.7	248.9	173.5	179.0
Isinglass River	10727.0	802.7	1183.8	1339.2	483.4	498.2
Nippo Brook-Isinglass River	17389.0	266.0	373.5	452.8	330.4	342.0
Isinglass River Watershed	Area	1990	2000	2005	2010	2015
Total % Impervious Surface		2.8%	4.1%	4.8%	2.5%	2.6%
Total Area - Impervious Surface	47394.0	1337.7	1962.7	2257.6	1187.3	1225.1

It is important to note that Table 21 includes data from lesser quality imagery for the years 1990 – 2005 and calculated data for 2000 and 2005 significantly overstated the amount of impervious surface. Taking that into consideration, impervious surface coverage in the Isinglass River watershed has not increased much (0.1% from 2010 to 2015); however, it will be important to track this data into the future.

Population Growth

As reported in Table 22, population in the watershed communities has increased from 47,561 in 1990 to 56,989 in 2005, a 20 percent increase during the fifteen (15) year period from 1990 to 2005. Note: This Plan does not address whether population has increased within or outside the Isinglass River watershed.

Table 22. Population Statistics from 1990 to 2010³

Population	% Community in Watershed	1990	2000	2010
Barrington	44	6,164	7,475	8,576
Rochester	24	26,630	28,641	29,752
Strafford	72	2,965	3,626	3,991
Farmington	17	5,739	5,774	6,786
Northwood	17	3,124	3,640	4,241
Total		44,622	49,156	53,346

³ US Census Bureau

Zoning Districts and Overlay Districts

Zoning is predominantly agricultural and residential in the river corridor (87 percent) and watershed (66 percent), Table 23. As reported previously in this Chapter (Sections B and C), the amount of land available in watershed for development is approximately 40,669 acres. The conversion of 40,669 acres to developed lands, particularly for residential subdivisions, could represent an enormous shift in the character of the watershed.

Table 23. Acreage of Zoning Districts by Type

Zoning District	Corridor Acres	% Corridor Area	Watershed Acres	% Watershed Area
Agricultural	337	7.7	4,303	8.7
Agricultural/Residential	3,842	87.2	32,475	65.8
Village	0	0	217	0.5
Commercial Industrial/General*	225	5.1	5,386	10.9

* General District includes residential and nonresidential uses

Riparian Buffer Conditions within the Corridor

Riparian areas and buffers are the vegetated uplands adjacent to surface waters and wetlands that help reduce the adverse effects of human activities on these resources. The primary function of a buffer is to physically protect and separate a wetland from future disturbance.

Riparian areas and buffers provide valuable functions and services including:

- absorbing and filtering runoff to protect water quality
- intercepting and slowing runoff to prevent erosion
- providing habitat for wetland species and upland species
- improving landscape aesthetics
- maintaining recreational uses

The Complex Systems Research Center at the University of New Hampshire conducted a *Stream Buffer Characterization Study* (2007)⁴, sponsored by the New Hampshire Estuaries Project, which mapped and evaluated the condition of riparian buffers for communities in the coastal watershed. Study data for the watershed communities was compiled (Table 24) to evaluate impervious surface coverage and population trends for the Isinglass river corridor and watershed.

⁴ Complex Systems Research Center at the University of New Hampshire, *Stream Buffer Characterization Study* (2007)

Table 24. Buffer Condition Data in the Isinglass River Watershed from the New Hampshire Estuaries Project “Stream Buffer Characterization Study”

Buffer Characterization	Decision Rule	Acres of 150-foot buffer in watershed	Acres of 300-foot buffer in watershed
Intact	<10% impacted	69.3	247.3
Mostly Intact	1-25% impacted	14.2	65.7
Somewhat Modified	25-50% impacted	42.9	42.7
Impaired	>50% impacted	1.7	134.9
Total Land Area (acres)		2,145.7	4,353.2
% Total Watershed Land Area		4.2	8.5

* Note: The *Decision Rule* establishes categories based on the degree to which each buffer or buffer segment was impacted by human activity, specifically the percent of land area within the buffer mapped by land use type as either developed, transportation, or agriculture.

As reported in Table 24, the total land area of 150-foot and 300-foot buffer represents only a small fraction of the total land area within the watershed. However, the benefits provided with respect to water quality and wildlife habitat in the watershed are significant. Riparian areas and buffers adjacent to intermittent, headwater, first order and second order tributaries are particularly valuable as these smaller tributaries represent 74 percent of the total tributary, stream and river miles in the watershed. Refer to Table 9 for a summary of stream miles by stream order.

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CHAPTER VI. PRIORITY MANAGEMENT ISSUES AND IMPLEMENTATION PLAN

A. Original Plan Priorities

The following priority management issues were identified during initial development of the Isinglass River Management Plan based on input from IRLAC, survey results from 2005 and 2007, key interviews conducted in 2008, and a community meeting held in 2008 (see Appendices A-C).

Water Quality and Quantity Protection

- Viability of the Fishery
- Maintain High Water Quality of the River
- Protect and Restore Riparian Buffers
- Protect Public and Private Drinking Water Sources
- Raise Awareness of Non-Point Source Pollution
- Maintain Class B Status to Maintain Recreational Uses
- Balance Uses While Preserving the River's Quality

Flood Management and Remediation

- Preserve Flood Storage Areas
- Reduce and Prevent Flood Damage to the River and its Riparian Areas
- Improve Habitat Protection at River and Tributary Crossings
- Improve Road Management Post-Flood Cleanup Practices
- Improve Stormwater Management Methods

Land Protection, Resource and Habitat Conservation

- Prioritize Lands for Protection and Conservation
- Implement Instream Flows for Habitat and Recreation
- Preserve Forests, Open Space and Habitat
- Conserve Riparian, Shoreland and Water Quality Buffers
- Preserve Historic Resources in the River Corridor

River Corridor and Watershed Planning

- Coordinate Watershed Planning with Partner Agencies and Organizations
- Coordinate Watershed Planning among the Communities

Stewardship, Education and Outreach

- Raise Awareness of the River, Its Resources, and Its Protection
- Foster stewardship of riparian landowners and all residents in the watershed
- Pursue education and outreach across various media

B. Current Plan Priorities

The 2017 River Management Plan review and 2018 Plan revision provided IRLAC with the opportunity to reevaluate these issues as well as the initial set of goals, objectives and strategies developed in 2008. With this Plan revision, goals, objectives and strategies have been reviewed in light of several factors including applicability to the Isinglass River:

- the small size and lack of developmental opportunities along the river;
- creation and maintenance of the IRLAC website as the primary vehicle for sharing information with the public; and
- participation of IRLAC members on municipal boards and commissions and ongoing professional interaction with NHDES as the means for IRLAC to stay abreast of regulatory changes and developmental pressures.

IRLAC now sees its advisory role as that of maintenance of the river resource and continued attention as applicable to the five primary issues. As a result, many of the initial 14 goals, 24 objectives, and 67 strategies identified or recommended by Strafford Regional Planning Commission in 2008 have been successfully implemented, are no longer relevant or were never applicable to the Isinglass River, are beyond the scope of IRLAC's authority or purview, or are redundant to other listed strategies (Table 25). Those strategies that remain key priorities (highlighted in yellow in the table) will continue to be the focus of IRLAC during the current phase of Plan implementation.

Management approaches for the Implementation Plan will continue to focus on:

- Public Education, Outreach and Training
- Local Land Use Regulations and Policies
- State and Local Enforcement of Regulations
- Collection and Use of Data
- Capacity and Consensus Building with Stakeholders
- Collaboration with local, regional and state agencies/groups
- River Management Plan periodic reviews and updates

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Table 25. IRLAC Key Priorities, 2018 and Beyond (yellow highlighted strategies are still active)

Strategy ID	Description	Status as of 2018
Issue 1. Water Quality and Quantity Protection		
1	Obtain funding to support and expand the existing water quality monitoring program and purchase additional testing equipment as needed.	Accomplished. Waste Management donated monitoring equipment and NHDES performs annual service on the equipment.
2	Coordinate with state and non-profit partners to provide training for new volunteers for the water quality monitoring and stream assessment programs.	Accomplished. NHDES conducts annual training and experienced IRLAC volunteers coach new volunteers during monitoring.
3	Recruit new volunteers for the water quality monitoring and stream assessment programs by developing outreach materials and opportunities.	Ongoing. Word of mouth and the IRLAC website are used to recruit volunteers.
4	Identify additional sampling sites and data needs of constituents in the watershed for targeting water quality monitoring and stream assessment programs.	Accomplished. Extensive water quality monitoring was conducted throughout the watershed in 2007 and 2008. Results indicated that in the absence of new development, additional monitoring is not warranted. NHDES continues to conduct additional monitoring at two trend stations on the mainstem.
5	Document the existing implementation plan for comprehensive water quality monitoring and stream assessment programs (refer to Chapter IV for recommendations to incorporate results from the NHDES VRAP annual reports in the plan).	No longer needed. The USGS fluvial geomorphology study and water quality monitoring results to date are sufficient.
6	Implement the recommendations from the NHDES VRAP annual reports to improve the water quality monitoring program.	No longer needed. Ongoing water quality monitoring is sufficient to understand trends in the river's water quality. Since low pH and mercury deposition are not the result of watershed level human activity, and since low dissolved oxygen is due to low flows, improvements in these parameters are unlikely.
7	Continue collecting data to identify any new water quality issues and support adherence to water quality standards for designated uses and to support fisheries and habitat protection within the watershed.	Ongoing. The VRAP, Lay Lakes, and NHDES monitoring programs are expected to continue into the future.

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Strategy ID	Description	Status as of 2018
8	Develop a detailed drainage network map of the watershed, including but not limited to subwatersheds, tributaries, soils, slopes, vegetative cover, land cover, and infrastructure.	Accomplished. The NH Wildlife Action Plan, The Land Conservation Plan for New Hampshire's Coastal Watersheds, Strafford Regional Planning Commission, and municipal land use and related maps contain this information.
9	Use the drainage network map, air photography and GIS data to analyze developing areas, unvegetated riparian areas, and locations where best management practices should be implemented to protect water quality.	No longer needed. Google Earth and NH Granit are sources of information that can be used to monitor these locations.
10	Utilize the detailed drainage map and analysis to identify water quality issues in the river corridor and watershed.	No longer needed. Data collected to date and monitoring of development patterns are sufficient.
11	Support state enforcement of Comprehensive Shoreland Protection Act and enforcement of local requirements relating to buffers and setbacks for development in the river corridor (and watershed where applicable). Work with NHDES and local stakeholders on the development and implementation of the Instream Flow Program on the Isinglass. This supports protection of river flows and balanced use of the river's water.	Ongoing
12	Meet annually with local land use boards to encourage adoption or strengthening of buffer requirements in subdivision and site plan regulations that pertain to the Isinglass River and its tributaries.	No longer applicable. IRLAC communicates periodically with municipalities, attends public hearings, and submits formal comments related to development and land use that may affect the Isinglass River.
13	Include local land use boards, elected officials and municipal staff in all education, outreach and publicity initiatives relating to buffers and buffer protection as outlined in this Plan.	Ongoing, via periodic contact and IRLAC website
14	Using the detailed drainage map and analyses (see Goal 1-2), identify areas where riparian and shoreland buffers are degraded or do not exist.	No longer applicable. The river generally supports adequate buffers. In the event of shoreline development, IRLAC weighs in on development plans to help protect those buffers.
15	Utilize sample planting plans and guidance brochures on planting and caring for buffers developed by UNH Cooperative Extension to educate riparian property owners about water quality. Provide this information through the IRLAC website and at presentations, workshops and other public events.	No longer applicable. The IRLAC website provides education and links to additional information from NHDES, UNH Cooperative Extension and other sources.

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Strategy ID	Description	Status as of 2018
16	Participate in state and national programs that fund implementation of buffer restoration.	No longer applicable. This strategy is beyond the purview of IRLAC.
17	Develop an outreach implementation plan focused on water quality issues (identified in Objective 1) in the watershed. The plan should include partnering organizations, groups and agencies, funding sources, and evaluation criteria.	Ongoing via website.
18	Utilize existing brochures and fact sheets about how to modify practices, maintenance and management to effectively reduce and minimize point and non-point sources of pollution at home, for businesses and for municipalities.	Ongoing via website.
19	Utilize existing guidance brochures and fact sheets about planting and caring for buffers developed by UNH Cooperative Extension to educate riparian property owners about water quality. Provide this information through the IRLAC website and at presentations, workshops and other public events.	Ongoing via website.
Issue 2. Flood Management and Remediation		
20	Present elected officials in the watershed communities with flood evaluation and stream condition data. Discuss potential causes of flooding and flood damage, and identify common goals for protection of the river and its tributaries.	Accomplished. The USGS fluvial geomorphology study provided sufficient information to meet this strategy.
21	Continue collection of stream assessments (erosion and sedimentation vegetation loss, bank stability, and habitat loss) as part of the VRAP and VBAP programs. Produce annual report or summary of this data and provide to watershed communities.	Accomplished via USGS study. Additional monitoring is a function of future development patterns in the river corridor.
22	Review information from local hazard mitigation plans to identify flood hazard areas and flood damage areas, and the potential causes within the corridor and watershed.	Accomplished via USGS study.
23	Conduct stream geomorphic assessment to identify Fluvial Erosion Hazard areas and develop a fluvial erosion hazard overlay.	Accomplished via USGS study.

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Strategy ID	Description	Status as of 2018
24	Use existing data from NH Department of Transportation and Strafford Regional Planning Commission to map the location of road crossings, bridges and culverts in the river corridor.	Accomplished via USGS study.
25	Use existing data from NH Department of Transportation and Strafford Regional Planning Commission to conduct corridor site assessments to document stream crossing conditions, stream morphology, and aquatic habitat effects.	Accomplished via USGS study.
26	Develop recommendations for management practices and a priority list of improvements for road crossings in the river corridor and watershed. Provide recommendations to elected officials in the watershed to inform decisions regarding allocation of funds in the local Capital Improvement Plan and annual budget.	Ongoing. IRLAC is notified of development plans from municipalities and/or NHDES as development permit applications are received.
27	Gather information from annual FEMA reports from the watershed communities about key wetlands and uplands that provide flood storage within the river corridor and watershed. Identify areas where new flooding occurred during large storm events in the past few years.	Accomplished via USGS study.
28	Present information to elected officials about the importance of preserving these areas within the river corridor and watershed to protect property and reduce costly repair to infrastructure.	Ongoing via periodic communications with municipal officials and IRLAC website.
29	Conduct outreach to property owners in watershed communities about the importance of preserving these wetlands and uplands to protect property and reduce costly repair to infrastructure.	Accomplished, ongoing via IRLAC website.
30	Develop maps for watershed communities that display the key wetland and uplands that provide flood storage. Provide these maps to the communities.	Ongoing. IRLAC relies on Strafford Regional Planning Commission to provide updated watershed maps.
31	Support local regulations to preserve key wetlands and uplands that provide flood storage in the river corridor and watershed.	Ongoing. IRLAC monitors changes in local regulations, attends public hearings of interest, and provides comment on proposed regulations as applicable.
Issue 3. Land Protection, Resource and Habitat Conservation		

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Strategy ID	Description	Status as of 2018
32	Using existing technical studies (The Land Conservation Plan for New Hampshire's Coastal Watersheds and the New Hampshire Wildlife Action Plan) and the map set for this plan, identify significant resources in the river corridor and watershed, including agricultural lands, unfragmented forest blocks, wildlife habitat, and water resources.	Accomplished. IRLAC reviews updates to these plans as they become available. Since this Management Plan was first developed, the Town of Barrington also developed a Natural Resources Inventory which IRLAC has reviewed for the presence of significant resources within the river corridor and watershed.
33	Using the inventory of natural resources, evaluate their relationship with existing conserved lands, current land use, and resource regulations. Identify specific parcels and/or resources for protection using conservation measures aimed at protecting the specific values of the resources.	Ongoing. IRLAC monitors proposed conservation easements and provides supporting comments to municipal officials and land trusts. IRLAC will work with the state to identify state-owned lands that are important to retain under state ownership.
34	Identify land conservation efforts of local open space committees and conservation commissions that are actively pursuing land conservation in the watershed.	Ongoing, as needed.
35	Partner with local land trusts and other groups conducting land conservation in the watershed to help them develop working relationships with local land owners and implement potential land conservation measures.	Ongoing, as needed.
36	Partner with regional land conservation groups and land trusts to conduct annual estate planning and land conservation workshops to encourage land preservation.	Redundant to strategies 33-35.
37	Coordinate watershed communities to identify shared land and natural resource protection goals, strategies, and information. The Strafford Regional Planning Commission, land conservation groups and land trusts may have available resources to provide overall coordination for this effort.	Redundant to strategies 33-35.
Issue 4. River Corridor and Watershed Planning		
38	Meet annually with local land use boards to discuss important issues and strategies designed at balancing uses and preserving river quality.	Ongoing, IRLAC periodically has contact with municipal departments in relation to issues of importance to the river.

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Strategy ID	Description	Status as of 2018
39	Encourage adoption of erosion and sedimentation control and stormwater management standards for development within the watershed.	Ongoing, as needed.
40	Form partnerships to coordinate and conduct training, and encourage attendance at regional and state workshops, focused on land and resource protection regulations.	No longer applicable, beyond the purview of IRLAC.
41	Support and participate in training opportunities to educate local land use boards, elected officials and community staff about low impact development, better site design and smart growth policies.	No longer applicable, beyond the purview of IRLAC.
42	Share information from the NH Department of Environmental Services, UNH Stormwater Center, UNH Cooperative Extension, and others to provide information and presentations about emerging science and technology aimed at improving land use that help meet the goals of the River Management Plan.	Ongoing via IRLAC website.
43	Encourage adoption of innovative land use controls, such as multi-density zoning, environmental characteristics zoning, and site level design requirements by watershed communities.	Ongoing to the extent that communities propose such initiatives.
44	Identify potential sites to implement emerging science and technology for stormwater and sediment and erosion control. Partner with local communities or seek funding sources for these projects.	No longer applicable, beyond the purview of IRLAC.
45	The IRLAC will review the Implementation Strategies and set action-based priorities. Based on the priorities identified, IRLAC will develop an implementation plan including time frames and a schedule for completion.	Accomplished, via Plan reviews and revisions.
46	Employ a river and watershed coordinator to assist with implementation of priority strategies from the River Management Plan.	Not necessary based on the small size of the river. IRLAC volunteers fulfill this role.

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Strategy ID	Description	Status as of 2018
47	Identify stakeholders in each watershed community and among other interested parties (land preservation groups, land trusts, non-profits, educational, etc.). Identify their important issues, geographic areas of concern/interest, and partnership capability toward implementing the goals and strategies of the Plan.	Accomplished, and ongoing as needed.
48	Expand coordination of IRLAC's review of development projects in the river corridor by notifying land conservation groups, non-profit and other voluntary groups and interested parties in the watershed of projects under review (timeframes, meeting dates, site visits) and by making project review information, such as letters of recommendation and site plans/applications accessible. Make this information accessible by developing a projects database and website.	Not necessary based on the small size of the river and small number of proposed development projects.
49	Keep abreast of regulatory changes in the watershed communities and the state that affect resources and land use in the river corridor and watershed.	Ongoing.
50	Maintain contact with Conservation Commissions and local land protection groups and land trusts about important issues and to support revision of land protection goals and strategies	Ongoing.
51	Maintain contact with local land use boards, and other LACs about important issues and strategies designed for balancing uses and preserving river quality	Ongoing, as needed.
52	Encourage the completion of Natural Resource Inventories in all the watershed communities. Assist communities in sourcing and applying for grants to fund these studies.	Ongoing. Barrington has an NRI, Rochester and Strafford have Master Plans.
53	Identify agencies, groups and educational institutions conducting research, evaluation or planning activities within the watershed, and obtain results and data.	Ongoing, IRLAC relies in part on Strafford Regional Planning Commission, and professional networks for this information.
54	Continue to compile and inventory data and resource-based information on river corridor and watershed resources. Make this information available to all watershed communities including on the IRLAC website.	Ongoing via IRLAC website.

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Strategy ID	Description	Status as of 2018
55	Provide copies of the River Management Plan to the Land Use Boards and elected officials.	Accomplished, and ongoing when Plan revisions are made.
56	Outreach to the Land Use Boards of the corridor and watershed communities to encourage the adoption of the River Management Plan as part of their Master Plans.	Accomplished, and ongoing when Plan revisions are made.
57	Develop a publicity plan to advertise and get the word out about Plan Implementation, and specific outings and events, important meetings of local land use boards, and other IRLAC initiatives.	Not necessary based on the small size of the river, events are announced on the IRLAC website.
58	Develop a database of newspaper, television, radio and local publications, including contact information, rates, publication dates, and distribution area. Include these contacts in email lists and IRLAC website notices to publicize events.	Not necessary based on the small size of the river.
59	Solicit volunteers to develop and maintain the publicity database and to implement the publicity plan.	Not necessary based on the small size of the river.
Issue 5. Stewardship, Education and Outreach		
60	Develop IRLAC website to facilitate outreach and education, dissemination of information, and promote river related events and projects.	Accomplished, ongoing. The IRLAC website is maintained, reviewed and updated at least annually.
61	Acquire funding to develop and implement education and outreach strategies such as a “What Can Property Owners Do” campaign aimed at improving household and business practices that benefit water quality and resource protection.	Funding is not necessary, the IRLAC website is the primary vehicle for sharing information.
62	Organize bi-annual “Volunteer River Clean-Up Days” events in each corridor and watershed community with focus on reinforcing goals and implementation actions in the River Management Plan.	Ongoing, small groups of volunteers accomplish this informally particularly during VRAP water sampling and Waste Management initiatives.
63	Establish a sponsorship program for river and tributary segments where local volunteer and civic groups would be responsible for providing ongoing clean up.	Ongoing, via NHDOT Adopt A Highway program, and small groups of volunteers accomplish this informally.
64	Utilize existing outreach materials about developing planting plans that integrate native species and shade trees, and provide riparian habitat. Provide this information through the IRLAC website and at presentations, workshops and other public events.	Ongoing as the opportunity arises, and via IRLAC website.

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Strategy ID	Description	Status as of 2018
65	Make presentations to owners of riparian and shoreland property to raise awareness of the functions and values of buffers. Provide this information through the IRLAC website and at presentations, workshops and other public events, as opportunities arise.	Ongoing as the opportunity arises, and via IRLAC website.
66	Through the IRLAC website and presentations, promote methods and techniques to maintain healthy functioning buffers.	Ongoing as the opportunity arises, and via IRLAC website.
67	Develop demonstration projects and/or hold instructional workshops at municipal parks on the river or hosted by a riparian property owner. Enlist the help of local gardening clubs and nurseries to assist with these events.	Not necessary based on the small size of the river. IRLAC volunteers participate in opportunities as they arise, to share information via local events, public walks, and the ILRAC website.

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C. Evaluation of Progress

To measure success and evaluate if steps are being taken to reach desired management priorities and goals, IRLAC periodically reviews progress on implementation measures, renews priorities, and identifies new opportunities to enhance protection of the Isinglass River. Implementation of new or revised priorities depends on available resources, funding availability, time frames of grants, availability of volunteers, and other commitments from partnerships.

Funding may be available from a variety of local, state, federal and nonprofit sources. Implementation Actions that may require funding could be grouped according to topic, goals and products for inclusion in a single grant proposal (i.e. stormwater, ordinance and regulation development, outreach and education, land conservation) and grant applications will be developed and submitted in the event such funding may be needed to support further river protections. To date, IRLAC has not required outside funding (other than Waste Management’s donation of water quality monitoring equipment, and donations for website costs). Waste Management also donates meeting space for IRLAC monthly meetings.

D. Partners

Table 26 provides a partial list of communities, agencies and groups that IRLAC has, or can in the future collaborate with for implementation of the Management Plan.

Table 26. Identified IRLAC Partners

Category	Partners
Watershed Communities	Barrington, Dover, Farmington, Northwood, Rochester and Strafford
Local Land Trusts	Southeast Land Trust, Bear Paw Regional Greenways
State	Department of Environmental Services Piscataqua Region Estuaries Program (formerly part of the NH Coastal Program) Natural Heritage Bureau (DRED) NH Fish and Game Department UNH Cooperative Extension Service UNH Stormwater Center Strafford Regional Planning Commission NH Department of Transportation
Federal	Natural Resource Conservation Service Strafford Soil Conservation District Rockingham Soil Conservation District New Hampshire Estuaries Project NH Sea Grant
Other Stakeholders	Cocheco River Local Advisory Committee Society for the Protection of NH Forests Trout Unlimited Local and riverfront and river corridor landowners Local businesses with riverfront or river corridor property

CHAPTER VII: SUMMARY

The Isinglass River Management Plan was developed with the goals of protecting and conserving the rivers many resources; protecting riparian and aquatic habitat; advocating for water quality and quantity to sustain aquatic and recreational uses; and balancing the development of land and water uses for recreation with other public needs within the river corridor and watershed.

With this Plan revision, the Isinglass River Local Advisory Committee (IRLAC) continues to advocate for implementation of the revised Plan within the watershed and supports integration of its goals and strategies by communities in the Isinglass watershed in their planning initiatives and land use decisions.

Chapter VI includes ongoing strategies that continue to address preservation, conservation and sustainability of natural resources in the river corridor and watershed. These strategies address the challenges of land use change and growth in the watershed by: conducting evaluations to help identify land use change, analyze trends, and determine the ecological impacts and cumulative effects of land use change; supporting technology and research and information gathering; coordinating with watershed partners, local officials, and land use boards to implement and enforce effective protection measures; and reaching out to the public for their support and stewardship in the watershed.

The Isinglass River Management Plan will be reviewed and updated periodically depending upon need and subsequent recommended changes in the Action Plan, and changes in local and state regulatory requirements and development trends.

APPENDIX A. Survey Results of 2005 and 2007

2005 Isinglass River Riparian Landowner Survey Results

Of the 171 surveys mailed, 30 responses were received (18%). Survey responses indicated that the majority of landowners are residents of one of the three riparian communities and have owned property for a number of years. Relatively few have purchased during the most recent real estate boom.

The majority of respondents indicated that the values associated with the preservation of wildlife habitat are most important, with the majority of respondents indicating that wildlife and/or scenic values are what they like best about the river. Recreation is also a priority value, with the majority of respondents stating that passive recreational opportunities (fishing, hunting, bird watching, walking/hiking, canoeing, etc.) are of key importance. Potential habitat loss from development and related problems such as erosion and sedimentation were the most frequently listed concerns.

Half of the respondents allow public access, with only about one-third of the respondents citing problems with public use. However, nearly half of the respondents indicated that litter and overuse are concerns that they have. This response would indicate that additional public access points would alleviate problems for riparian communities, particularly as population density increases with new housing developments encroaching on the corridor area.

Finally, it should be noted that although the survey did not include any response item relating directly to water levels, five responses (totaling 16.6%) included low water levels (seasonal declines in stream flow associated with maintaining water levels in Bow Lake) in the river as a significant concern.

2007 Isinglass River Corridor Property Owner Survey Results

Of the 769 surveys mailed, 77 surveys were completed (10 percent return), and 19 were returned as undeliverable.

Primary Issue of Concern: As identified by 82% of respondents in the survey, the most significant issue that negatively impacts or could negatively impact natural resources in the watershed is development pressure and associated impacts.

The following issues consistently ranked high throughout the survey and were considered important for protection of the Isinglass River, overall water quality and the watershed.

- √ Water Use and Consumption – drinking (72%), habitat (49%) and agriculture (39%).
- √ Water Quality – improve regulations and standards (60%), improve monitoring (57%), preserve and restore buffers for rivers, streams and wetlands (57%), and improving

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- ✓ municipal practices of water and natural resource management (62%).
- ✓ **Surface Water Quality** - 26% reported the quality of surface waters in their community is “Good or Excellent”, and 26 % responded “No Opinion/Don’t Know”.
- ✓ **Pollution Sources** - the following factors were identified as the most responsible for existing pollution problems: erosion from roads and construction sites (81%), road salt and domestic water softeners (65%), and stormwater runoff from developed lands (55%).
- ✓ **Regulations and Standards** – strengthen or improve regulations and standards for development; improve enforcement of existing regulations designed to protect natural resources.
- ✓ **Public Information, Education, Awareness** –The general deficit in public knowledge is illustrated in the property owners responses about: the quality of surface waters where they live; whether they know or suspect certain pollutants are affecting water quality in their area; and their ability to identify specific groups that contribute to protecting water quality in their community. Many property owners simply did not know about the status of local water quality and who acts to protect it in their community from a regulatory perspective. On a positive note, more than 50% of property owners reported altering specific behaviors to conserve water or preserve water quality, which demonstrates willingness to take personal responsibility and to adapt lifestyle changes to respond to these issues.
- ✓ **Stormwater Management** – reduce volume and improve methods and treatment by using innovative practices.
- ✓ **Preservation** – permanent land protection, preserve and restore buffers for rivers.

Additional Survey Results

Practices at Home: 47% of respondents consider improving home and garden practices “very important or extremely important” for protecting water resources (see General Survey question #4). Confirmation of this opinion is found in responses relative to changing behavior to conserve water or preserve water quality: 85% pumped septic systems or repaired/replaced failing systems; 61% tested their drinking water; and 49% changed their water use practices and application of pesticides, herbicides, fertilizers and chemicals to preserve water quality.

Information. Respondents were most interested in learning more about issues on their properties such as private well protection and septic systems (see General Survey question #13).

2007 Isinglass River Corridor Municipal Officials Survey Results

Of the 125 surveys mailed to municipal officers in the three Isinglass River Corridor communities, 19 surveys were completed (15 percent return rate).

Primary Issue of Concern: As identified by 89% of respondents in the survey (17 responses), the most significant issue that negatively impacts or could negatively impact natural resources in the watershed is **development pressure and associated impacts.**

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The following issues consistently ranked high throughout the survey and were considered important for protection of the Isinglass River, overall water quality and the watershed.

- √ Water Use and Consumption – protect for habitat, drinking, fishing and agriculture.
- √ Water Quality – protect drinking water; land preservation; dissemination of information; improve monitoring; preserve and restore buffers for rivers, streams and wetlands; improve wastewater treatment.
- √ Surface Water Quality - 50% reported the quality of surface waters in their community is “Good or Excellent”, while “Good and Improving” and “Fair” ratings each received 17%.
- √ Pollution Sources - the following factors were identified as the most responsible for existing pollution problems: erosion from roads and construction sites 67%; stormwater runoff from developed lands 67%; road salt and domestic water softeners 61%; and runoff from home landscapes 56%.
- √ Improve Regulations and Standards – improve and strengthen regulations and standards for development and improve enforcement of existing regulations designed to protect water quality and natural resources.
- √ When asked how well certain groups contribute to protecting water quality in the community, 63% considered cities and towns most effective, with individuals/citizens/ volunteers and the IRLAC at 58%, and State government at 53%.
- √ Public information, education, and awareness – lack of information related to natural resource and watershed issues.
- √ Stormwater Management – reduce volume and improve methods and treatment by using innovative practices.
- √ Preservation – agricultural lands, open space, buffers.

Additional Survey Results

Practices at Home: Interestingly, 47% of municipal officials consider improving home and garden practices “not important or somewhat important” for protecting water resources; however, 78 % reported pumping or repairing/replacing septic systems and 45% of respondents reported changing their water use practices and application of pesticides, herbicides, fertilizers and chemicals to preserve water quality. In addition, 56% consider runoff from home landscapes most responsible for existing pollution problems in the watershed (with erosion at 67% and road salt and domestic water softeners at 61%).

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APPENDIX B. Key Person Interview Results 2008

The individuals who participated in the Key Person Interviews represent a cross-section of natural resource conservation and preservation groups in the region, and land use planning professionals from the three river corridor communities. Although their opinions and views are representative of the nature of their participation at the local level, the consistency of their responses was not surprising. Each participant offered a well-informed perspective of the status of the Isinglass River as a NH protected river and valuable community and regional resource, and shared common goals and objectives with respect to environmental protection of the river and within the watershed. Key themes that were repeatedly expressed during these interviews were:

- √ Enforcement of state and local protective regulations
- √ Water quality and quantity
- √ Growth management and planning
- √ Land protection and conservation
- √ Education, outreach and training

Integration of Key Issues with the River Management Plan

The following are recommendations to integrate the key issues identified in the Key Person Interviews with the River Management Plan.

- √ Expand coordination of review of development projects in the river corridor; notify land conservation groups, non-profit and other voluntary groups and interested parties in the watershed of projects under review (timeframes, meeting dates, site visits) and by making project review information, such as letters of recommendation and site plans/applications accessible; Make this information accessible by developing a projects database and posting it on a website.
- √ Seek partners to improve management and regulation of resources in the river corridor and watershed; focus partnerships to expand IRLAC regulatory, voluntary and outreach/stewardship roles in the watershed; increase IRLAC support of land protection and conservation efforts in the river corridor and watershed.
- √ Develop specific goals and strategies to address key themes identified above, and 2) develop an implementation plan to track progress toward these goals and strategies.
- √ As part of outreach activities, meet with land conservation groups, non-profit and other voluntary groups, and interested parties in the watershed to review the goals strategies of the work plan to identify opportunities for coordination and collaboration; secure commitments and/or letters of agreement to implement specific goals and strategies of the River Management Plan.

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Key Person Interviews included the following individuals:

Interview Format	Individual	Title	Town/City/Affiliation
Q	John Huckins	Chair, Planning Board	Barrington
I	Steve Conklin	Water Commissioner	Barrington
Q	Daniel Kern	Executive Director	Bear Paws Regional Greenways
Q	Douglas DePorter	District 6 Engineer	NH Dept. of Transportation
Q	Michael Behrendt	City Planner	Rochester
T	Charlie Moreno	Chair, Planning Board	Strafford
Q	Phil Auger	University of NH Cooperative Extension	Strafford
T	John Wallace	Board of Directors	Strafford Rivers Conservancy
I	Mark Seymour	President, Great Bay Chapter	Trout Unlimited

I = In-Person Interview T = Telephone Interview Q = Questionnaire via email

APPENDIX C. Summary of Discussion from June 2, 2008 Community Meeting

MEMORANDUM

To: Isinglass Local Advisory Committee

From: Julie LaBranche, Strafford Regional Planning Commission

Date: June 6, 2008

Re: Community Meeting of June 2, 2008 - Summary of Discussion

The Isinglass River Local Advisory Committee, with the Strafford Regional Planning Commission, conducted a Community Meeting on Monday, June 2, 2008 at the Barrington Town Hall to review and discuss the Final Draft of the Isinglass River Management Plan.

Julie LaBranche, SRPC, introduced participants and provided an overview of the RMP goals, components and priority issues.

Ann Schulz provided a historical perspective of the formation of the Isinglass River Protection Project and how this group lead efforts to designate the Isinglass River under the NH Rivers Management and Protection Program.

Maryalice Fischer presented an overview of the IRLAC water quality monitoring and stream assessment programs, and presented statistical data from water quality sampling sites.

Julie LaBranche concluded the meeting with a general discussion with participants of relevant issues in the river corridor and watershed. Below is a summary of this discussion.

Attendees

Steve Conklin – Barrington Water and Sewer Committee
John Wallace – Chair, Barrington Conservation Commission
Pam Failing – Barrington Conservation Commission
Cynthia Copeland - SRPC

IRLAC Members: Wayne Donle, Pam Skeffington, Ann and Jim Schulz, Maryalice Fischer, Liz Evans

A. Discussion Points

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Concerns raised by Steve Conklin on behalf of the Barrington Water and Sewer Committee:

1. Expand upon the watershed focus of the plan
2. P.8. Aquifers – review statement that “none of the aquifers are significant”
3. P. 10 Wetlands – add discussion of designated prime wetlands in Barrington
4. P. 13 Instream Flow – currently documented by NHDES that, at certain times of the year, Rochester diverts *ALL* water from the Berry’s River to their municipal drinking water supply; request that this be noted (with references) in this section
5. Stormwater – recent policy change by FEMA states that Class VI roads can be included in assessments for federal assistance provided to towns for repair of flood damage; monetary compensation is provided directly to the “road owner(s)” and not to towns.
6. Stormwater – when replacing damaged stormwater infrastructure, must evaluate new designs and upgrades to accommodate current hydrologic regime (i.e. large storm events, generation of more runoff in the watershed due to development); refer to the proposed/ongoing Achuelot River study
7. P. 38 Management Approach – should include State enforcement and consistency issues relating to Alteration of Terrain and Wetlands permitting programs; refer to the NH Office of Legislative Budget Assistant “Alteration of Terrain and Wetlands Permitting Audit Report – August 2007”. This report can be downloaded at http://www.gencourt.state.nh.us/lba/PerformanceReports/DES_2007p.html. A summary of results from the report are on page 3 of this document.
8. Need to clarify terms – storm events based on precipitation data and not on the volume of water being generated in an event in a watershed

Note: I addressed Comments #2 and #3 above by adding and revising text in the appropriate sections of the River Management Plan as noted.

General Comments/Issues of Concern

1. Education and outreach focused on “experiential” activities and events; bring the public to the river to engage in activities that are relevant to their daily lives and interests; buy in is important
2. Target schools to implement outreach and education about environment and natural resources in the watershed; promote attendance at “Science Camp”, curriculum development, field study projects by students as part of curriculum
3. ENFORCEMENT of existing regulations on the local and state level
4. Public support for environmental regulations but lack of perception about complying
5. Need local support from the public, property owners, elected officials to make enforcement effective, accepted and an expected by everyone
6. State permitting agencies lack visibility on the local level – no “policing” of resources
7. Home Owner/Land Owner education – the public should know what environmental constraints and/or resources are on their property **before** or after they purchase

APPENDIX D. Map Set

Map #	Title
1	Isinglass River Watershed
2	Topography
3	Soils
4	Wildlife Action Plan Habitat Types
5	Wildlife Action Plan Habitat Tiers
6	Conservation Focus Areas
7	Conservation Lands and Parcel Data
8	Recreational Opportunities and Public Access
9	Zoning and Land Use
10	Fluvial Erosion and Flooding Hazards
11	Impervious Cover