



The Sudbury, Assabet and Concord
WILD & SCENIC
River Stewardship Council
sudbury-assabet-concord.org

The Sudbury, Assabet and Concord Wild and Scenic River

Conservation Plan

2019 Update



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May 2019 Update

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Thank you to the current representatives on the River Stewardship Council for their volunteerism and commitment to caring for the Wild and Scenic River, and their guidance in all of our projects. We are especially grateful to Anne Slugg, Chairwoman of the River Stewardship Council in 2018, for her watchful eye and careful attention to our work over many months. The RSC is grateful to Sarah Bursky, the National Park Service's Rivers Manager for the SuAsCo Wild and Scenic River, without whose dedication, persistence, organizational skills, and good humor this revised Conservation Plan could not have reached this point.

The work of the River Stewardship Council across two decades has involved countless organizational partners, town, state, and federal employees, local volunteers and advocates. To everyone who has been involved with these successes through time, thank you for your dedication and commitment to caring for a nationally unique and locally beloved resource.

2018 River Stewardship Council Representatives

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I. INTRODUCTION

The historic Sudbury, Assabet and Concord Rivers have been loved, used, and celebrated by local residents and visitors to the region. For those who live nearby, they inspire daily, and are a resource for fishing, boating, hiking, writing and reading, repose and relaxation. Designated by the U.S. Congress as Wild and Scenic in 1999, the rivers are the focus of a Conservation Plan published in 1996. The 1996 Plan was the product of a collaborative effort by state and federal agencies, river advocates, municipal officials, and members of the public, and it has long served as the guiding management plan for the work of the River Stewardship Council (RSC) to protect the rivers.

Now, more than twenty years since the drafting of that plan, the Council has updated it, to guide collaborative work going forward. It is intended to help citizens, local organizations,

“He who hears the rippling of rivers in these degenerate days will not utterly despair.”

Henry David Thoreau

and state and federal officials work together to tackle the challenges facing the cultural and ecological resources of the region.

History of the Wild and Scenic River Designation

In the 1980s, development pressure led to efforts to protect the Sudbury, Assabet and Concord Rivers from perceived threats, in particular a possible diversion of the Sudbury River for Boston's water supply. In 1987, a group of citizens asked their congressman to introduce legislation to study the three rivers for possible inclusion in the Wild and Scenic system, beginning the 12-year process that led to the designation in 1999. The long path to designation included extensive public outreach in the eight towns along the rivers, a National Park Service study advised by a committee of local stakeholders, and votes by all eight towns to support designation. On April 9, 1999, the U.S. Congress designated 29 miles of the Sudbury, Assabet and Concord Rivers as part of the Wild and Scenic River system.



Senators Ted Kennedy and John Kerry, and Congressman Chet Atkins were some of those present at the ceremony celebrating Wild and Scenic designation in 1999.

The federally-designated Sudbury, Assabet and Concord Wild and Scenic Rivers are critical to the quality of life in our region of Greater Boston and are now part of the 1% of the rivers that comprise the National Wild and Scenic River System. Among the designated rivers across the country, the Sudbury, Assabet and Concord are unique in their place in American literature and history, their proximity to metropolitan Boston, and in that they are three rivers that tie eight communities together.

Of the miles included, 14.9 are classified as scenic, 14.1 as recreational, and all 29 count as the first-ever designation to “protect and enhance . . . literary resources.” They collectively drain the 399 square mile watershed, flowing into the Merrimack River at Lowell, and are protected for their scenic, ecological, recreational, historical and literary values. The designation honors the unique impact these rivers had in America's history, serving as the backdrop to historical events in the pre-colonial era and Colonial era, inspiring Thoreau and Emerson, some of the country's greatest thinkers on ecology and the environment, and leading to a culture of river protections today.

Designated as a “partnership river,” and passing through private, state and federal land, the Sudbury, Assabet and Concord flow through one of the most densely populated regions of all of the Wild and Scenic Rivers. Yet the residents in the eight communities abutting the Wild and Scenic segment have demonstrated a firm commitment as evidenced by their votes to adopt the Conservation Plan and to support Wild and Scenic designation. These communities are critical partners in the rivers' long-term protection.

Management Principles of Partnership Wild and Scenic Rivers

Most of the 203 rivers in the National Wild and Scenic Rivers System flow through federally-owned land and are managed by the federal agency that manages the land. The broad purposes of designation of a river as a National Wild and Scenic River are to preserve the water quality, free-flowing condition and “outstandingly remarkable values” for which the river was designated, protect the river from the harmful effects of new federal projects such as dams and hydroelectric facilities, and protect and enhance the values which led it to be designated, through implementation of a river management or conservation plan.

Over the past 25 years, river conservation interests at the local, state and federal levels have collaborated to develop an effective, partnership-based approach to manage those rivers that pass through the patchwork of private and public land typical in the Eastern U.S. within the framework of the Wild and Scenic Rivers Act. This unique approach, called “Partnership Wild and Scenic Rivers,” has been recognized by the National Park Service and the U.S. Congress as a distinct and consistent application of the Wild and Scenic Rivers Act. Based on their management plans and legislation, the 13 Partnership Rivers in the Northeast, Mid-Atlantic states and Florida designated as Partnership Rivers share the following principles:

Much has been achieved since the river was designated. The achievements from the original Conservation Plan are described in “Stories and Successes, 1999-2018,” available online at www.sudbury-assabet-concord.org

- No new federal acquisition of land pursuant to the designation.
- Adjacent land use continues to be governed by local communities and state statutes, as prior to designation.
- The management plan is written and implemented through a broad participatory process involving guidance from a locally-based advisory council. The plan forms the basis of the post-designation management.
- The National Park Service reviews federally funded, sponsored, or licensed projects to ensure federal consistency with the plan’s river protection goals.
- The responsibilities associated with stewardship and protection of the river resources are shared among all of the partners – local, state, federal and private – and volunteerism is a consistent backbone of the success.
- The costs and responsibilities for managing and protecting the river’s resources are shared among all of the partners – local, state, federal, and non-governmental.

These fundamental principles were key to the original designation of the Sudbury, Assabet and Concord, and will be maintained through each update to the Conservation Plan.

Achievements Resulting from Designation

The Conservation Plan has been the guiding document for the work of the RSC and its partners, laying out protections for the River’s “Outstandingly Remarkable Resource Values” – ecology, recreation, scenery,

archaeology and history, and literary. Serving as the “comprehensive river management plan” as required by designation, it was drafted by the Study Committee and its partners and approved in 1996. The plan has served as the guidance for action over the last two decades. The plan included provisions related to the Wild and Scenic designation, all of which are carried forward in this 2019 update. These provisions, together with the National Park Service’s Draft Report to Congress, and the text of federal legislation in 1999 designating the portions of the Sudbury, Assabet and Concord into the federal system, provide the full background and context for the national Wild and Scenic River designation.

Many of the original goals in the 1996 Conservation Plan have been accomplished. Chief among these accomplishments are:

- Monthly meetings and regular management of the River Stewardship Council.
- Review and analysis of regional water withdrawal permits and wastewater permitting, support for citizen science-based quality monitoring, and leadership on setting standards appropriate for these rivers.
- Support of community initiatives that protect and enhance the values of the rivers through the funding of over 60 small grant projects, including education and outreach, boat access improvements, stewardship of protected land, land conservation, and literary and art-themed projects
- Support of the conservation of 2,401 acres of land along the rivers.
- Participation in the design or improvements to eight bridges, and submitting over 50 comment letters on other development or construction projects along the river.
- Funding of several research studies to better inform management decisions.
- Hosting of 16 years of the annual RiverFest celebration, providing more than 800 experiences for the public along the rivers.
- Funding of over 15,000 educational experiences for youth in 15 schools across the region.

Listing and quantifying these achievements illustrates the diverse and wide-ranging effect of the Wild and Scenic designation in its communities. One of the greatest benefits to all involved through the years is more difficult to quantify – the interconnectedness among the partners that has yielded support, expertise, and collaborative vision.

Additional summaries of the accomplishments of the Council can be found in the Sudbury, Assabet and Concord Long Term Success Report, “Stories and Successes, 1999-2018.”

Changes in the Region Since 1996

Much has changed in the Boston MetroWest region since 1996, when the original Conservation Plan was published. A 2015 University of Massachusetts report notes that towns in the Sudbury, Assabet and Concord watershed had an average growth rate of about 0.5% from 2000 to 2010 and the report predicted growth rates up to 1% per year through 2015. Thereafter, projections indicate a lower growth rate of between 0.25% and 0.35%. The report noted that there would be out-migration of college students and retiring baby boomers, with growth primarily expected to occur along either side of Routes 495 and 9. Yet, the Framingham Conservation Commission issues the 8th highest number of Orders of Conditions tied to Notice of intent filings under the Wetlands Protection Act (WPA) of all 351

communities in the Commonwealth. The Town of Framingham has recently become a City, and growth has been considerable around the commuter rail in response to a growing and expensive Boston region.

The regulatory framework has also changed in significant ways since 1996. The RSC contracted with Mason and Associates in spring of 2018 to compile a thorough review of existing regulatory protections which highlight what has changed, opportunities and challenges. This is included in Appendix 3.

At the federal level, the most significant changes have been in the implementation or interpretation of laws predating 1996, including flood hazard mapping by FEMA as part of the National Flood Insurance Program, and changes in the interpretation of “waters of the United States” in the Clean Water Act (CWA) as it applies to wetlands. A number of programs related to water quality under the CWA and some related to the federal Safe Drinking Water Act have moved forward. These include identification of impaired waters and development of a pollution budget (TMDL) for the Assabet River resulting in improved wastewater treatment, and increased efforts to protect water supplies. The Environmental Protection Agency has also implemented more stringent stormwater management permits under the CWA for small municipal stormwater systems, industrial facilities, and construction activities. These efforts interact with Massachusetts programs/agencies, such as changes in the State’s wetlands regulations and water quality standards, and may affect municipal activities especially related to public water and sewer facilities.

At the state level, major legal and regulatory changes include:

- The Rivers Protection Act of 1996 (Rivers Act) as it provided a significant increase in both jurisdiction and resource protection over the state Wetlands Protection Act.
- Implementation of the Massachusetts Endangered Species Act of 1990 has advanced significantly since 1996, in terms of the Natural Heritage and Endangered Species Program (NHESP) designated species/habitat mapping, project review, and coordination with other agencies. The NHESP Vernal Pool Certification program is an example of significant advancement of resource protection since 1996.
- The Water Policy of 2004 of the Executive Office of Energy and Environmental Affairs (EEA) that promoted Water Resources Management Plan preparation.
- The Water Management Act (1986) regulations were updated in 2014, providing significant changes to the permitting of water supplies, and including streamflow criteria which may limit water withdrawals from particular surface water supplies at particular times.
- EEA’s Sustainable Water Management Initiative (SWMI, 2012) provided the framework for water resources management and the WMA regulations update that balanced various public interests related to water supply, protection of biological resources, and other water uses.
- The Massachusetts Drought Management Plan (2013) advanced the coordinated protection of water resources at times of low flow.
- The state’s Water Conservation Standards were updated in 2006, 2012, and 2018.
- The Community Preservation Act of 2000 has provided significant financial resources for preservation efforts in member communities, consistent with Sudbury, Assabet and Concord Wild and Scenic River goals.

Role of the River Stewardship Council

As a Partnership River within the National Wild and Scenic River system, the Sudbury, Assabet and Concord Wild and Scenic Rivers are administered in partnership with the entities along the River who have jurisdiction. A local body known as the River Stewardship Council (RSC), comprises representatives from State and Federal agencies, the eight municipalities, and two local non-profit organizations administers the program locally in partnership with the National Park Service.

The role of the RSC is to protect and enhance these special resources. The committed town volunteers, nonprofit partners, state and federal representatives, bring life to the Wild and Scenic River program. The Council representatives makes choices about where to direct funds for the betterment of the rivers and their communities, comments and provides guidance on critical issues, and generates outreach and excitement for river appreciation and stewardship.

Purpose and Process of the Update

By law, Wild and Scenic Rivers must have a “comprehensive management plan.” The original Conservation Plan detailed regulations and protections that existed at the time of designation, so as to be clear as to what conditions should be “protected and enhanced” into the future. The original plan emphasized the significance of these protections and noted that the River Stewardship Council will support their implementation. It drew a distinction between the work of existing regulators and managers, and the potential projects of the Council.

Now, 20 years later, many federal, state and local regulations have changed, as have development patterns, river conditions, and the climate. It is critical to focus on the actions that the Council and watershed communities can take to improve river conditions.

The process for this Conservation Plan Update began with a retreat of the Council and key partners in April 2017, to identify major conservation challenges and priorities for the next 10 years. Next, presentations were held in the fall of 2017 and winter of 2018 in each of the eight member municipalities along the Wild and Scenic Rivers, to reengage with residents about the role of the Plan and the rivers in their communities. Municipalities were invited to share major issues of concern. The Plan update was then drafted, with the help of many collaborators, between February and August of 2018, and edited in fall 2018. A final draft was presented to federal, state and municipal partners in November 2018 with a request for written comments.

How to Use this Update

The Conservation Plan Update is intended as a supplement to the River Conservation Plan of 1996. Where there have been major changes to river conditions or federal/state/local regulations, we have noted this in the “status” portion of individual sections. In most cases, the “objectives” of the original plan have not changed, but in many cases, the strategies have; where original sections remain the same, they re-appear in this Update and page numbers for the original Plan are referenced.

The RSC contracted with Mason and Associates to do a thorough regulatory review of the eight towns, and State and Federal regulations. This full report is included in Appendix 3, and summary information is included in the body of this document. While no additional study was commissioned as part of the update, some specific studies are noted in this document.

The intent of the update is to:

- a) Note major changes to the condition of the resources and the rivers, as relevant to strategies and action plans, and
- b) Highlight new strategies on which to focus going forward.

The Conservation Plan should be used as a guiding document, but also as a living document: emerging priorities can be channeled into the more frequent 3-5 year strategic plans and annual work plans of the RSC.

II. THE RIVER MANAGEMENT PHILOSOPHY

Goals of the Plan

The River Management Philosophy, as written in the original Conservation Plan (p. 3) remains the guide, and the stewardship approach is still intact.

Goals for River Protection from the 1996 Conservation Plan:

1. Conserve and enhance the Sudbury, Assabet and Concord Rivers' wildlife habitat, scenery, recreational resources, historic and archaeological resources, and literary values for the benefit of present and future generations.
2. Make decisions affecting the rivers and related resources in a coordinated, holistic way, in cooperation with local governments, private property owners, and state and federal agencies.
3. Create an adaptable administrative framework that can accommodate the needs of future decision makers.
4. Promote education and awareness; identify and study trends that have occurred and others likely to occur.

At the retreat, the RSC agreed to the following elements of how it would like to do its work going forward. These complement those in the original plan.

- Take a holistic approach to address the complex issues facing the rivers.

Recognizing the pace and scale of the issues, the Council will work where it can make a difference long term in conserving and enhancing the values of the rivers and recognize where partners may accomplish these goals more efficiently and effectively.

- Identify "tipping points" within certain issues and strategies, in order to gauge high priority projects and issues
- Address new issues, including the effects of climate change and emerging contaminants
- Take into account the effects of climate change when identifying management priorities going forward
- Work upstream and downstream of the Wild and Scenic segments to reach different audiences and affect different issues. (See watershed-wide approach)
- Improve outreach to more effectively target audiences with issues that resonate with them.

A Watershed-wide Approach

The RSC's accomplishments have in large part focused on the areas directly along the Wild and Scenic segment. Partnerships and programs within the eight Wild and Scenic communities have been prioritized. This has made sense as the building blocks to the program following designation. (See "Stories and Successes, 1999-2018," in Appendix 8 available at our website.)

The Conservation Plan also identifies in its “Watershed Protection Initiatives” (p. 25) the need to be concerned with issues further afield in the whole watershed. Ecologically speaking, the rivers are greatly affected by actions upstream and downstream, and human impacts that cross municipal boundaries. The Council has funded policy advice and water quality monitoring at the watershed level.

Environmental education has been focused along the three rivers, but at times outside of the eight towns, providing children the experience of learning from a river, which they might not otherwise have had. Land conservation through acquisition and restrictions has moved farther into the headwaters and along the tributary streams to protect water quality and quantity, riparian corridors for wildlife habitat, and scenic values.

Many of the issues facing the rivers impact the landscape beyond town boundaries, requiring creativity, flexibility and broad partnerships to tackle successfully. While this scope of work continues to evolve, we understand our work to be as follows:

- Work along the 29 miles of the Wild and Scenic segments continues to be the priority.
- Recognizing that there is a “gray area” with regard to what has direct impact on the Wild and Scenic Rivers, the RSC will continue to assess projects and work beyond the designation on a case by case basis, keeping in mind the readiness and commitment of partners, the potential impact of a project to “protect and enhance” the Wild and Scenic River, and competing budget priorities.
- With regard to specific strategies:
 - Recognizing that **river access points** directly on the Wild and Scenic segment are our priority to enhance recreational use, but are limited in opportunity, we will work to build and improve river access points also upstream and downstream of the Wild and Scenic segment as viable projects are proposed.
 - Funding for **environmental education** will continue to be focused where we have willing school districts and nonprofit partners in the Sudbury, Assabet and Concord (SuAsCo) watershed, and where there is a *direct river experience in our watershed* for children and youth on the three rivers.
 - Funding for **policy advice and water quality monitoring** will continue with our lead partner, OARS, along the three rivers and major tributaries. Statewide policy advice, and water quality projects will be assessed according to the impact to the SuAsCo watershed and the project’s potential to build capacity to protect and enhance the Wild and Scenic River and connected tributaries specifically.
 - Funding for **land conservation** with our lead partner, Sudbury Valley Trustees (SVT), and other organizations, will focus on protecting lands based on their rank as outlined by set priorities in the Resource Management section.

The River Stewardship Council will determine on a case-by-case basis where we need to comment and/or get involved on development and municipal projects. Where other major partners are contributing input on projects farther afield from the Wild and Scenic segments, the RSC may choose not to.

III. UPDATES TO THE ADMINISTRATIVE FRAMEWORK

The bulk of the administrative framework as laid out in the 1996 Conservation Plan remains the same. The core membership, procedures and agreements remain the same (Conservation Plan, p. 9).

Notable updates to the Administrative Framework:

- The Commonwealth of Massachusetts' environmental programs have undergone structural changes. It was previously recommended that the Riverways Program of the Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE) take the lead in pursuing options to achieve consistency at the State level. The Riverways Program, however, has since been incorporated into the Division of Ecological Restoration (DER). Currently the Council maintains close connections with the DER and the Department of Environmental Protection (DEP). The Council is trying to build closer ties to the Department of Conservation and Recreation (DCR), as well, as they also have an important role in water management, particularly in the Framingham area.
- As noted in the Plan, bylaws are developed for more specific procedural issues. The RSC has updated the bylaws as of 2016 and this is included in Appendix 1.
- The role of the Council can cause confusion among municipalities and interested parties, and to help with this, an RSC member job description and guidelines for navigating the role were developed and appear in Appendix 2.
- There is agreement that updates to the Plan need to occur at greater frequency than every 20 years, and a 10-year window is recommended. Additionally, a 3-5 year Strategic Plan will serve as the platform for creating project and funding priorities.

IV. THREATS TO THE OUTSTANDINGLY REMARKABLE RESOURCE VALUES

The 1996 Conservation Plan laid out a framework for long-term protection for the rivers and their outstanding scenery, recreation, ecology, history and archaeology, and literary values. Since that time, the challenges to the resources have changed, and the strategies must address these challenges.

In its retreat of spring 2017, the RSC and associated partners identified the following as major issues affecting the watershed.

Threats to Outstandingly Remarkable Values (ORVs):

- Decreasing water flows threaten all of the values, as weather patterns become more extreme, land is developed, and water withdrawals increase. Smaller and private groundwater withdrawals are less regulated and increasing in number.
- Stormwater runoff is the likely source of many of the remaining water quality problems, and impervious surfaces are on the rise due to growing populations and development. Stormwater pollution is exacerbated by increasingly intense rainfall events.
- The problem of terrestrial and aquatic invasive species is growing, and solutions are expensive and require partnership efforts to maximize reach and scale.
- Rapid land development and fragmentation at the landscape scale threatens habitat connectivity, water quality, ecosystem services, tributary and headwater degradation, and the River experience.
- Protective legislation and regulations can be whittled away over time, and anti-regulatory sentiment needs to be countered with understanding of the costs of water quality and quantity degradation and the value of environmental services.
- Climate change threatens ecosystem integrity at a broader geographic scale than any one watershed.
- Partners have to be ready for any decrease in federal and state environmental program budgets – less for staff, grant programs, science, testing, and enforcement – which requires nimbleness and resourcefulness.
- Preserving the Wild and Scenic experience with a growing population is a challenge, as is the enforcement of rules related to public use, such as noise, trash, and motorcraft speed.
- There is a disconnect between the public and the rivers and their value, and not enough understanding about the benefit of designation to local communities. Maintaining interconnectedness of the towns in stewarding the rivers is an ongoing effort.
- The Sudbury, Assabet and Concord Rivers have limited access areas for recreation, and current access points on the rivers need more regular maintenance.
- There is a need to build more bridges between municipalities and environmental advocates and collaboration on cost-effective, mutually beneficial projects.



Photo courtesy of Terri Ackerman

V. RESOURCE MANAGEMENT

Overview

This section of the Conservation Plan Update parallels the original Plan, and describes a detailed program that will provide long-term protection for the Sudbury, Assabet and Concord Rivers and their outstanding scenic, recreational, ecological, historic and archaeological, and literary values. The intent of the strategies and action recommendations is to provide possible collaborative approaches to address the challenges noted above. The discussion is divided according to the chapters of the original Plan. Recommendations for the eight municipalities along the river appear as a section within the Plan (whereas portions appeared in the Appendix in the original Plan and Study documents).

The 1996 Conservation Plan noted that “a fundamental tenet of the Plan – [is] that the rivers’ outstanding resources can only be protected through sound management of the land and water base on which they rely” (p. 17). This remains a fundamental principle of this Plan Update.

Public and Private Lands Management

OBJECTIVE:

To conserve the ecological integrity and scenic character of the Sudbury, Assabet and Concord River corridor through sensitive management of privately-owned and publicly-owned shoreland and upland areas, without unduly restricting other uses of those lands (Conservation Plan, p. 19).

STATUS:

Land conservation has long been a critical part of the protection of the Wild and Scenic River's many values. In 2002, an inventory of unprotected lands along the Wild and Scenic sections of the Sudbury, Assabet and Concord Rivers was created with the help of many partners, including the National Park Service, U.S. Fish and Wildlife Service, SVT, and towns and local land trusts. Many of the parcels identified were incorporated into municipal open space and recreation plans, and the inventory informed subsequent outreach to landowners along the river. The inventory was updated in 2015 and again in 2018 and is available in Appendix 4. The Council's work with SVT has supported over 2,400 acres being protected since designation.

The mechanisms and funding sources for land conservation have shifted somewhat since publication of the 1996 River Conservation Plan. Federal funds for National Wildlife Refuge acquisitions have essentially disappeared, and the Massachusetts Department of Fisheries and Wildlife has shifted its focus to other parts of the state where land is less expensive. However, all the municipalities along the Wild and Scenic River, with the exception of Framingham, have adopted the Community Preservation Act, allowing them to set aside dedicated funding for open space acquisition, historic preservation, and affordable housing. This has proved an invaluable source of funding for land protection, as has the private – individual and foundation – funding leveraged by local and regional land trusts working in the area. State grants from the Executive Office of Energy and Environmental Affairs have also been critical to many land conservation projects.

There are still a number of ecologically and historically important properties to protect, and the municipalities and land trusts continue to play a vital role in communicating with landowners and engaging the public around land conservation issues.

STANDARDS:

The standards described in the 1996 Conservation Plan – with regard to private and public lands - noted local zoning, state, and federal laws at that time as constituting the minimum standard, and noted that land managers should “seek to minimize impacts on water quality, streamflows, views to and from the river, and the scenic character of the river corridor”(p. 19).

Land along the rivers is relatively expensive per acre and there are few large parcels remaining to be protected. In the future, a greater priority will need to be placed on minimizing impacts on land along major tributaries and headwater streams, recognizing the impact to the Wild and Scenic corridor and building resiliency to climate change.

2018 UPDATED ACTION PROGRAM:

The Key Actions, Supporting Activities, and Additional Opportunities of the 1996 Conservation Plan remain relevant as major mechanisms for land protection in that they referenced existing federal, state and local land use regulations and policies, as well as good private land stewardship and private land acquisition (p. 19-22).

LAND CONSERVATION AT A WATERSHED SCALE:

The 1996 Plan noted as a critical action: *“Watershed protection initiatives: SVT and OAR . . . should give special attention to protecting land along the undesignated sections of the Sudbury and Assabet rivers when setting priorities for their watershed-wide program”* (p. 25). Noting the value of work upstream and downstream of the Wild and Scenic segment, the RSC developed its watershed-wide approach (noted above) and in particular, set priorities for private land conservation which will be ranked as follows:

1. Projects along the Wild and Scenic Rivers, and in the eight municipalities where work protects and enhances the Rivers (and funding for early work to pursue and explore such projects with landowners).
2. Projects on the Sudbury, Assabet and Concord upstream or downstream from the Wild and Scenic segment (and funding for work to pursue and explore such projects with landowners).
3. Projects in critical headwater zones or along key tributaries on a case-by-case basis, depending on: the ecological significance of the tributary, the relative degree of vulnerability of the land, and the potential impact on the Wild and Scenic Rivers if the property is not protected.
4. Stewardship of public and private lands along the River, and stewardship of landowner relationships, where there is a described/documented positive impact on the Wild and Scenic River.

Priority Strategies for Land Management:

1. *“Local enforcement of regulations: Improve the zoning, building code, Title 5, wetlands bylaw and conservation restriction enforcement capacity of the riverfront towns”* (p. 23). At the time of this update, it is difficult to adequately assess the enforcement of existing regulations in each town; however, it is an area for continued improvement.
2. *“Local Planning: Each riverfront town should emphasize conservation of the river in updates to its Open Space Plan, Master Plan, Comprehensive Plan, and other land use plan”* (p. 23). Mason and Associates noted in its 2018 report that current town plans do not strongly emphasize the connection to the Wild and Scenic Rivers and that this is an area that could be strengthened. Additional municipal recommendations are listed by town.
3. Working with SVT and other regional partners, to increase the pace of land protection, in both Wild and Scenic municipalities and in headwaters, through identification of shared priority parcels, funding, advocacy for Community Preservation Act passage, letters of support, and other outreach activities.
4. Prioritize stewardship of protected undeveloped lands along the river corridors, to manage for habitat, counteract invasive species, provide good signage and access opportunities, and protect ecosystem services. See also under Ecology ORV section, below.
5. Support collaborative efforts of stewardship and land conservation, such as the SuAsCo Cooperative Invasive Species Management Area (CISMA), and the Metrowest Conservation Alliance (previously the West Suburban Conservation Council); maintain a link to collaborations through shared representatives.
6. Support RSC municipal representatives building a stronger link between Council work and local conservation commission work, to bolster each other’s work.
7. Consider models for engaging local stewards, such as a “Riverkeeper” certification, similar to Master Gardener, teaching landowners and others river stewardship skills.
8. Update inventory of unprotected land along the Wild and Scenic segments regularly, and reach out to landowners. The RSC can be an ally to land conservation groups by actively building relationships and being aware of key parcels identified for protection.
9. Develop abutter awareness and work with abutters as a target audience; all residents can impact the rivers.



Great Meadows National Wildlife Refuge, Photo courtesy of Terri Ackerman

Water Resource Management – Water Quality

Because of the complexity of water quality and quantity management, the following changes have been made to those sections of the 1996 Conservation Plan:

OBJECTIVE:

To enhance and maintain the river segments' water quality so as to protect their outstanding quality-dependent resources (ecology, recreation and scenery).

The segments' water quality will be improved and protected to meet water quality standards under the CWA and other state and federal water pollution control laws year-round. This will reduce or eliminate the gradual loss of aquatic habitat quality and diversity. It will also protect against the loss of open water areas and consequent reduction in the rivers' value for recreation and scenery.

STATUS:

The quality of the water in the three rivers has improved since designation in some ways, and faces new challenges in other ways. At the State level, the Massachusetts Rivers Alliance has worked to improve the Water Management Act's flow protections, improving the stormwater permits under the CWA, led the efforts to improve the state's drought management plan, and successfully increased the budgets at the state level of several agencies that directly benefit the three rivers and increased the line item for invasive plant removal funding.

With strong advocacy by OARS, a Total Maximum Daily Load (TMDL) limit for phosphorus was completed for the Assabet River in 2004. Since then, due to more stringent National Pollutant Discharge

Elimination System (NPDES) wastewater discharge permits under the CWA, the Total Phosphorus concentration in the Assabet and Concord Rivers has decreased significantly. Phosphorus pollution creates excessive aquatic weed and algae growth that contributes to human-induced eutrophication of the rivers. Due to major upgrades in municipal wastewater treatment, in-stream phosphorus concentration in the Assabet and Concord Rivers is now generally at the level where it will not cause eutrophication. The exceptions are the impounded areas where phosphorus is recycled by the sediments – but these are outside of the Wild and Scenic River segments. The cycling of nutrients from sediments has not yet been addressed. The Concord River’s impairment due to phosphorus is recommended for removal from the state’s Integrated List of Waters for 2016 (i.e., impaired waters, Sec. 303d of the CWA) due to this improvement—a sign of progress. The Sudbury River remains impaired due to its slow-moving nature, lack of flow and presumably pollutants contributed by stormwater. It currently receives minimal wastewater treatment plant discharges. The slow-moving water of the Sudbury River and extensive wetlands depress dissolved oxygen levels and elevate phosphorus levels that contribute to eutrophication. As flow diminishes, these problems may increase. Cyanobacteria (*Anabaena* spp.), a strain of toxic bluegreen algae, was identified in the river at Fairhaven Bay in 2016.

Increasing identification of contaminants of emerging concern in effluent and river water, particularly of endocrine disruptors, raises questions about their sources, interactions, and ways to reduce their presence in the rivers. A U.S. Fish and Wildlife study (Iwanowicz et al., 2013) that included the wildlife refuges in the Sudbury, Assabet and Concord watershed found that their samples included intersex largemouth bass: 33% in the Assabet River, 75% in the Sudbury River, and 9% in the Concord River.

The mercury contamination of the Sudbury River from the Nyanza Superfund site in Ashland is diminishing in the fish tissue, but due to methylation in the river’s extensive wetland areas, is still presumed to be entering the food chain, and eating any fish from the river is prohibited and severely restricted downstream in the Concord River.

Although in-stream concentrations of the nutrient phosphorus have decreased, some invasive aquatic plants, particularly water chestnut (*Trapa natans*), have flourished. Water chestnut, a long-term problem in the Sudbury River at the Great Meadows Refuge, has been managed to some degree through intensive mechanical harvesting. Mechanical harvesting supplemented by hand-pulling has made progress in keeping the Sudbury River open and in some areas reduced or eliminated the need for mechanical harvesting. However, water chestnut is becoming far more widespread and rigorous and consistent removal is required every year to prevent it from impairing recreation, scenic and ecology ORVs.

The Clean Water Act has been implemented in substantially the same way at the federal (EPA) and state (MassDEP) levels as when the Plan first went into effect, but jurisdiction under the Act has been subject to changes by political administrations. Over time, stormwater has become the main source of surface water pollution for most surface waters in the Commonwealth now that pollution from wastewater discharges has been significantly reduced. Stormwater permitting under the Clean Water Act is becoming more rigorous to address this source.

With population increases in the watershed has come an increase in built impervious area. Most communities in the watershed have adopted their own wetlands protection bylaw and many also have a stormwater bylaw to improve stormwater recharge and control stormwater pollution to help mitigate

the damage caused by impervious cover. Climate change is expected to exacerbate water quality problems due to increased thermal pollution, heat stress, loss of flow due to evaporation and drought, and increased pollution and sedimentation due to more intense rainfall.

Trash in the water and along river banks had been considered a serious water quality problem in the Recreational and Scenic evaluation (Water Resources Study, 1994, Chapt. 7-11). Annual river cleanups by OARS and other groups have significantly reduced the amount of trash in the rivers.

STANDARDS:

The standard is to reduce pollutant loadings to levels that are within the rivers' assimilative capacity. Pollutants of concern include, but are not limited to: nitrogen and phosphorous in order to reduce the rate of aquatic biomass growth (cultural eutrophication); mercury; endocrine-disrupting compounds and pharmaceuticals to reduce impacts on wildlife, ecosystem health and fishing recreation; heated water/thermal pollution to reduce stress on aquatic life, particularly fish; harmful bacteria to enable primary and secondary contact recreation (e.g., swimming and boating); road salt, suspended solids, toxic chemicals and other pollutants.

Point source discharges:

- No new point source discharges should be permitted into the designated segments or upstream of the segments;
- Alternatives to point source discharges should be given strong preference, such as treated ground discharge systems that will replenish groundwater resources;
- Release of contaminants, particularly mercury, from already-contaminated sites upstream of or within the segments should be prevented to the maximum extent possible.

Non-point source pollution:

- Non-point source pollution should be controlled to the maximum extent possible and in compliance with federal and state laws, regulations and policies.
- Vegetative buffers of native plants should be in place along all riverfront property except where they may interfere with boat ramps or historic structures.
- No fertilizer, pesticides, or other form of nutrient or chemical pollution should be allowed to enter the river segments, whether directly from runoff or from tributaries.
- Stormwater discharged to the segments and tributaries should not have elevated temperatures, or elevated concentrations of bacteria or other pollutants. No increase in temperature of critical resources, such as tributary coldwater streams, should be allowed.
- Septic systems should be maintained so that contamination does not enter the river; where present, bacterial contamination should be tracked to its source and eliminated.

At the time of writing, herbicides are currently being used to treat invasive species as part of an integrated pest management strategy with the intent to reduce populations and be able to manually harvest in the future.

Riverine qualities can be lost through the conversion of open water into wetlands, and wetlands into uplands. This may occur through the rampant growth of aquatic biomass due to excess nutrients and

through sedimentation, and also through the displacement of native vegetation by non-native, pollution-tolerant species. Water pollution can also damage the health of aquatic life and lead to shifts in the composition of aquatic communities by interfering with feeding, reproduction, and habitat. These shifts can impact recreational fishing, wildlife viewing, and ecology. Thermal pollution and increased water temperature due to increased air temperature and loss of flow narrows the biological diversity of fish and other aquatic species and damages aquatic habitat. The changing conditions due to climate disruption, including hotter air temperature, more intense precipitation, and increasingly frequent and unpredictable floods and droughts, will create new challenges in meeting this objective and require redoubled effort.

Priority Strategies for Water Quality:

1. Work with river communities and partners to strengthen local bylaws/ordinances and programs to reduce non-point source pollution through stormwater management, including green infrastructure. Work with Mass. Rivers Alliance at the statewide level.
2. Communicate the importance of implementing laws and regulations at the local, state and federal levels that protect river resources, through comment letters, presentations, educational materials and grant-making and communication when protective measures are in jeopardy.
3. Support science-based decision-making through grant-making and engagement, particularly to support citizen science.
4. Develop relationships with DCR, MWRA and DER, including particularly water managers in Framingham and support communication around mutual issues of concern.
5. Support development of watershed-based permitting approach: Permits issued by or under the auspices of MassDEP and/or the EPA should be based on the cumulative impacts of permits throughout the river basin when setting new or renewal permit conditions.
6. Measure and track the status of key indicators of water quality under a quality-controlled water quality monitoring program.
7. Support federal, state and local budget allocations for water quality monitoring.
8. Monitor aquatic and riparian biomass in order to track progress in reducing eutrophication and maintaining habitat quality; periodic biomass assessments should be carried out.
9. Support municipal use of green infrastructure to infiltrate stormwater and reduce stormwater pollution, particularly where the rivers and tributaries run through urban areas with few buffers.
10. Work with conservation commissions to ensure that lawns and pavement are no closer than 20 feet to the river or stream bank. Work with municipalities to control pet waste and coal-tar containing pavement sealer within areas draining to the rivers or their tributaries.
11. Support education and enforcement regarding laws and regulations to reduce harmful nutrient release, including [Chapter 262 of the Acts of 2012](#), An Act Relative to the Regulation of Plant Nutrients. No phosphorus-containing fertilizer should be used on lawns that contribute runoff to rivers, either directly or via storm drains.
12. Support the tracking, mapping and elimination of septic and sewer contamination of groundwater and surface waters. Encourage updates to outfalls known to be problematic.
13. Conduct studies of the segments' aquatic biota to track changes in populations and organism health as need arises.
14. Support the MS4 permitting process as appropriate, including holding workshops on technical issues and funding mechanisms, and support town efforts at implementation.
15. Engage in studies and advocacy related to contaminants of emerging concern, including endocrine disruptors. Partner where feasible on these issues.

Water Resource Management – Water Quantity

OBJECTIVE:

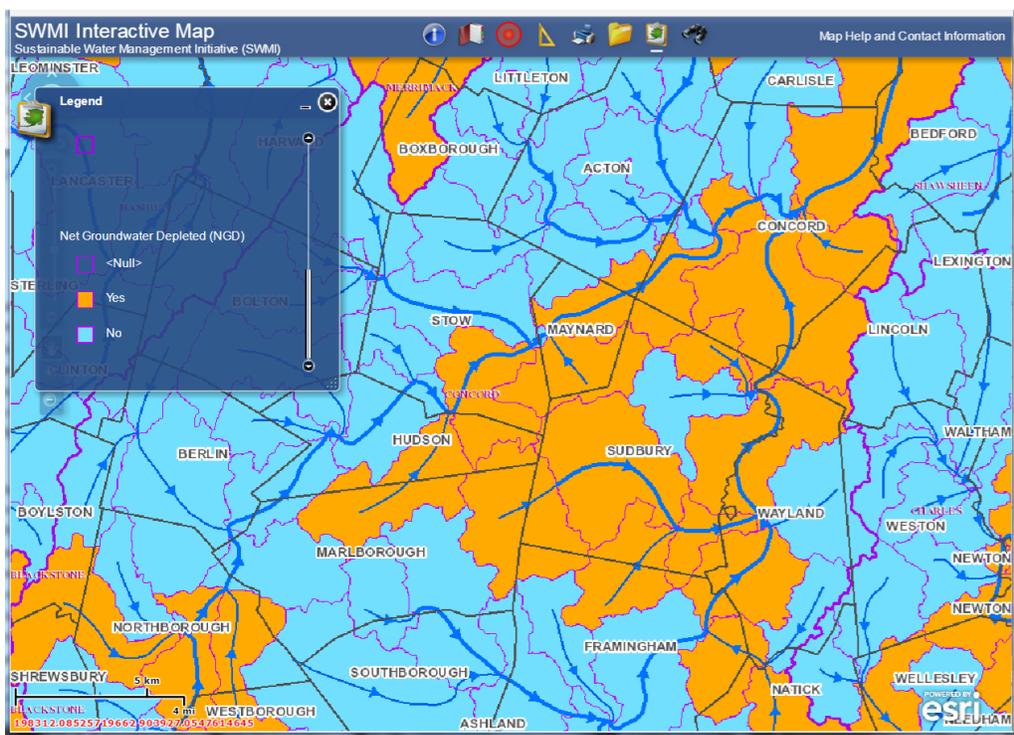
Protect the natural seasonal flows necessary to maintain the segments' water quality and to sustain their flow-dependent outstanding resources (wildlife habitat, recreation and scenery) while, to the extent possible without creating a direct and adverse effect on these resources, meeting compatible waste assimilation and water supply needs.

STATUS:

Seasonal flows and water levels in the three rivers fluctuate widely and there are extensive floodplains. The gradient of the rivers is relatively flat. While high flows in the rivers currently appear to be within normal bounds, and with some appropriate seasonality to support healthy aquatic and riverine communities, future fluctuations from the impacts of climate change could be a challenge. The low flows are currently problematic.

Land use, changing precipitation patterns, flow management through dams, direct withdrawals, indirect withdrawals through induced infiltration from wells, and stormwater management all influence streamflow. Many of these human activities can be modified through education, regulation and other means of changing behavior. However, apart from reducing our greenhouse gas emissions, we cannot affect the precipitation patterns. We can only modify how we plan for, react and adapt to them.

MassDEP maps showing net groundwater depletion during the low flow period (August) illustrate the water imbalance in the watershed and impact of water withdrawals on water availability for streamflow.



Sudbury, Assabet, Concord River confluence (show stream and river flow lines), SWMI viewer, MassDEP.

Restoring the water balance is a long-term goal that will ensure adequate stream and river flows in the future and support local needs for drinking water and waste conveyance. Restoring the water balance involves decisions about water withdrawals, wastewater discharges, and interbasin transfers in the residential, municipal, institutional and industrial sectors. It also requires reversing the trend of increasing impervious cover due to land development. This will also be a long-term effort, but can be acted on immediately.

At the state level, the Sustainable Water Management Initiative revisions to the Water Management Act incentivize increasing permeable surfaces and recharging more stormwater. The small Municipal Separate Storm Sewer System (MS4) permit does the same. Municipal vulnerability preparedness for climate change also benefits from maximizing stormwater recharge which will reduce flooding impacts and make water supplies more sustainable.

With respect to the possibility of potential use of the water from the Sudbury River, the status of the Framingham Reservoirs #1 and #2 is currently “off-line.” The City of Framingham has considered the reactivation of the Birch Road wellfield; studies by the USGS have determined that water withdrawals at this location would impact river flow and have a negative effect during medium-low flow periods unless carefully managed to avoid such effects.

The Stearns and Bracket Reservoirs (Framingham Reservoir #1 and #2, respectively) are impoundments of the Sudbury River. The Sudbury Reservoir and Foss Reservoir (Framingham Reservoir #3) are tributaries to the Sudbury River and are approved sources of emergency water supply for the Massachusetts Water Resources Authority (MWRA) system. The MWRA system serves 2.2 million people and 5,500 industrial users in the Boston Metropolitan area, including residents of the SuAsCo basin communities of Framingham, Bedford, Marlborough, Northborough and Southborough as well as Ashland (emergency only). Reservoirs #3 and #4, while part of the Stony Brook watershed, also may have some influence on the Sudbury downstream. No MWRA planning documents identify a current or definite future need for consumptive withdrawals from the Sudbury River for MWRA customers. The Concord River is the sole public drinking water source of the town of Billerica but the withdrawal is below the designated Wild and Scenic segment.

To determine the impact of flow reductions on habitat and biodiversity, the RSC supported two studies: “Sudbury River Ecological Study” (2015) and “Freshwater Mussel Survey” (2017) in the Sudbury River. Further study of mussels had been recommended in the “Final Water Resource Study: Sudbury, Assabet and Concord Rivers” (p. 1-5).¹ These studies identified eastern pondmussel (*Ligumia nasuta*), a species listed as of Special Concern in Massachusetts, in the Sudbury River. The 1994 study concluded: “Undoubtedly, the severity and length of summertime low-flow periods in recent years have created a bottleneck for some species and encouraged others. It will be critical to protect riparian corridors and encourage natural ecosystem process in the river, within the obvious constraints of a densely populated river basin where demand for surface water and groundwater is intense, myriad pollution sources exist, invasive species are becoming more firmly established, and climate is changing.” (p. 14)

In addition, the Nyanza Natural Resources Damages fund supported the “Concord River Diadromous Fish Restoration Feasibility Study” (2016). This study showed the influence of the Talbot Mill dam in North

¹ “Final Water Resource Study: Sudbury, Assabet and Concord Rivers,” Goldman Environmental Consultants (GEC), April 21, 1994. Vols. I and II.

BillERICA on water levels upstream and on migratory fish and proposed options for improving fish passage. Discussions on how to restore fish passage and studies on the behavior and presence of migratory fish in the watershed are ongoing.

The 1994 Water Resource Study predicted that lower water levels “would likely increase the expansion of exotic vegetation, including purple loosestrife, glossy buckthorn, water chestnut and fanwort.” The spread of purple loosestrife due to potentially lower water levels was “a major concern” for river bulrush, a state-listed rare species (p. 1-4). Note that a biocontrol effort by CISMA to significantly decrease the purple loosestrife populations has been quite successful. However, invasive water chestnut has spread throughout the watershed and remains a significant challenge for the Wild and Scenic segments despite long-term intensive efforts at management. Progress in water chestnut control includes a management plan and several annual ongoing control efforts that have made significant progress but must be consistently maintained. The Study noted that the habitats of other state-listed species “would likely be adversely affected by any reduction in current water levels.” The frame of reference of the study’s modeling was up to the year 2010.

Water level was also determined by the Water Resource Study to be key to the recreational suitability of the river for boating and fishing. Very high water made passage under bridges difficult, creating challenging conditions for inexperienced paddlers, and made the water too turbid for fishing. Rapid flow was enjoyed by experienced paddlers. Low water meant insufficient draft for most boats and degraded scenic and aesthetic values. Obstruction of boating passage by trees has emerged as a new and serious problem, especially on the narrower Assabet River. This occurs at all water levels. The causes may include bank erosion from high flows during severe storms, more intense wind storms, significantly increased beaver activity, aging tree stock, and trees weakened by drought. The bridge replacement program by Mass DOT has resulted in the slight lowering of some bridges except where intensive input has resulted in redesign, such as at Lee’s Bridge in Lincoln/Concord.

Flow also affects water quality by diluting pollutants and reducing water temperatures during the summer. Thermal pollution is a major concern with rising air temperatures due to climate change.

STANDARDS:

Protecting and restoring the water balance will involve several sectors. For example, consumptive withdrawals of water (e.g., water pumped from wells within the basin and transferred through sewers to locations outside of the basin, or irrigation water lost to evaporation) and changes in land use that reduce the amount of natural storage of water in groundwater and wetlands, result in increased peak flows and worse floods, and reduced flows during dry spells. These human activities should be modified to protect the rivers’ long-term health through the following standards.

Wildlife habitat

The areal extent and diversity of river-related wildlife habitat that existed under the baseline conditions reported in the 1994 Water Resources Study will be protected. In order to achieve this standard, certain flow conditions must be met

Flow levels: Water levels sufficient to maintain the existing diverse wetland vegetation that provides breeding, feeding, and cover habitat for both resident native and migratory wildlife will be protected along with flows necessary to ensure compliance with water quality standards and to protect the health

of bottom-dwelling and in-stream fauna and microinvertebrates. Flow volume will provide adequate dilution of pollutants to meet Water Quality Standards and to reduce thermal pollution that affects the viability of fish and other temperature-sensitive aquatic life.

Seasonal flows: To maintain habitat viability, streambed quality and fish spawning conditions, naturally-occurring seasonal flow regimes adequate to maintain these features will be protected. Because the 1994 Water Resources Study did not address seasonal or flushing flows, this aspect of the rivers' hydrology will be studied in detail before new withdrawals that would affect flushing flows are pursued.

Recreational resources

The opportunities for high quality recreation on the rivers will be maintained. In order to achieve this standard, the following specific conditions must be met:

Frequency of opportunity: The seasonal pattern of flows in the rivers observed during the Water Resources Study, which provides a variety of recreational experiences, will be protected from changes that would diminish either the availability or variety of these experiences. Included are spring high water levels that allow access by canoe to the rivers' wide floodplain; flows that create whitewater conditions on the Assabet and Concord Rivers; and water levels sufficient to maintain the rivers' navigability for both motorized and non-motorized boats.

Quality of opportunity: Flow alterations that would significantly impair the rivers' scenic values by reducing natural water levels or by creating offensive water quality conditions will not be permitted. Flow alterations that would damage populations of game fish are likewise not allowed.

Water quality: Flows sufficient to enable the segments to comply with Massachusetts' Water Quality Standards will be protected.

Emergency uses: In a declared water supply emergency for a particular water supply (not a state-wide or regional declaration of drought emergency), public health and welfare will be given priority over in-stream needs. That is, the above water quantity standards would be suspended, if necessary, for the duration of the declared emergency.

Priority Strategies for Water Quantity:

1. **Drought management:** The Council will support efforts to minimize non-essential water use during periods of low flow. The RSC should also support efforts at the state and municipal level to regulate water use during droughts in a fair and equitable manner that also protects stream flow. This may include regulation of private wells for non-essential uses.
2. **Flow management:** The RSC will work to strengthen relationships with MWRA and DCR, as the major managing entities of Sudbury River upstream reservoirs.
3. **Water supply and wastewater planning:** Efforts shall be made at the municipal, state and federal levels to restore the water balance in the watershed to protect the rivers' flows. Minimize interbasin transfers of water out of SuAsCo subwatersheds through sewer systems and sewer extensions. The RSC can play an outreach, research, and advocacy role with this planning.
4. **Updates to State planning documents:** Future revisions to state planning documents should reflect current knowledge, information gained from the Water Resources Study, and the water quantity and quality standards of this River Conservation Plan, and be developed in consultation with the RSC.
5. **Water conservation and water use efficiency:** Pursue water conservation and opportunities to increase water use efficiency to reduce reliance on the Sudbury, Assabet and Concord Rivers' surface and groundwater sources for present and future water supply. Focus will be on supporting water use efficiency as the most important element of state and local river basin and long-range water supply plans. Water conservation, water reuse, water banking, and water use efficiency in municipalities bordering the Wild and Scenic segments and upstream of those segments will be promoted. The Massachusetts Water Conservation Standards shall provide the baseline and additional efforts to increase water use efficiency may surpass these standards.
6. **Dams and stream continuity:** The Council will work with local, state and federal authorities to review dams, improperly designed or aging culverts and other stream crossings, on a case by case basis, and advocate for dam removal where appropriate and most beneficial overall to protecting and enhancing Wild and Scenic values.
7. **Research and Study:** A detailed empirical study is desirable to determine the minimum flow needs of the rivers and the appropriate flow regime (variable with season) to protect habitat values. If such a study is pursued, the RSC should participate in developing the scope of work and reviewing the results. Explore the differences between "natural flow" and "minimum flow" for this system and determine the best approach.
8. **Implementation of local water use efficiency plans:** The RSC will work with municipalities to ensure that appropriate and effective water conservation measures are identified in the local water conservation plans that registered and permitted water users must file with the state. The RSC will assist MassDEP in monitoring the implementation status of these plans. The RSC will also support the development and distribution of educational materials that promote voluntary conservation measures for local unregulated users, especially for non-essential water use such as lawn irrigation.

VI. PROTECTION OF OUTSTANDINGLY REMARKABLE RESOURCE VALUES

This section of the Plan Update addresses the protection of the five outstandingly remarkable values (ORVs) that were found to make the river study segments eligible for Wild and Scenic designation. The mandate of the Wild and Scenic Act is to “protect and enhance” these values.

Recreational Resources

OBJECTIVE:

Protect and enhance the Sudbury, Assabet and Concord Rivers’ outstanding recreational resources.

STANDARDS:

Existing recreational opportunities will be maintained and enhanced. All recreational activities and facilities will be managed in a way that will prevent degradation of the rivers’ land and water resources. The RSC will take the lead in monitoring river recreation, identifying persistent issues associated with recreational use, and promoting the cooperative resolution of those issues (Conservation Plan, p. 48).

STATUS:

Access areas along the Sudbury, Assabet and Concord have been improved over time. In Wayland, the Route 20 boat ramp is the best access on the entire Sudbury for trailered boats. The RSC initiated the idea to approach Raytheon to donate land for the Route 20 boat ramp and approached Mass DOT to build the ramp. In 2018, two improved access areas are in process by the Town of Concord. Additional areas such as the trailered Bedford Boat Landing have been improved over time with kiosks, signage and volunteer stewardship. In Framingham, working with the DPW on a sewer station upgrade at the end of Little Farms Road, there have been improvements to the parking and access to the river at this point for car-top access. The Framingham Conservation Commission is also working with the Parks and Recreation Department to develop a cartop access at the parcel located off Simpson Drive, within the area being treated for invasive water chestnut.

The Council has sought to improve recreational offerings through the annual RiverFest event and small grants given to municipalities for recreation and education programs. However, access points remain limited. Recreation along the Sudbury, Assabet and Concord Rivers can still be greatly enhanced and encouraged, and boat access areas can be better maintained to prevent erosion and excessive invasive plant growth.

The human impacts caused by recreational use, including boating, hiking, picnicking, dog walking, fishing and other users, are not new to this update. Trash entering the river system continues to impact the aesthetics of the river and habitat quality, and has a direct impact on wildlife species. There are also impacts with wakes created by motorboats traveling above the designated speed limits, which impact the river banks, vegetation, and stir up sediment. Law enforcement officers, though limited in number, patrol the rivers in an effort to increase compliance with regulations, including speed limits.

Priority Strategies for Recreation:

1. The Council will continue to work closely with local, state and federal authorities to address issues of concern, such as trespassing on private property, noise, trash, parking and traffic problems.
2. The Council will coordinate with public and private land managers, as well as private organizations, to resolve conflicts related to competing uses, and to educate users about care for the rivers.
3. The Council will monitor projects, initiatives, policies and other decisions at all levels of government that could harm the rivers' recreational value, and weigh in where appropriate and necessary.
4. Acquisition of additional access points by municipality: The riverfront municipalities should seek out opportunities to acquire additional public access points along the segments through easements, municipal ownership, or transfer of use (Conservation Plan, p. 51). The RSC can participate in fundraising, advocacy, interpretation and site planning for these potential locations.
5. Develop an access plan by funding an inventory of potential access sites and town-owned land.
6. Increase awareness of the rivers' recreational opportunities by developing: (1) new partnerships to build access, (2) an "access steward program" to have public outreach during busy seasons and to ensure good care for existing access areas, and (3) partnerships with communities to developed recreation programs with those that do not have such a program.
7. Develop a case for greater access in the top three existing/new sites; this could involve getting assistance with/working with a consultant on an economic analysis.
8. The RSC should pay attention to future use of the Stearns and Brackett Reservoirs, as recreation in these areas would help to develop an overall identity and connection to the Sudbury River, and be beneficial in securing support.



Photo courtesy of Terri Ackerman

Ecological Resources

OBJECTIVE:

Protect and enhance the Sudbury, Assabet and Concord Rivers' outstanding ecological resources.

STANDARDS:

The quantity, quality, and diversity of river-dependent fish and wildlife habitat, as documented by the Resource Assessment and Eligibility Report and the Water Resources Study, will be maintained and enhanced (Conservation Plan, p. 52).

STATUS:

Although there is no evidence of change in the general native biodiversity of the river there has been an increase in non-native invasive species, which over time can reduce native biodiversity through competition for light, space and food. Impacts of climate change can be seen in increased air and water temperature and the intensity of floods and droughts. These climate-related changes affect the plants, animals and ecology of the watershed.

Pollutants continue to be an issue for the ecosystem. Mercury contamination from the nearby Nyanza Superfund site has rendered fish in the Sudbury River officially unsafe for anyone to eat since 1986. Mercury contamination watershed-wide has decreased somewhat due to reductions in airborne deposition of mercury from the Ohio Valley coal burning power plants and in-state trash incineration, but fish consumption advisories related to mercury are still in effect.

Additionally, population growth in Greater Boston and the MetroWest region has brought with it an increase in impacts such as loss of tree cover due to development, more impervious surfaces, increased runoff and water demand. Impacts from these changes can lead to alterations in water temperature, water flows, and increased pollution of our waters. A 2013 U.S. Fish and Wildlife Study found intersex fish in the rivers. The causes are unknown, but may include endocrine disrupting chemicals from wastewater treatment plants, septic systems and surface runoff, including plastics, flowing into the river.

Growing communities also have the potential to lead to more conflict over competing uses and the addition of new uses. Waterfowl hunting is now permitted on some parts of Great Meadows National Wildlife Refuge; it is part of the National Wildlife Refuge Systems priority wildlife-dependent uses. Hunting was not mentioned in the original Conservation Plan.

Non-native invasive species

Though invasive species had been identified within the river system at the time of designation, invasive species have spread over time and new species have been discovered within the watershed. To date, efforts have focused on water chestnut and purple loosestrife control, though several additional species have been documented within the rivers including Eurasian milfoil, variable milfoil, curly pondweed, fanwort, water lettuce, water hyacinth, European water clover, and common reed.

Water chestnut control efforts began in 1997. This species forms dense mats of vegetation, impeding recreational access to the river, reducing biodiversity of native plants, increasing sediment levels, and potentially reducing available oxygen within the river, leading to fish kills. Mechanical harvesting, hand pulling and herbicides have been used in various stretches of the river to manage water chestnut, and numerous partners (OARS, CISMA, USFWS, land trusts and several municipalities) are working together on its management. OARS published a “Water Chestnut Management Guidance and Five-Year Management Plan for the Sudbury, Assabet and Concord River Watershed” in 2017. CISMA’s Aquatic Invasives Management Subcommittee is working on plan implementation. Biological control of purple loosestrife, using the *Galerucella* beetle, began in 1996 and has decreased the amount of purple loosestrife throughout the watershed. It is hoped that the beetles will continue to disperse on their own and manage the purple loosestrife populations throughout the river system.

In 2016, Asian clams were found in the Sudbury and Concord River systems. No management efforts are currently underway to address the clams.

There has been an effort to educate boaters on their role in spreading invasive species through the installation of Stop Aquatic Hitchhiker signs at some boat launches within the watershed. More needs to be done to educate all recreational users of the river on invasive species identification, their impacts, and what they can do to reduce their spread.

Rare species and habitat restoration

The Sudbury, Assabet and Concord Rivers continue to support several rare species including marsh birds, mussels and various plants. A 2017 study commissioned by the RSC found the first known occurrence of the state-listed Eastern pondmussel in the Sudbury River. The portion of the Sudbury River from the Saxonville Dam and then downstream has been added to the Natural Heritage Endangered Species Program Priority Habitat designations for the newest listings. In 2007, native phragmites was confirmed

along the banks of the Sudbury River, and the globally rare Long's bulrush was documented along the banks of the Concord River. Both the phragmites and the Long's bulrush were found within Great Meadows National Wildlife Refuge. Maintaining and restoring habitat for these species and others will continue. Maintaining adequate water flow, water temperatures, aquatic connectivity, and structure will enhance the biodiversity found in the rivers. The Sudbury, Assabet and Concord Rivers watershed also has several coldwater fisheries streams identified by the State of Massachusetts; these streams should be monitored and managed to maintain their suitability as coldwater fisheries. Four wildlife tunnels have been constructed under Route 2 in Concord to facilitate wildlife crossings. These tunnels were designed with extensive and detailed input from the RSC. River-dependent and wetland animals, documented using these tunnels, include the Northern river otter, American mink, common snapping turtle, muskrat, multiple frog species, and mallard ducks.

Current management programs include a pilot project started in 2017 to restore wild rice along the banks of the Sudbury and Concord Rivers and a potential program to restore diadromous fish to the Concord River. A feasibility study regarding the restoration of diadromous fish, which migrate between fresh water and salt water, to the Concord River was completed in 2016. The study determined that it was feasible to restore diadromous fish to the river and targeted restoration of blueback herring, alewife, American shad, American eel and sea lamprey. American eel is currently present in the river.

Climate change and the rivers

Although the issue of climate change was already well known to scientists when the first Conservation Plan was written, it is now making a noticeable impact on our rivers. That impact will only escalate over time. In New England, while total annual precipitation has remained relatively constant, the trend for over a century has been for it to arrive in increasingly intense storms. That translates into larger floods interspersed with longer droughts. A reduction in snowpack and earlier peak streamflow are also anticipated. Adding to the effect, NOAA research indicates a slowing of the progression of the jet stream over the northeast US, leading to a stalling effect in late winter and resulting in repeated storms. 2010 was the best example so far of the results of these trends. There were three major storms in the last two weeks of March 2010 resulting in record flooding, while late August saw record low water levels. In addition to changes in precipitation timing and changes in flow regimes, climate change is also anticipated to cause longer growing seasons and temporal changes in species habitats and life strategies, all of which will impact the biodiversity of the rivers and their riparian buffers.

Dealing with this new reality may require revisiting the 19th century flowage issues, reexamining control paradigms for upstream Sudbury River dams, developing a new emphasis on increasing recharge and improving municipal water use strategies. The RSC's involvement in the Framingham Birch Road Well proposals and studies of the river ecology in the North Framingham/South Wayland area serve as prototypes for one sort of response to these issues.

Priority Strategies for Ecology:

1. Promote and work with State and local agencies on projects that support the restoration, protection and/or enhancement of aquatic wildlife habitat along the main stem of the river and its tributaries. Projects should protect habitat diversity, enhance habitat for rare and endangered species, promote fish restoration, restore high value habitats, maintain wetland habitat, and manage invasive species.
2. Develop clear goals for river restoration and initiate studies and projects to achieve the goals identified.
3. Form a partnership with Trout Unlimited to promote habitat restoration and fish restoration.
4. Gather research and study results related to the biodiversity of the rivers to determine changes in biodiversity over time and identify species likely to be impacted by changes in water quantity and temperature. Work at all levels of government to identify and implement protection measures for these species.
5. Continue involvement with and support to CISMA. Promote CISMA as the mechanism to disseminate information on invasive species management within the watershed.
6. Continue to monitor and manage water chestnut, with a focus on upstream and headwater populations beyond the wild and scenic segments of the rivers once the designated segments are well managed.
7. Implement recommendations from the 2017 Water Resource Inventory and Assessment for Great Meadows National Wildlife Refuge and Assabet River National Wildlife Refuge which include supporting efforts to improve water quality of the rivers and in streams in the Sudbury, Assabet and Concord River basins and to evaluate the hydrologic influence of upstream and downstream dams on Great Meadows NWR.
8. Prioritize potential stream crossing, bridge replacement, and upgrade projects to meet Massachusetts stream crossing standards using data collected through the North Atlantic Aquatic Connectivity Collaborative and OARS which assessed several road-stream crossings within the watershed. Results of surveys are at www.streamcontinuity.org.
9. Support diadromous fish restoration in the Concord River. Raise awareness regarding the need for aquatic connectivity.
10. Reach out to sustainability professionals hired in the eight towns. Water and energy are intimately connected. Develop connections between municipal sustainability actions, municipal vulnerability preparedness efforts, and river values. Support efforts to improve energy efficiency and use more low-carbon energy sources.
11. Work with communities to revise flood maps to reflect climate change models and predictions relating to 50-, 100- and 500-year floods.
12. Support sustainable landscaping initiatives that bolster native/pollinator plants, non-irrigated landscaping and stormwater recharge on-site where appropriate (excluding contaminated areas), through funding and collaborative work.
13. Participate in designing standards and incentives for green infrastructure at the state and local level.
14. Support and collaborate on local by-laws and policies to build climate resilience (such as related to wetlands, stormwater, and green infrastructure.)

Historical, Archaeological and Literary Resources

OBJECTIVE:

Protect and enhance the outstanding historic, archaeological and literary resources associated with the Sudbury, Assabet and Concord Rivers (Conservation Plan, p. 54).

STANDARDS:

Protection and interpretation of the rivers' archeological sites, historic sites, and literary heritage: Public land managers and private organizations will continue to protect sites along the rivers that are significant to the area's history, archaeology and literary heritage, and will continue to provide appropriate interpretation of such sites for the public's benefit (p. 54).

STATUS:

The 1996 Conservation Plan focused on discrete historic sites along the river, but the RSC's work has focused on the historic and literary value of the rivers and river systems themselves.

River banks still disclose artifacts showing that native agriculture, fisheries and fur trade existed in and along the rivers at least 8,000 years ago. Since the last Ice Age, rivers have been the arteries of transportation and communication for communities living nearby.

Today, each town within the Wild and Scenic Sudbury, Assabet and Concord Rivers treasures its history going back to the early settlements: The first colonial settlers of Concord, Sudbury, and Wayland sought the Musketaquid's bountiful marsh grasses to support their cattle. The original European settlers of Billerica and Framingham harnessed river flow to run saw and grist mills. The history of Wayland farmers fighting for water flow to their farms, and arguing against dams and bars, impacted significant legal innovations such as water rights and eminent domain. The Middlesex Canal in North Billerica connected western farmers with the thriving port of Boston.

The Sudbury's lazy flow inspired reams of writings. Emerson and Hawthorne lived in the historic Old Manse on the banks of the Concord River. Thoreau was a creature of the rivers, living within view of the Concord River and studying and enjoying the three-river system. It is now known that Thoreau spent more time on the rivers than he spent at Walden Pond.

Maintaining and protecting historical and archaeological sites and stories now requires the careful deliberation of competing values and needs, as it did then. The late 19th century use of the Sudbury River for Boston's water supply not only involved several impoundments on the Sudbury but construction of compensating reservoirs on both the Sudbury and the Assabet to regulate the flow of the Concord River; 19th century engineers well understood that all three rivers comprised one system. Understanding the system-ness of the rivers will be critical to dealing with present-day issues such as proposals to remove the Billerica dam or efforts to control climate-change induced flooding in our riverside municipalities.

Priority Strategies for History, Archaeology and Literature:

1. The Council will continue to innovate on projects, and offer grants to new partners, to develop interpretative opportunities and public engagement activities related to the rich archaeological, literary and cultural history along the river.
2. Continue to deepen relationships with The Trustees' Old Manse, Minute Man National Historical Park, Freedom's Way National Heritage Area, the Concord Museum and other history-focused partners.
3. Consider other opportunities for partnering for re-enactments, to bring history alive.
4. Capture history of Summit Pond/Heritage Park.
5. Work with Partnership Wild and Scenic Rivers Program (NPS) to be part of the oral histories project being developed as of 2018; capture oral histories of original participators in designation.
6. Create new partnerships with Thoreau societies and historical societies; develop or co-sponsor writing groups and events.
7. Consider partnering on a children's book, or expanding the Junior River Ranger concept into a larger publication. Consider models of "story walks," where children's books are separated out across a trail as an interpretive walk for kids. The Carol Getchell Trail in Framingham provides an example.
8. Look for opportunities such as the Old Manse Boathouse or the Talbot Mills Dam or Minute Man Park to include Wild and Scenic interpretation in other interpretation opportunities.

Scenic Resources

OBJECTIVE:

Protect and enhance the outstanding scenic resources associated with the Sudbury, Assabet and Concord Rivers.

STANDARDS:

Landscape Protection: The distinctive and noteworthy landscapes associated with the segments will be protected from inappropriate land use changes (Conservation Plan, p. 57).

Viewshed Protection: Existing scenic views to and from the rivers will be protected from inappropriate land use changes (Conservation Plan, p. 57).

Scenic bridges: The many distinctive bridges that span the segments will be protected and maintained (Conservation Plan, p. 57). Scenic bridges will be preserved, and repairs to less scenic bridges will consider scenic design.

STATUS:

Landscape protection has continued at a good pace, in large part due to work by regional and local land trusts, as well as through the passage of the Community Preservation Act (CPA), signed into law by Governor Paul Cellucci and Lieutenant Governor Jane Swift on September 14, 2000. The intent of CPA is to help communities preserve open space and historic sites, create affordable housing, and develop outdoor recreational facilities using dollars raised locally through the imposition of a surcharge of not more than 3% of the tax levy against real property. Seven of the Wild and Scenic municipalities have adopted the CPA.

Several municipal plans specifically identify the scenic attributes of the Sudbury, Assabet and Concord Rivers as priority areas for protection, and these are noted in Appendix 4. Where municipalities could increase protections is noted in municipal recommendations below. OARS has worked with the RSC to develop a Visual Resource Inventory of eleven key views along the three rivers using a National Park Service methodology. This work can be extended to other views.

Massachusetts Heritage Landscape Inventories

Massachusetts Heritage Landscape Inventories were completed in Sudbury, Concord, and Lincoln, by the Massachusetts Department of Conservation and Recreation (DCR) in partnership with the Freedom's Way Heritage Association (FWHA). Through public meetings and consultations, priority heritage landscapes were identified for their significance and contribution to community character and potential for loss of integrity. The following are comments resulting from public meetings:

Sudbury River Corridor: "There is a real sense of wilderness when canoeing or kayaking along the Sudbury River from Route 27 downstream to Fairhaven Bay at the Lincoln/Concord line."

Water Row Corridor: "It is one of Sudbury's most scenic roads with stunning views of marshland, the Sudbury River, meadows, an historic site and an occasional historic house."

Concord: Best known and most visible flood meadow and Egg Rock (a distinctive glacial erratic at the three-river confluence), land along the Concord River that is part of Great Meadows National Wildlife Refuge and land along the Sudbury River in the southern part of town. “The flood meadows are valued for their scenic open landscape character (an increasing rarity in eastern Massachusetts), as well as their role in flood prevention, water quality, wildlife habitat and their historical associations.”

Scenic Bridges

The River Stewardship Council was very active between 2000 and 2010 in bridge restoration work along the Sudbury, Assabet and Concord Rivers, including Lee’s Bridge in Concord and the Route 3 Bridge in Billerica, and revisions to the Pelham Island Road Bridge and the Route 20 Bridge (see Stories and Successes Report for details). At the time of this report, the historic Stone’s Bridge in Wayland is undergoing improvements. Stone’s Bridge is listed on the National Register of Historic Places.

Scenic Roads

Municipalities can adopt the Scenic Roads Act (MGL Chapter 40-15C) and designate roads for which there must be review and approval for the removal of trees and stone walls that are within the right-of-way. All of the Wild and Scenic municipalities have approved scenic roads; others in the region can be encouraged to do the same and these offer possibilities for public engagement.

Priority Strategies for Scenery:

1. Update existing Heritage Landscape Inventories in Sudbury, Concord, and Lincoln and partner with Freedom's Way to complete them for Billerica, Bedford, Carlisle, Wayland, and Framingham, or conduct one for the river corridors within each Wild and Scenic segment with Town involvement. Contact DCR and Freedom's Way to include Wayland in the National Heritage Landscape Inventory, since Wayland was the original Sudbury.
2. Participate in municipal Open Space and Recreation Plan updating to include Wild and Scenic attributes and protections.
3. Prioritize two significant land parcels that could alter the character of the road in Sudbury; the 10-acre meadow on the corner of Plympton Road and Water Row and the Newbridge Farm fronting on Newbridge Road at Water Row. Planning for the future of these parcels is critical in preserving this road. Make Water Row a priority in a comprehensive archaeological study.
4. Work collaboratively with other meadow stewards on issues of mutual concern such as land management, public access and invasive vegetation removal.
5. Consider a scenic overlay district which may provide a no-disturb buffer on private property bordering on scenic roads near the rivers or adopt flexible zoning standards to protect certain views. Such bylaws could be written to apply to the numbered routes also, which are not protected under the Scenic Roads Act.
6. Encourage towns with a local historic district bylaw to apply for Certified Local Government (CLG) status which is granted by the National Park Service (NPS) through the MHC. At least 10% of the Massachusetts Historical Commission's yearly federal funding allocation is distributed to CLG communities through Survey and Planning matching grants. Framingham was designated in 2017 and Bedford is also a CLG.
7. Partner with municipal departments, Mass DOT, and the Army Corps of Engineers as relevant to give due regard to preserving the distinctive designs and appropriate scale of bridges spanning the rivers when planning significant reconstruction and maintenance, while balancing ecological values.
8. Continue the work started on the Visual Resource Inventory as a baseline scenic assessment, to be available to town planners and NPS. Periodic inventories will then be completed (recommended every 5 years) to monitor changes to scenic values.

VII. EDUCATION AND OUTREACH

OBJECTIVE:

The Council's objective remains to support and complement ongoing education and outreach activities, rather than to duplicate them.

STANDARDS:

Long-term protection of the Sudbury, Assabet and Concord Rivers has always relied upon a shared sense of responsibility and the enlightened stewardship of all who use and manage the river and its adjacent lands (Conservation Plan, p. 61).

STATUS:

The River Stewardship Council has supported education and outreach programs in the region, such as those of Mass Audubon and SVT, through financial contributions. The Council has funded both Audubon's RiverSchools program for close to two decades, and has reached thousands of youth and adults through these efforts. The small grants program has also been effective at providing opportunities to smaller organizations, such as camps, synagogues and town programs.



Mass Audubon Society Riverschools participants, Photo courtesy of Mass Audubon Society

The Council has also undertaken its own event and outreach activities. RiverFest – a weekend of events up and down the rivers, run by partner organizations and coordinated by the RSC – is the annual volunteer-based celebration that has drawn thousands of participants for over 17 years. More, broad outreach efforts have helped bring together stakeholders on a range of river issues, such as essential requirements for wastewater treatment plant facilities, NOAA fisheries restoration and potential dam removal. The Council also piloted a Junior River Ranger program, which is regularly used by OARS and USFWS in programs, and by visiting children.

With changing political administrations, constant pressure on state and federal budgets, and shifting focuses for the municipalities, the Council's ongoing investment in education and outreach remains a priority and a challenge. What are the best ways to engage the general public and the municipalities? How can we keep partners connected? How can we reach a younger audience? These are the questions we will need to answer going forward.

Additionally, environmental organizations have begun to address the fact that with large-scale problems such as climate change, development, and pollution, programming and outreach needs to be run in partnership with, and reach, diverse communities. “Too many people find themselves harmed by drought, floods, sea-level rise, other impacts of climate change, failing infrastructure, loss of healthy, free-flowing rivers, and drinking water contamination. Without a more inclusive, larger collective effort for our rivers, decision-makers are likely to either ignore these problems or choose unfair solutions that impact vulnerable and underrepresented populations the most.” (River Network, Why Equity, Diversity and Inclusion are the Foundation of River Network’s Mission)

Priority Strategies for Education and Outreach:

1. Continue the annual RiverFest celebration. Consider ways to keep it fresh and how to grow the audiences, while raising the profile of the Wild and Scenic River. Continue to assess how the event increases engagement in river issues.
2. Promote river-related activities in all local schools. Where programs do not currently exist, reach out to develop relationships with those schools.
3. Expand hands-on opportunities for the public to experience the river (e.g., nature hikes and canoe trips) and to help improve it (e.g., river clean-ups, trail boardwalk and bridge structures) with OARS, USFWS, SVT, Appalachian Mountain Club, and other partners.
4. Develop and distribute information about the special features of the Sudbury, Assabet and Concord Rivers and how this Plan will provide for their long-term protection and management, through PowerPoint presentations and local access TV projects.
5. Consider new strategies in communications, such as greater use of social media. Employing interns and fellows may assist in this area.
6. Continue to invest in a presence with regional networks, such as CISMA, Metrowest Land Conservation Council (MLCC), Mass. Rivers Alliance and others.
7. Identify target audiences for a range of experiences.
8. Educate landowners, developers, and local land use boards about land and landscape management that minimizes water use, improves ecological integrity, protects water quality, improves stormwater management and builds resilience to climate change.
9. Support public education and enforcement of state and local regulations regarding septic system maintenance and replacement where necessary to reduce bacteria pollution of surface waters.
10. Think of the River as a text book and the RSC as a resource for classroom teachers, particularly using the Internet. Make data and studies accessible to classroom teachers to analyze (tie into state standards).
11. Use smartphone technology to build river engagement, possibly by mapping downed trees or creating a Wild and Scenic tour which would include historical places and ecological concepts.
12. Develop a toolbox of interactive resources.
13. Continue to promote and produce the Junior River Ranger workbook, Family-Friendly River Map, and river recreation guides.
14. Engage the Council in learning about diversity and inclusion. What opportunities do we have as a Wild and Scenic River outside of Greater Boston to provide a unique experience to a broader constituency? Learn from River Network and other adopters of inclusion initiatives.



Photo courtesy of Terri Ackerman

VIII. MUNICIPAL ROLE AND ISSUES OF LOCAL CONCERN

The 1996 Conservation Plan included town-level recommendations as an appendix to the Plan. In the study document, there was a description of each town’s Riverfront Character, Local Land Use Requirements, and Riverfront Development Potential. For the purpose of this update, the Council determined that an update of local conditions in each town was beneficial, as a snapshot in time to see the management and progression, combined with current recommendations. It should be noted that much of the original nature of town character as defined in the original Plan remains true.

Mason and Associates’ general finding was that as of 2018, “all eight of the WSR member communities protect the WSRs and adjacent lands to a large extent, and they administer meaningful development regulations that protect water resources in the rivers’ watersheds. Many municipalities promote greenways and interconnected conservation lands; some municipalities specifically support the Sudbury, Assabet and Concord Wild and Scenic River protection efforts. However, most plans do not specifically mention the federal Wild and Scenic River designation. None of the eight Master Plans identify the Sudbury, Assabet and Concord Wild and Scenic River Stewardship Council by name, and no plan maps were found that specifically call out the WSR designation or limits.” (Mason and Associates, August 2018) Included in the Appendix is the regulatory review completed by Mason and Associates, which

outlines all municipality regulatory protections as they exist in 2018 in a town-by-town summary. There is also a table of all existing ordinances, “Summary of Plans and Bylaws,” in Appendix 3. Recommendations from that report are included below.

It is important to note that while these municipal sections were written in close collaboration with many of the municipal boards and commissions, this writing is the collective product of the River Stewardship Council. The Council strives to take a balanced approach in naming issues affecting the Rivers, while also noting municipal and other interests. Still, the writing was not submitted by, or necessarily voted on, by Town selectboards.

Priority Strategies, Municipal:

1. Encourage municipalities to revise their Master Plans and open space and recreation plans (OSRPs) to include recommendations of this Conservation Plan.
2. Relationships between the River Stewardship Council and state and federal officials need to be strengthened, to build clear communication about the case for the River, and to advocate as appropriate for green budgets and appropriate protection mechanisms.
3. Strengthen communication between town representatives and their municipalities, so that there is a regular communication channel about issues of concern.
4. Emphasize green infrastructure and low impact development (LID) in stormwater management to both reduce pollutants entering the river (including thermal pollution), and recharge stormwater to support base flow. This would fit in various local land use regulations.
5. Work with municipalities on ways to increase flow by increasing stormwater recharge (using green infrastructure and LID, reducing impervious surfaces, etc.), water conservation/water use efficiency, reducing water withdrawals (both surface and wells), and applying state-wide drought restrictions to private wells.
6. In order to increase public access opportunities, the RSC will have to work closely with municipalities on town investment in trails, put-ins, and invasive plant management.
7. Municipalities within the study area should consider establishing Open Space zoning for dedicated open space properties rather than leaving them in residential or other zoning classifications (Mass Wildlife, 2018).
8. Municipalities should consider showing the rivers as features on future zoning maps along with roads to clarify the relationships between land uses and the rivers.
9. Improve relationships with Conservation Commissions so that there is a strong partnership for dealing with issues and interests that arise, particularly under the wetlands laws, which relate to the Wild and Scenic River.
10. The state Wetlands Protection Act (WPA) is vulnerable to budget cuts and DEP's enforcement capacity and the Circuit Rider program had been severely cut in the budget. It is up to municipalities to implement and strengthen their bylaws in the face of climate change to protect the interests of the Act. Town bylaws should be examined to see what can be strengthened (wider buffer zones, wider no-build areas). Some bylaws could serve as a model for others.
11. Encourage municipal adoption of policies and regulations related to the above through research, education, and demonstration.
12. Encourage municipalities to adopt the CPA at the highest possible percentage (3%) to increase available funds for open space protection.

Below is a discussion of noteworthy municipal changes in the eight shoreline communities.

BEDFORD:

Changes to riverfront character and land use

Since 1990, a concerted and long-term acquisition plan has been followed by the Town of Bedford to protect corridors of significant size associated with the Concord River and its tributary streams. Over 59 acres of land have been acquired by the Town directly adjacent to the Great Meadows National Wildlife Refuge, and are designated as conservation areas managed by the Bedford Conservation Commission under MGL chapter 40, section 8C: Pine Grove Farm, Peppergrass Brook, Altmann and Letizi. Altmann and Peppergrass Brook are further protected by conservation restrictions held by the Mass. Division of Fisheries and Wildlife and SVT. Over 50 additional acres protect wetlands, floodplains and uplands near Peppergrass Brook, a perennial stream tributary to the Concord River, including the Carlson, Brown-Page, Redmond-Anderson, Comley, Brennan and Wellington conservation areas.

A conservation restriction held by SVT protects the 2.5-acre Town-owned Pickman Meadow, adjacent to both Great Meadows and Altmann. The 203-acre Huckins Farm Conservation Restriction encompasses Mill Brook from North Road to Great Meadows and the Billerica town line. This wide area is further extended by nearly 20 acres of adjacent conservation areas such as Coffin, Lillian Carlson and Anthony; Coffin also has additional protection by a conservation restriction held by SVT. To the south, the Langone conservation area, and the Bedford Meadows, Cormier and Eleazer Davis Farm conservation restrictions protect over 28 additional acres in close proximity to Great Meadows. The total additional lands protected since 1990 and associated with Great Meadows and the Concord River include at least 160 acres. The total protected corridor size, including previously acquired areas, is approximately 400 acres; with Great Meadows in Bedford, the total size is well over 1,000 acres.

While the local Wetlands Protection Bylaw does regulate work within 100 feet of the floodplain, there are no set performance standards for this area. However, under the Wetlands Protection Act, projects within the one percent Annual Chance Flood (formerly 100-year floodplain) and the 200-foot Riverfront Area are subject to strict standards, and the width of the Riverfront Area often exceeds that of the floodplain. The 100-foot buffer zone to a vernal pool (certified or uncertified) is considered a resource area under the Bylaw.

Draft Open Space and Recreation Plans compiled since 1986 have included acquisition and preservation goals relevant to the lands adjacent to the Great Meadows National Wildlife Refuge. Several subsequent acquisitions and conservation restrictions have resulted from the OSRP goals and objectives. No Chapter 61 or 61A lands now exist in the Dudley Road area. The Eleazer Davis Farm on Davis Road is still under Chapter 61A. Part of this property is protected by a conservation restriction granted to the town.

Challenges and opportunities

- **Access areas:** While the boat ramp continues to grow in popularity, the town maintains a floating boat dock which each winter is removed from the water, then replaced in the spring. The partly paved and gravel travel and parking portion along with a kiosk are also maintained on a regular basis. Maintaining this area, providing education and outreach to users, and finding other opportunities in other areas to access the River are all critical initiatives.

- **Private wells:** From time to time, homeowners choose to install private wells basically for lawn irrigation purpose. During extreme water shortages the increased use of those wells can have a greater river impact. Regulations and other education and outreach efforts regarding private wells should be considered.
- **Billerica Dam and Fish Migration:** The removal of the Billerica dam will not have a significant impact on the water level in Bedford. However, fish migration and spawning in the area of Mill Brook and Mongo Brook will likely take place. Mongo Brook could be interesting as the Concord and Shawsheen Rivers both share the same flood plain at the Great Cedar Swamp off Davis Road.

BILLERICA:

Changes to riverfront character and land use

Billerica enjoys approximately 2.4 miles of the designated Wild and Scenic portion of the Concord River beginning at the Bedford line and terminating at the Route 3 Bridge. Billerica has outstanding river-related resources including wildlife habitat, recreation, aesthetics and cultural sites. The Town is fortunate to have the island where Thoreau spent the night as described in his *A Week on the Concord and Merrimack Rivers*, which is surveyed as a privately-owned parcel nestled in the USFWS lot.

The health and protection of the Concord River is particularly important to Billerica as it is the primary drinking water source for the Town. To this end, the Town has taken steps to protect and improve the quality of the water. Billerica adopted a Stormwater Management Bylaw and regulations in 2008. Through the stormwater program and the National Pollutant Discharge Elimination System (NPDES), several areas of point and non-point discharge have been identified and remediated. In 2002, a Town Wetlands Bylaw was passed and regulations were promulgated in early 2003. An important aspect of this Bylaw is the establishment of buffer zones as resource-related protected areas. A new Town Water Treatment Plant was built in 2006. In addition, the Town has recently updated its Open Space and Recreation Plan, Master Plan and passed the Community Preservation Act. All of these will assist in acquiring property, protecting and improving land along the river, and providing access to the river, which is greatly important to the residents.

Billerica has a long and storied history relating to the Concord River. As a result, much of the land abutting the River is developed, mostly with residential homes. This poses some situations that need to be addressed over time. Of particular interest is the need to balance the expansion of municipal sewer in some of these areas. Sewer expansion involves opportunities and challenges. It will improve water quality through the removal of failed septic systems in some areas, but also makes riverfront and floodplain more vulnerable to development. Development along the river also inhibits the acquisition of land which could provide river access, wildlife corridors, protected land continuity and development of trails.

The Conservation Commission worked in conjunction with USFW to create a parking area off of Nashua Rd abutting the Great Meadow Wildlife Refuge and trail work, including raised boardwalks, along the River's edge. The intent was to continue the trail through Governor Dudley Park and connect with Bedford at the historic Brothers Rock. Because this enterprise, led by USFWS and a local Boy Scout troop, encountered resistance from abutters the process stalled. It is the Commission's hope this can be revived. In 2018, the Town was successful in acquiring land located on Carter Avenue, which is directly on the river and in the Wild and Scenic-designated stretch. This acquisition provides opportunity for

floodplain and wetlands restoration, potential boat access and a community park. A small beach, Bartlett's Landing, slightly downstream provides river access. However, it is limited in size. Identifying and prioritizing valuable land along the river for protection and access to the Concord River is and will continue to be an important goal of the Town.

The Talbot Mills Dam in Billerica, which is outside and downstream of the Wild and Scenic segment, continues to be a major source of discussion and debate. In 2016, Mass. Division of Marine Fisheries, NOAA, USFWS and MassDEP conducted a "Feasibility Study to Restore Diadromous Fish to the Concord River." The study report discusses three potential alternatives to the current situation that could restore the historic populations of diadromous fish. Advocates for fish restoration see potential in restoring natural river flow regimes and ecological systems, with some degree of restoration of the site. However, there is local concern over the water supply intake, which is about 1-mile upstream and is the only means of providing water to the community, and the vulnerability of floodplain properties if any changes are made to the dam. The alternative involving a fish ladder is a more palatable option to the Town as of 2019.

Challenges and opportunities

- Establish a public awareness and outreach program that will educate and inform residents and potential developers of the values and importance of a healthy river and river stewardship, especially in floodplain zones and areas that, due to the topography, are prone to degradation and erosion. A partnership with RSC would be helpful in this endeavor.
- Identify and acquire new river public access locations, as well as improve and maintain existing parcels. This will include providing designated parking areas, signage, maintenance plans and access maps. Additionally, explore the feasibility of developing river access on other town-owned lots, for example, North Billerica Fire Station, Waterview Avenue and Fordway Bridge. River access is and continues to be a high priority for the residents of Billerica.
- A mitigation condition of the Route 4 bridge reconstruction project at the Route 4 Billerica pump station was to provide access using funding set aside from the project; this is still outstanding.
- There is a \$200,000 conservation replication fund established by the Town of Billerica to be used for wetland replication and enhancement at 250 Boston Road that has yet to be expended for this purpose. Any change in how these funds are to be used that varies from the original requirement requires consultation with MassDEP and the Attorney General's Office.
- Continue to identify parcels along the River as well as the tributaries for protection, potential acquisition and education outreach to property owners.
- Address the invasive species problem along the River, specifically, the Water Chestnut infestation at the Talbot Mills impoundment.
- Discuss with Town departments and boards about balancing the need for the installation of town sewer while preserving and maintaining the groundwater recharge provided by septic systems.
- Discussions within the Town and communities upstream regarding Talbot Mill Dam should continue to better assess the fish population restoration plan.

- The Town DPW, Board of Health, and Conservation Department are working to comply with the MS4 Stormwater Program requirements, which is expected to improve the quality of stormwater discharges.

CARLISLE:

Carlisle's southeastern border is formed by the Wild and Scenic designated-portion of the Concord River; the eastern third (+/-) of the town drains to the Concord River; the southwestern third of the town drains to the Assabet River; the northern third of the town lies outside the Sudbury, Assabet and Concord Wild and Scenic watershed. The town is rural, with low density residential and agricultural uses and a few businesses, but mostly in the Carlisle village center. Conservation lands occur scattered throughout town, and in particular along the Concord River. The 2015 Sudbury, Assabet and Concord Wild and Scenic River Unprotected Land Inventory identifies a number of parcels along the Concord River south of Route 225; some but not all of these are identified in the Carlisle OSRP.

The Carlisle Master Plan process is underway; this will essentially be a new plan compared to the last plan which was approved in the 1960s. The town OSRP was updated relatively recently; it provides an excellent basis for conservation and recreation planning, and provides much of the baseline information that one would find in a master plan (e.g., analysis of growth and development).

Changes to riverfront character and land use:

There have been nine conservation and public access actions taken in Carlisle, generally located off Skelton Road and Route 225 and some in the southwestern part of town and associated with Spencer Brook, a tributary of the Assabet River.

1. In 2011, two 2-acre lots along Skelton Road were protected from future development with a permanent Conservation Restriction granted to the Town of Carlisle. The lots are to remain predominantly in natural, scenic and/or open condition. The land is now and has been in active agriculture.
2. In 2012, a small (9,347 sf) privately-owned parcel of land located at the Route 225 bridge on its north-westerly side was granted to the Carlisle Conservation Foundation (CCF) by its private land owner. This protects the most easily accessible place for the public along the Concord River in Carlisle. It is generally used by anglers and is not readily usable for launching boats due to site conditions. This small parcel is bound by Route 225, the Great Meadows Wildlife Refuge and by the town-owned Foss Farm Conservation land.
3. On May 30, 2013, through a joint effort by the residents of the Town of Carlisle and Sudbury Valley Trustees (SVT), 1000 feet of the Concord River frontage was permanently protected from development when SVT purchased Lot 6 from the Elliott family, long-time Carlisle residents. The 9-acre lot has important wetlands and a hillside river vista. Funds from the Community Preservation Act were used to acquire the Conservation Restriction on the lot and granted to the Town of Carlisle. This property is now called the Elliott Concord River Preserve and trails were quickly created and a canoe access (landing) installed on the property somewhat south of

the Route 225 Bridge. Acquisition of this property was rewarded soon afterward by the discovery of a Massachusetts “Threatened” rare wildlife species on the property.

4. Most recently in late 2017 and early 2018, the Town of Carlisle acquired two lots totaling 6 acres of land proximate to the Great Meadows National Wildlife Refuge in Carlisle. The land was purchased with a combination of funds from the Community Preservation Act and from a significant donation from the Carlisle Conservation Foundation (CCF). The land is under the management of the Carlisle Conservation Commission with a Conservation Restriction granted to CCF.
5. The Town of Carlisle also anticipates a deeded transfer to the Town of 32 acres of land adjacent to those 6 acres. All these lands abut the Great Meadows National Wildlife Refuge in Carlisle. The transfer is made possible through a proposed dense development located near Bedford Road. The 32 acres will be placed under a permanent Conservation Restriction granted to CCF. These lands currently contain established trails connecting it to several hundred acres of protected land along the Concord Wild and Scenic River.
6. Carlisle participated in the CISMA grant opportunity to clear and treat invasive plants within the Foss Farm Conservation Land and the Towle Conservation Land. CCF used CISMA funds as well to clear invasive plants on some of their land in another area of town. Using other town funds, the Conservation Commission continues to work to control both poison ivy and invasive plants on its Towle Conservation Land.
7. During the past 20 years Carlisle volunteers organized by the Carlisle Trails Committee have undertaken wetlands permitting and construction of many trail boardwalks including within the Greenough Conservation Land, CCF’s Greenough Land in Billerica and, in cooperation with the U.S. Fish and Wildlife Service, within the Carlisle Section of Great Meadows National Wildlife Refuge. These boardwalks are popular and used year around by outdoor enthusiasts from many area towns. They are maintained by Carlisle volunteers organized by the Trails Committee.
8. In the south western part of Carlisle, in 2004 the Town purchased with CPA funds the nearly 46-acre Benfield land which stretches between South Street and Spencer Brook, a tributary of the Assabet River near the Carlisle-Concord town line. The land was acquired for affordable housing, open space and recreation. A 26-unit of town-sponsored senior affordable housing was constructed on a 4.39-acre open field located beside South Street. The remainder of the property, consisting of forested uplands and an extensive open field and wetlands associated with Spencer Brook, all encumbered by conservation restrictions, will continue to be undeveloped except for the water supply well and the alternative technology septic field installed to support the housing. The protected public lands now provide public trails and a popular wildlife viewing platform, built by the Trails Committee, extending out above the Spencer Brook wetlands. The Benfield family also owned other properties in the Spencer Brook area of town. Those other lands have been subject to limited development with conservation restrictions placed on portions of the properties.
9. In 2018 the town, through its Conservation Commission, acquired 21-acres of open space as a result of a Senior Residential Open Space Community development. Again, the land, which consists of open fields and a substantial forest of white pine abuts Spencer Brook just upstream from the Benfield protected lands. Public trails are currently in the planning process.

Challenges and opportunities

- Challenges in Carlisle continue to be the control of invasive plants, both on bordering properties and within the Concord River itself. Although not addressed by the Town, a significant growth of invasive milfoil extends well into the river from its shores interfering with boating use and likely habitat values as well.
- When Carlisle acquired the Greenough Conservation Land it also acquired a large gentleman's barn and a caretaker's cottage located northerly of the Greenough dam. The Cottage has been removed. The deteriorating barn remains on site without a use and has become an attractive nuisance. The Town anticipates having the barn removed when funds are found.
- In 2000, the Massachusetts Office of Dam Safety advised the town to undertake actions to stabilize Greenough Dam located on the Greenough Conservation Land. The Town now has an engineered design and all necessary permits to undertake that repair and is pursuing funding for the project. The dam is responsible for the 20-acre Greenough pond, Carlisle's only significant town-owned pond and provides the only trail link for hikers from the north of the dam and also from the Town of Billerica to access trails on hundreds of acres of protected land south of the dam and along the Concord River. The pond provides important habitat for a long-term Massachusetts state wood duck monitoring program as wood duck boxes have been in place since 1948. The pond is within an area mapped by the Massachusetts Natural Heritage and Endangered Species Program for two state-listed "Threatened" wildlife species and is highlighted on other state habitat-related maps as well.
- A very few private homes in Carlisle abut the Concord River. These homes create an ongoing opportunity for visual impairment through vista clearing actions within the Wild and Scenic designated section of the river.
- The Benfield protected lands are located in an area of Carlisle with a particularly extensive growth of several species of invasive plants. The Benfield land did not escape this infestation. Neither grazing nor chemical treatment to control or eliminate existing poison ivy and invasive plants can be used because of the restrictions required to protect the public water supply installed to support the housing. The Town mows when and where it can, but control is challenging.

CONCORD:

The Assabet and Sudbury Rivers meet to form the Concord River in the Town of Concord. The upstream terminus of the Assabet Wild and Scenic segment is in West Concord, 1,000 feet downstream of the former Damon Mill Dam. All portions of the Concord River and Sudbury River in Concord are designated as Wild and Scenic River. The type and intensity of development in Concord poses both challenges, such as non-point source pollution, and opportunities, such as increased possibilities for public enjoyment of the River. In 2009, Concord adopted a Wetlands Bylaw that provides a 100-foot buffer zone around certified vernal pools, and allows enforcement capability. The Open Space and Recreation Plan was updated in 2015 and the Comprehensive Long-Range Plan was completed in 2018. Population growth experienced over the past 20 years or so is expected to level off in the future such that little population growth is expected over the next 20 years. However, the town is actively looking for options to increase

the housing stock to meet the town's needs for housing that existing residents can afford. Some of the town's goals related to housing and business development may conflict with conservation goals; the promotion of eco-tourism is a goal compatible with both business development and recreation goals (Mason and Associates, August 2018).

Changes to riverfront character and land use

There have been a number of conservation and public access actions taken.

1. Renovation to the Keyes Road municipal facility.
2. New construction at the Millbrook Tarry has been pulled back from Mill Brook, a tributary to the Concord River, and stormwater management improvements installed. The isolated wetlands previously present on the site were hydraulically connected to Mill Brook, allowing for improved future regulatory oversight.
3. MCI Concord – A storm drain was improved, resulting in decreased discharge of contaminants to the Assabet River. A 12-acre site was donated to the Concord Housing Development Corporation for affordable housing and open space purposes; an 83-unit assisted living facility has been approved that includes development of a trail network. The trail network will connect with the Bruce Freeman Rail Trail and provide views to the Assabet River, but the assisted living buildings will not be visible from the river. Six acres are required to be put into a Conservation Restriction.
4. Assabet River Bridges – A bridge has been installed, with input from the RSC, for the Bruce Freeman Rail Trail using the existing abutments from a former railroad bridge, and a second one has been reconstructed. Initial planning is underway for the installation of a pedestrian bridge that will link commercial properties at 300 Baker Avenue with the VOA Concord Park assisted living facility/former Boston Gas site.
5. 300 Baker Avenue – 30+ acres adjacent to the Assabet River have been put into a Conservation Restriction with a provision to allow construction of a pedestrian bridge to connect to the Assabet River, and land across the river has been put into a conservation restriction at Concord Park and Junction Village, creating a swath of protected riverfront.
6. MBTA Bridges – The MBTA has made significant landscaping improvements to its bridges on the Sudbury and Assabet River, including invasive plant removal and management.
7. Canoe/Kayak Access – Two access points have been added for the Assabet River, a put-in just east of the river in West Concord (via the Dino's Pizzeria parking lot), with dedicated parking and improved signage, and a second one (a landing) just north of Main St on Baker Avenue.
8. Rogers Land – 4.75 acres of land was acquired by the Town at the confluence of Second Division Brook and the Assabet River for trails and community gardens/agriculture. The Town also acquired easements over two privately-owned parcels adjacent to the Rogers Land to connect walking paths to the Marshall Farm and Wheeler Harrington Park trails. A natural boat landing with picnic facilities has been added.
9. Concord Public Works has implemented strict stormwater regulations for commercial/industrial developments and for subdivisions.

10. October Farm Riverfront was acquired, a joint venture between the Town and Concord Land Conservation Trust (CLCT), protecting 80 acres on the Concord River across from Great Meadows.

Challenges and opportunities

- Mass DOT storm drainage from highways in the watershed remains and improvements are still required.
- The boat launch at Lowell Road and the Concord River is heavily used and subject to frequent erosion events. Additional plantings and boulders are recommended.
- 50 acres on the Concord River between Monument Street and Great Meadows National Wildlife Refuge remains in private hands and is potentially developable. Continued outreach with the property owner is recommended.
- A 5-acre parcel located between the Assabet River and the Bruce Freeman Rail Trail with access off Upland Road has great potential for future development. The Town/CLCT should closely monitor development of this parcel.
- Houses abutting the Sudbury River in the Elsinore/Belknap are growing in size and scale; Southfield/Riverdale; and Coolidge/Oak neighborhoods present the potential for visual impairments from the river. Education and outreach to property owners abutting the river is recommended.
- The RSC should continue to coordinate with the National Park Service at the Minute Man National Historical Park to ensure that land use clearing and tree placement at the Old North Bridge are compatible with the interests of the Wild and Scenic Rivers. The same is true for the adjacent Old Manse owned by The Trustees.

FRAMINGHAM:

Changes to riverfront character and land use

Framingham is a busy, growing city, lying along the Boston MetroWest commuter line. Framingham recently changed from a town form of government to a city form of government. Therefore, many of the City's regulations refer to the Town of Framingham, and to bylaws rather than ordinances. This has no effect on the authority of those documents. The city lies at the upstream terminus of the Sudbury, Assabet and Concord Wild and Scenic River on the Sudbury River segment (commencing at the Danforth Street Bridge). The entire city lies within the Sudbury, Assabet and Concord watershed. It is one of the largest municipalities in the watershed, comprising approximately 7% of the total watershed area (similar to Concord and Sudbury). Framingham is by far the most populated community in the watershed with over 60,000 residents in 2010. (Mason and Associates, August 2018)

The Conservation Commission and Conservation Department in the City are well versed in the Wild and Scenic requirements and are in communication with NPS staff. The Town has been very committed in recent years to addressing invasive species. In 2019 Framingham established an internal working group comprising representatives from the Conservation Commission, Planning Board and Engineering Department to review a draft stormwater bylaw written by the stormwater engineer; the City intends to begin tackling the associated regulations as well as possible permitting authority soon.

Changes since the last Plan include:

- Framingham Conservation Commission added a No-Build to its wetland protection bylaw in 2018.
- Sudbury Landing housing development just downstream of Danforth St. Bridge.
- Construction of Carroll Getchell Nature Trail.
- Tunnel dewatering outfall during construction of Metropolitan Water Resources Authority's construction of the Metrowest Tunnel. This has been restored.
- Donation of the island inside the oxbow to the Town; this land is being considered for wildlife conservation with no planned recreation access. As part of the "Danforth Green PUD" development, the developer donated to the Town approximately 89 acres of land that included everything north of the Hultman Aqueduct. Town Meeting voted to accept the land "for passive recreation in perpetuity." Plans for the site are still in discussion.
- A series of beaver dams have resulted in flooding of most of the oxbow with water from Pod Meadow Brook making it accessible by portaging the dams. In 2017 the RSC requested that Framingham be in communication about any beaver trapping; historically it has only been the MWRA that has requested permission to trap (Health Dept.), out of concern for the Weston Aqueduct. Presently, the beavers have free reign.
- Construction of the Little Farms Road public access. Upgrade of this area should be complete in 2019 as part of a sewer pump station project that it was attached to.
- MWRA permit for trail on the Weston Aqueduct. A seasonal conservation crew established an extension of the Carol Getchell Trail heading north out of Little Farms to the base of the Weston Aqueduct trail. Additional connectivity plans are underway.
- Public access to Stone's Bridge is prohibited on the Wayland side due to unsafe bridge conditions but plans for its reconstruction are underway in 2019.

Challenges and opportunities

- There has been a massive infestation of water chestnuts in the impounded section of the Sudbury River in Saxonville. The Conservation Commission approved a five-year Order of Conditions for invasive aquatic vegetation management. The first year was completed in summer 2017. Herbicide spraying was adjusted to the timeline to increase the likelihood of positive impact. The project was funded by the RSC and Town in years 1 and 2, and they are confident of ongoing funding. The Council should continue to engage with OARS, CISMA and Framingham partners on this work. Surface coverage of water chestnut declined from 95% coverage to closer to 30% coverage for a second season. The River became navigable in 2018 for the first time in 8 years.
- Reservoir #1 on Salem End Road has over 70 percent coverage of water chestnut, and is under DCR management. Framingham lobbied DCR for treatment and it is expected for summer 2019. Funds were requested in the environmental bond bill from City Council Members. RSC members should monitor invasive species growth upstream of the Wild and Scenic segment, to prevent spread downstream.

- There is concern over toxic pollution and trash in upstream brooks, such as in Beaver Brook from three contaminated southside sites, and Cochituate Brook which flows through urban areas before entering the Sudbury River. The RSC should consider these as upstream impacts and consider options for involvement.
- There is a need to install dock and public accessibility to the Sudbury River upstream of the Saxonville Dam for weed harvesting and recreational use. Aquatic weeds upstream of the Wild and Scenic segment can re-infest cleared areas downstream. The Conservation Commission has been working on this issue for a long time with the City's Parks and Recreation Department, as well as OARS and the Office of Fishing and Boating. Recently there was more willingness to allow it at the Simpson Drive parcel just downstream of the Wickford Bridge.
- The RSC should continue to check on the status of the Birch Road Wells, and to continue to research impacts of additional water withdrawals.
- There is concern over the long-term structural integrity of the Saxonville Dam: granite blocks are moving some due to tree trunk growth between slabs. In 2019 the owner received an Order of Conditions for maintenance of the dam related to vegetation removal and closure of an old raceway. The Council should be involved in community planning related to the dam.
- With the transition to a City, there is interest in a Framingham watershed advisory group to the Conservation Commission and the City. The Conservation Department is interested in having a seat at the table. The Council should work on relationship building with new municipal leaders and find ways to support local water efforts.
- Support preservation of Stone's Bridge that is listed on the National Registry of Historic Places.
- With changes to a City government, there have been organizational changes to the City offices. The Conservation Department is seeking to retain its staff and structure through these changes. The RSC should support this in whatever ways possible.
- Framingham will be working on updating its Open Space and Recreation Plan for 2020 and the RSC should seek to maintain a strong connection during this process.

LINCOLN:

Changes to riverfront character and land use

The Sudbury River flows in Lincoln for 1.7 miles, beginning from the point where Lincoln, Concord, Sudbury and Wayland town boundaries meet. The entire section is designated Wild and Scenic River. All but 440 feet of Lincoln's river frontage is protected through federal, state or local conservation ownership or by conservation restrictions held by the Lincoln Land Conservation Trust (LLCT.) The watershed lands are largely in permanently protected conservation, including the Town's Mt. Misery Conservation Land and Town conservation properties near Walden Woods, Fairhaven Bay, and Farrar Pond. (Mason and Associates, August 2018) Two-thirds of the Town is within the Charles River watershed and the remaining area is divided between the Sudbury, Assabet and Concord and Shawsheen watersheds (Lincoln 2017 OSRP).

Town drinking water is supplied by two sources: Flint's Pond (also known as Sandy Pond), which is replenished by its own 464-acre watershed, and the Tower Road Well, both of which are in the Charles

River watershed. These resources are monitored by the Water Department and by volunteer Water Commissioners.

Lincoln's Wetland Protection Bylaw, updated in 2007, established a 200-foot buffer zone for rivers and perennial streams, brooks and creeks and a 100-foot buffer zone for other wetland resource areas. In 2018 Lincoln hired its first stormwater specialist to update and ground truth the Town's stormwater infrastructure mapping. Notes about impaired catch basins and those subject to clogging are being entered during this stage. This effort will greatly benefit the MS4 permitting process.

Over the past 20 years there have been serious wetlands violations occurring on nearly all the property lots with river frontage along Fairhaven Bay. These have mainly been for vista pruning and have included clear cutting, selective cutting, and tree topping. Multiple violations have occurred in the Farrar Pond neighborhood as well. In response to wetland violations throughout the town the Conservation Commission has assessed fines and imposed creative mitigation efforts, including one on Town land, to partially offset the harm done. In 2018 the Conservation Commission and the LLCT held an educational meeting specifically for Fairhaven Bay homeowners to reinforce the importance of protecting the river's buffer zone and other wetlands on their properties. The Conservation Commission adopted a Water-view Maintenance Policy in 2018 with the support of the LLCT to encourage ecologically sound practices for homeowners in the Fairhaven Bay area. The Conservation Department also mails an information packet to new homeowners with wetlands on their property. This outreach includes information on the value of wetlands, choosing native plants for landscaping, and a letter encouraging them to call the Conservation Department if they are considering a home project that could possibly impact the wetlands on their property.

Challenges and opportunities

- The Council should work with the Conservation Commission on improving the situation around violations.
- The Town and the LLCT have made multiple efforts to acquire conservation restrictions on the two remaining home lots with river frontage on Fairhaven Bay that do not already have them. A serious negotiation was last attempted in 2018 but was unsuccessful. Efforts will continue to be taken to maximize future protection on these lots.
- Water chestnut has long been problematic on the Lincoln section of the Sudbury River. From 2001 through 2014 the Lincoln Conservation Department, working together with the Town of Concord, borrowed a mechanical harvester from Great Meadows National Wildlife Refuge (GMNWR) to control this species. Beginning in 2015 it moved to hand-pulling in collaboration with the Town of Concord, the Concord Land Trust, CISMA, GMNWR, and local volunteers (Lincoln 2017 OSRP). Over time a gradual decrease in density has become noticeable. In 2018 the entire Lincoln segment of the river was cleared by hand-pulling. Control efforts will continue in the future.
- Invasive species on Town land along the Sudbury River, most especially in the Mt. Misery conservation area, are of concern to the Conservation Department. Eradication efforts there are particularly vigorous for glossy buckthorn and oriental bittersweet. In 2019, the Lincoln Conservation Department staff will raise and release *Galerucella spp.* beetles near the kayak landing in an effort to control purple loosestrife.

- The Town belongs to the Metropolitan Area Planning Council's MAGIC group and is establishing its own Climate Change Resilience Plan. It is working with a consultant and Town staff to prepare a Stormwater Management Plan, an Illicit Discharge Detection and Elimination Plan, and an Operations and Maintenance Program for compliance with the EPA's NPDES MS4 program.
- When Lincoln renewed its mapping and inventory process for stormwater infrastructure in 2018 it prioritized the urbanized areas of interest for MS4 permitting. Funding is not yet assured for completing the inventory for all other land, which includes the entirety of the Sudbury, Assabet and Concord watershed.
- The Town would benefit from a review of zoning and subdivision regulations incorporating more up-to-date standards. (Mason and Associates, August 2018)

SUDBURY:

Changes to riverfront character and land use

All of Sudbury is within the Sudbury, Assabet and Concord watershed; over half of the town's eastern boundary lies along the Sudbury River segment designated as Wild and Scenic. Almost the entire town lies within the Sudbury River watershed, while the northwest corner of town lies in the Assabet River watershed. Originating in Marlborough, Hop Brook is a major tributary to the Sudbury River in the town. Most of Sudbury's development is along State Route 20, much of it near Hop Brook. Although the town Master Plan is from 2001, it still has relevancy today in terms of certain goals, objective and implementation actions. The town's OSRP is from 2009 but is in the process of being updated. Planning, zoning, and resource protection bylaws provide a solid basis for continued protection of Sudbury, Assabet and Concord Wild and Scenic River values. (Mason and Associates, August 2018)

Though there have not been any significant changes in riverfront character there has been further river frontage protection. Since the Conservation Plan was written, Sudbury has acquired an additional 1.4 acres for conservation along the Sudbury River on Lincoln Lane. This was a fully permitted, developable lot that is now protected. There has also been a Conservation Restriction on another six plus acres of property along the Sudbury River. At the 2017 Annual Town Meeting, several parcels of land under town ownership were voted to be sold to the USFW to become part of Great Meadows National Wildlife Refuge. In addition to land acquisition and protection, the Conservation Commission has been working with the Nashawtuc Country Club to very significantly decrease the use of herbicides on the golf course that abuts the river.

Sudbury passed Stormwater Management Bylaws in 2009 and updated them in 2012. The bylaws include erosion and sedimentation requirements. An Illicit Discharge Bylaw was passed in 2010. The town updated its wetlands bylaws in 2017. Except for the area around the landfill, the entire Sudbury River corridor is designated state-listed species habitat by the Massachusetts Natural Heritage and Endangered Species Program.

Challenges and opportunities

Issues that the Town feels the RSC should address include:

- There is a need to assess the impact that upstream invasive species treatment has on downstream areas on the River in the Sudbury area.
- There needs to be coordination of river cleanups that engage local municipalities and existing groups.
- There is concern over protecting major tributaries of the Wild and Scenic River and a desire from the Town that the Council look closely at supporting work on the tributaries and associated resources.
- Sudbury High School is interested in greater river education and experiences and programming.

WAYLAND:

Changes to riverfront character and land use

The Sudbury River flows north along the western portion of Wayland, forming the border with the Town of Sudbury north of Old Sudbury Road. This entire section is designated Wild and Scenic River. Portions of the Great Meadow NWR occur/exist in Wayland in this western portion of town. Almost the entire town is within the Sudbury, Assabet and Concord Wild and Scenic River watershed. New subdivisions or large lot development opportunities are scarce due to extensive existing development, permanent conservation lands, and resource constraints such as wetlands. A few of these last large remaining lots, and other lots close to the river, are designated priorities for land protection in the Sudbury, Assabet and Concord 2015 Unprotected Lands Inventory; all of the land protection priority sites are also shown as priorities in the town's OSRP (2016 Draft, Section 9). (Mason and Associates, August 2018)

A handicapped accessible canoe and kayak landing, has been built by the Wayland Conservation Commission at the Greenways Conservation area, formerly the Paine Estate. There is no road access to this site, but it includes an adjacent picnic area. Landings once on the opposite riverbank, at Pelham Island, have disappeared. The former canoe launch alongside the Pelham Island Bridge has been blocked off by a guardrail installed by Mass DOT as part of the reconstruction of the bridge, despite promises by Mass DOT to preserve the launch. This remains an open issue.

The previously informal trailered boat launch on the northeast side of the Route 20 Bridge has been improved and formalized by Mass DOT, at the behest of the RSC, with a twelve-inch gravel base and signs on Route 20, as part of the bridge reconstruction project. The land to the north of the highway right of way, formerly privately owned and then purchased by the Raytheon Corporation as part of a hazardous waste cleanup project, has now been transferred to USFWS and incorporated into the Great Meadows National Wildlife Refuge. Issues with the ramp remain with lack of a formal turnaround and lack of provisions for maintenance.

In recent years the one-time footpath to the river from River Road just southwest of the Route 27 Bridge has widened into a major, albeit informal, trailered boat launch. Erosion is a serious issue at this spot. The Wayland Highway Department has made emergency repairs to the edge of the road pavement which was being destroyed by trailer/tow vehicle use, but lack of any official responsibility for maintenance remains a major issue.

At one time the end of the causeway that carried Old Sudbury Road over the river was used as a launch

site, but the causeway has been blocked off at the Old Town Bridge. There remains a very rough canoe launch site on the bank of the original river channel to the northeast of the historic bridge.

The Wayland banks alongside Sherman's Bridge have evolved into trailer launch sites. Erosion is a problem, as is parking on summer Saturday mornings.

The only bridge in Wayland that has not been rebuilt recently is Sherman's Bridge, which remains a very scenic wooden structure. There is ongoing conflict between the neighbors and river advocates, including the RSC, who want to maintain the current character, and Mass DOT and Wayland's DPW, who would like a more functional modern bridge, given that the current bridge discharges untreated stormwater into the Sudbury River.

A major section of shoreline bordered by a large parcel of land along Stonebridge Road once used for Iditarod dog training has been purchased by Great Meadows and incorporated into the Wildlife Refuge. The former Paine Estate, fronting the river opposite Pelham Island, was purchased by the Town and SVT (and Great Meadows NWR) and is now the Greenways Conservation Area.

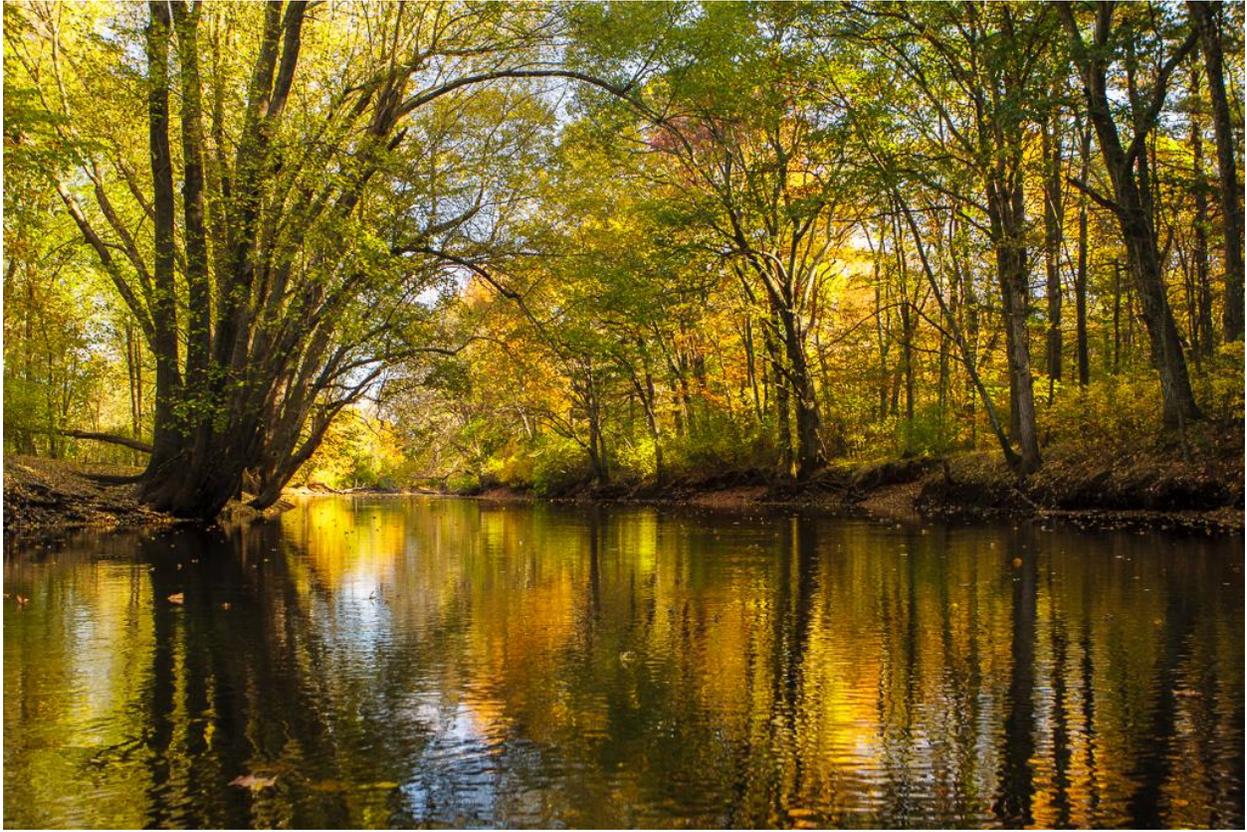
The former Raytheon property to the northeast of the Route 20 Bridge is now a mixed-use shopping mall and condo development. Re-development of an existing building on site is being proposed within the Riverfront area on this parcel, using an existing building on the site. On the west side of the river, just beyond an esker and access road to Wayland's Transfer Station, a new large apartment complex is being planned. Largely due to the intervention of the RSC none of these developments are visible from the river in the summer. The former Raytheon parcel development ("Wayland Town Center") includes a small new wastewater treatment plant that serves both the new development and the pre-existing businesses along Route 20. The RSC, NPS, and U.S. Fish and Wildlife Service participated in a successful appeal of the discharge permit to reduce phosphorus discharges from the plant. The settlement included restrictions on Wayland's use of phosphorus fertilizer anywhere in town.

Challenges and opportunities

- The two golf courses, Sandy Burr south of Pelham Island Road bridge and Wayland Country Club northeast of the Route 27 bridge, now represent the only large developable parcels along the river in Wayland. Neither has indicated any intention to change their status as a golf course. (If under Chapter 61, the Town would have first right of refusal). The two golf courses, along with land on Weir Meadow Road currently occupied by a commercial Hosta nursery, are the only parcels in Wayland that could be new river access points. The Weir Meadow parcel has been on the market in recent years.
- Water Chestnut, curly pondweed, fanwort and milfoil are the major invasive species in the Wayland segment of the Sudbury River. USFWS has done some harvesting, but the town has focused its funding on Heard Pond, an offshoot of the river directly connected at high water.
- A potential pollution threat exists at Wayland High School from an artificial turf athletic field, which leaches zinc from its old tire infill, and from which strands of plastic and particles of rubber can be blown or washed into the river. There is a need to further study endocrine disruptors in this river system, and evaluate materials that may be causing chemical runoff into the rivers.
- Another issue is Wayland's attempt to increase the flow allowed from its wastewater treatment

plant. An application is pending before EPA/DEP.

- Wayland's water supply is entirely from wells. All of Wayland's wells are along or in the river marsh, and generally intercept groundwater on its way to the river as base flow. However, Wayland has done an excellent job of controlling usage, both to meet the state standard 65 rgpcd, and because usage is limited by piping capacity to the storage tank in the summer. Lawn watering restrictions have been in place every summer in recent years.
- A significant threat is posed by a proposal to reactivate the Birch Road wells in Framingham, just over the Wayland town line, but sharing the same aquifer as the Meadowview and Happy Hollow wells that supply approximately half of Wayland's water. The first proposal, ultimately rejected by the state, would have dried up the river entirely during dry summers in the Stonebridge Road area. Framingham has been working with the RSC and USGS to define the area hydrology for nearly a decade since that rejection, and has yet to make another proposal. This requires ongoing monitoring.
- Continue to advocate for increased contact with the river through the schools and adult programs. In Wayland the Conservation Commission is a natural partner.
- There are plans for a new rail trail that will go through the wetlands west of Russell's Garden Center. The bridge over the river will be repaired to make it safe for pedestrians and the Council should engage in this design.



Assabet River, courtesy of Dave Griffin (OARS)