



NASHUA RIVER WATERSHED SQUANNACOOK/ NISSITISSIT

SOURCE WATER ISSUES REPORT

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INTRODUCTION

The Nashua River Watershed Source Water Issues Report was originally designed as a tool to guide discussion at the December 2002 Source Water Analysis Workshop. After the Workshop, we reviewed, revised, and finalized the report with feedback from the local committee. Our goal was to develop a report that presents a realistic and agreed-upon analysis of local source water issues and recommendations to assist the Stewardship Exchange Team and the community as they develop implementation strategies for land protection and restoration in the Squannacook and Nissitissit subbasins of the Nashua River Watershed.

Specifically, the purpose of the Report is to:

1. Provide background and context on the watershed and the jurisdictions within it for the Stewardship Exchange Team's visit in early May 2003,
2. Outline the primary drinking water protection issues in the watershed, based on existing research and the knowledge of local professionals,
3. Identify how growth management, land protection, forest management and restoration can be used to address those issues,
4. Identify the most viable funding sources for both protection and restoration,
5. Present draft maps that use publicly available information to identify priority areas for protection and restoration.

The Source Water Issues Report presents the analysis and observations of the project partners based on feedback from our initial meeting, surveys, one-on-one discussions with local committee members and review of the documents identified on the last page of this report.

Sections of this report draw heavily from the following sources:

- The Nashua River Watershed 5 Year Action Plan 2002-2006, developed by The Nashua River Watershed Association and The Massachusetts Watershed Initiative Nashua Team, 2002.
- The Squannassit ACEC nomination, prepared by a group of local residents coordinated by the Nashua River Watershed Association.
- The 1995 to 2020 Vision for the Nashua River Watershed, prepared by the Nashua River Watershed Association, 1995.

SUMMARY OF FINDINGS

THE WATERSHED

The Squannacook and Nissitissit Rivers, which are located on the border between Massachusetts and New Hampshire, are important tributaries to the Nashua River. These two subbasins comprise approximately 133 square miles and include portions of four counties, two states, and five towns in Massachusetts and six towns in New Hampshire. Numerous medium and high yield groundwater aquifers, as well as many stratified drift aquifers, are located in the watershed and are the primary drinking water sources for residents in the watersheds.

Public water sources in the sub-basins serve an estimated population of 30,000, with a total of 21 public water systems in Massachusetts and 23 public water systems in New Hampshire.¹ Public water systems are classified into three categories: Community Water System², Non-Transient Non-Community Water System (NTNC)³, and Transient Non-community Water System (TNC).⁴ Throughout the two subbasins, there is a mix of all three systems. There are approximately 9 community water systems in Massachusetts and 3 community water systems in New Hampshire. (See Appendix D: Public Water Systems in the Squannacook and Nissitissit Sub-basins.)

In addition to providing drinking water, the aquatic and riparian habitat of this extensive system of rivers and streams create the primary ecological connections throughout the region. Numerous lakes, ponds, wetlands, and vernal pools are located within the watershed providing high aesthetic quality and rich wildlife habitat. More than 20 rare or endangered species have been identified in the area. The water resources of the area also provide outstanding recreation opportunities including boating, swimming and fishing.

The topography ranges from steep upland plateau in the headwater sections to more gently rolling, hilly terrain, to generally flat coastal plain lowland river valleys. The land use pattern in the watershed is characterized by relatively large blocks of open space divided by linear development along roads, with the most intense development along the state numbered highways. The predominant land cover is forest. More than three-quarters (79 percent) of the Squannacook

¹ Northeast Rural Water Association's "Northeast News Leaks," Spring 2003, pg. 1.

² Community Water System is defined as a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year round residents.

³ Non-Transient Non-Community Water System (NTNC) is defined as "a public water system that is not a community water system that has at least 15 service connections or regularly serves at least 25 of the same persons or more approximately four or more hours per day, four days a week, more than six months or 180 days per year, such as a workplace providing water to employees." (MA 310 CMR 22.02) In New Hampshire, a NTNC is defined as "a system which is not a community system and which serves the same 25 people or more over 6 months per year." (NH Env-Ws 300-309 Drinking Water Rules)

⁴ Transient Non-Community Water System (TNC) is defined as "a public water system that is not a community water system or a non-transient water system but is a water system which has at least 15 service connections or serves water to 25 different persons at least 60 days of the year. Some examples of these types of systems are: restaurants, motels, campgrounds, parks, golf courses, ski areas, and community centers." (MA 310 CMR 22.02) In New Hampshire, this type of system is called a Transient Water System (TWS) and is defined as "a non-community water system that does not regularly serve at least the same 25 persons over 6 months per year. (NH Env-Ws 300-309 Drinking Water Rules.)

watershed and 66 percent of the Nissitissit watershed is forested. Farmland and orchards account for roughly 7 percent of land use. Currently, developed land uses account for only 13 percent of the total (11 percent residential and 2 percent commercial/industrial), but the rapid development experienced over the past thirty years is expected to continue. This region of Massachusetts is expected to grow by more than 25 percent over the next decade, and the growth rate for Brookline and Hollis, NH is projected to be between 70 and 140 percent.

Because changes in land and resource use are incremental, it is often difficult to appreciate the net effect of unplanned development on source water quality, public health, and quality of life. The patterns and trends described in this report should communicate a sense of urgency around the need for source water protection. They should also project a sense of optimism about the expected benefits and results of proactive watershed management and land conservation. "The glass is (still) more than half full."

The Local Economy

It is difficult to compile an accurate economic analysis in the Squannacook and Nissitissit subwatersheds due to the fact that the area’s borders overlap sections of four counties and two states. Throughout the subwatershed area, however, the predominant employers are small manufacturing companies, small lumber companies, local governments, and home businesses. Many communities function as bedroom communities, with employment hubs around Interstates 495 and 93, and Route 3. The job base in the watershed is mostly small business and local government; much of the new development comes from increasing residential growth, but without an increasing job base. Agriculture and silviculture are relatively small industries throughout the two sub-basins.

Land Use

In general, the municipalities in the watershed have experienced rapid population growth over the past few decades. The average population growth rate from 1990 to 2000 for all eleven jurisdictions was 11.9 percent, double the Massachusetts state average of 5.5 percent and slightly higher than the New Hampshire state average (11.4 percent). Groton, MA and Brookline, NH experienced the greatest percent increases, 27 percent and 73 percent respectively. Two towns in New Hampshire, Greenville and Mason, saw their population decrease. The total current population in the watershed is estimated at 29,105.

Town	2000 Census	1990 Census	% Change
Ashby, MA	2,845	2,717	+4.7%
Groton, MA	9,547	7,511	+27.1%
Pepperell, MA	11,142	10,098	+10.3%
Shirley, MA	6,373	6,118	+4.1%
Townsend, MA	9,198	8,496	+8.2%

Town	2000 Census	1990 Census	% Change
Greenville, NH	2,224	2,231	-0.3%
Hollis, NH	7,015	5,705	+22.9%
Mason, NH	1,147	1,212	-5.4%
Milford, NH	13,535	11,795	+14.7%
New Ipswich, NH	4,289	4,014	+6.8%

It is estimated that less than 5 percent of the land is owned or controlled by water suppliers – a fact that is highlighted in the source water assessment plans from both states. There is currently a relatively low percentage (less than 8 percent) of total impervious surfaces, such as paved streets and parking lots. The land use pattern consists of concentrated settlements and strip development along with low-density residential and some commercial operations and industry.

Much of the Squannacook-Nissitissit watershed area is undeveloped, with large areas of privately owned open spaces. Approximately 11 percent of the land area is permanently protected. Larger open space areas include Willard Brook State Forest, Townsend State Forest, the Bertozzi Wildlife Management Area, Hunting Hill, Groton Town Forest, Beaver Brook Association Land, Russell-Abbot State Forest, and lands along the Nissitissit River. Other smaller open space areas are controlled by state and municipal agencies or non-profit conservation organizations. According to the Nashua River Watershed Association, the pattern of protected areas provides compelling opportunity for a coordinated plan for conservation in this region. All protected parcels in the area are either isolated or connected at best by only a few other protected parcels, and some important habitat areas are only partially protected. The protection of connections among these parcels can be critical to not only managing future growth but protecting water quality, particularly if they are prioritized based on location of the location of wellheads and aquifer recharge zones.

PRIMARY THREATS TO WATER RESOURCES

Groundwater in the watershed, which serves as the primary drinking water source for residents, is currently of very high quality, as is most of the surface water. The large percentage of forest cover, wetlands and hydric soils in the watershed contributes significantly to the quality and quantity of the water resources.

Watershed hydrologists have shown through research that 75 percent forest cover is the recommended threshold for protecting water resources. (More on this point can be found in Appendix A.) The Squannacook and Nissitissit River watersheds have between 66 percent and 77 percent forest cover, which is excellent.

Though quality is high, current drafts for the source water assessment and protection reports (SWAPs) for both Massachusetts and New Hampshire communities in the watershed show low

levels of protection for these relatively pristine sources. A well's designated water supply protection area is the land around the well where protection activities should be focused – typically the estimated area from which groundwater and surface water will flow to the well under severe pumping conditions. Each well has a Zone I protection area (or in New Hampshire, called the “sanitary radius”) and a Zone II protection area (or in New Hampshire, called “wellhead protection area”.) While current development in the Squannacook and Nissitissit watersheds immediately around wellheads and recharge areas continues to be limited, these areas are not sufficiently protected.

In Massachusetts, the Department of Environmental Protection (DEP) requires that the supplier own or control land in Zone I, which none of the suppliers in this watershed do. Neither are there wellhead protection plans for the wells, as is currently being recommended in Massachusetts. A Wellhead Protection Plan could coordinate community efforts, including public participation, to identify protection strategies and establish a timeframe for implementation.

In New Hampshire, and in Brookline and Hollis in particular, the assessments of public water supply systems show consistent inappropriate land use in the sanitary radius, e.g., sewer lines, septic systems or storage of regulated material. Regardless of the current level of protection activity, or current land use scenario, New Hampshire's Department of Environmental Services (DES), based on current assessments, is encouraging water suppliers and municipalities to use this information and available resources to improve their water supply protection strategies through land acquisition, stricter zoning and subdivision ordinances, and lastly, education and inspection programs. A few communities – Hollis in particular with its aquifer protection overlay zone – attempt to manage water resource protection, but most focus on wetlands not wellheads.

According to the Source Water Assessment and Protection reports (SWAPs) available for both states (Pepperell and Shirley, MA are expected to be completed by year's end), the primary threat to groundwater is increasing residential and commercial development and the roads that come with it. Although agricultural practices can be a threat, farming is not a predominant or increasing land use and when contamination from a farm occurs, the suppliers can usually identify the source readily and work with the farmer to control it. The main contamination concerns with new development are:

1. Sodium and chloride, which come from road salts, are already relatively high in Townsend and West Groton (and probably other supplies, but our information on them is limited). Although they are currently at manageable levels, new roads in groundwater recharge areas could increase levels to the point where expensive treatment will be required.
2. Pesticides and fertilizers from lawn maintenance products. SWAP planners stressed the need to limit and control residential development in Zones I and II in the aquifer recharge areas because of the threat of future contamination from pesticides and fertilizers.
3. Fecal coliform from septic systems. There was a pathogen violation in 1998 in Townsend (high levels of e. coli – unknown if source was human or animal) that was quickly resolved, but the threat continues to be a concern, particularly as septic systems proliferate in the watershed.

4. Chemicals and solvents, from industrial, commercial and household sources. Several years ago West Groton had contamination from TCE, a common solvent, which was identified and resolved quickly. As development becomes more complex and widespread the potential sources of chemical contaminants increases will become much more difficult to identify and resolve.

To date, as contamination has occurred, the suppliers have been able to identify the sources and take action with the landowners to control and remediate the problem. As development becomes more prolific and complex, this will be more difficult and less effective. Treatment is minimal at most of the public supplies, so increased threats will eventually require increased treatment.⁵

The challenge for these watersheds is safeguarding the current quality and quantity of water and protecting potential new water supplies in the face of accelerated growth. The potential water supply needs in the area, as identified in Massachusetts state buildout analyses, far exceeds current supplies and therefore it is probable that new well locations will be required. If inappropriate development or storm water management occurs in aquifer areas, these potential supplies may not be available when they are needed.⁶ For example, in recent years, West Groton Water Supply has conducted an extensive drilling program to locate additional water sources. Only three groundwater sites were located, one of which had nitrate contamination from a working farm.

Due to widely dispersed development patterns, it has not been cost-effective for towns to provide sewer services to all areas of the watershed. Large developments on septic systems pose a serious risk of nitrate pollution to groundwater resources. Massachusetts and New Hampshire regulate citing, design, and construction, but have only begun to address the issue of septic system maintenance and disposal.⁷

Other issues in the watershed include excessive aquatic vegetation and high nutrient levels in several of the watersheds' lakes and ponds. Some of these impoundments are already eutrophic, negatively impacting recreational opportunities and wildlife. According to the 1998 Nashua River Watershed Report Card, the Harbor Pond area on the Squannacook is threatened by increased temperatures, fecal coliform, low dissolved oxygen, sedimentation and invasive weeds. These threats will likely increase with new development and when groundwater is recharged by contaminated surface water.

Protecting drinking water resources will require:

1. **Regional Focus on Water Supply Protection:** Greater involvement by local public officials is essential to further the significant work done by private organizations and state agencies in the watersheds and to create a stronger focus on water supply protection. State recommendations regarding wellhead protection efforts offer opportunities to link land use planning with new protection plans and strategies that can be carried out by NGOs and agencies in partnership.

⁵ November 25th, 2002. Conversation with Gordon Newell, West Groton Water Supply.

⁶ Squannassit ACEC Application, Resources of Squannassit

⁷ 1995 to 2020 Vision for the Nashua River Watershed. Prepared by the Nashua River Watershed Association, 1995.

2. **Targeted Landowner Outreach and Improved Land Management:** A number of existing programs at the state level and new programs at the federal level - in particular the federal farm bill - offer an increasing number of landowner assistance programs. Outreach by the watershed association in partnership with municipalities to targeted landowners may help address conservation and restoration strategies with key, receptive landowners - especially those within the wellhead protection zones. TPL, in partnership with local steering committee members, can also help with outreach to landowners regarding conservation alternatives.

3. **Forest and Farmland Protection:** Conserving and managing existing forests, farmland, wetlands, and natural land will protect groundwater infiltration, watershed hydrology and water quality. Healthy forests, which are becoming highly fragmented throughout the watershed, contribute significantly to maintaining water quality and quantity and will be key to the long-term health of water resources. In addition to the direct effects of forest loss, conversion to developed land use typically increases soil erosion, sediment and nutrient inputs, and the potential for chemicals (e.g., pesticide and fertilizer residues, septic leachate) that reach streams, wetlands, and water supplies. Extending the restoration and protection of riparian forests on agricultural and open land in the watershed is critically important for the maintenance or improvement of water quality.

STRATEGIES FOR ADDRESSING THREATS

Regional Focus on Water Supply Protection

Since the Squannacook and Nissitissit watersheds span eleven municipalities, four counties and two states, inter-jurisdictional planning and growth management is critical, especially with regard to water supply planning. According to the Nashua River Watershed Association (NRWA), working relationships currently exist among state programs, (such as the Massachusetts Department of Environmental Protection water monitoring program, the New Hampshire Department of Environmental Services), the EPA, and organizations including NRWA, the Society for the Protection of New Hampshire Forests, and local land trusts and watershed organizations. Unfortunately, the Massachusetts Watershed Initiative was ended in 2003, which had provided significant support for watershed-wide coordination. It is unclear at this point what the impact of that change will be.

In addition, there are several regional planning agencies working to address land use, growth, and environmental issues including the Southwest Regional Planning Commission, the Nashua Regional Planning Commission, and the Montachusett Regional Planning Commission. Greater focus on water supply and drinking water quality protection should be developed and promoted by these regional teams. In particular, wellhead protection efforts should be prioritized using both regulatory and land conservation tools.

- ❑ Work in partnership with state programs. In Massachusetts, the state Community Preservation Initiative is working to provide communities with information about water demand and where future water supplies might exist and encouraging communities to protect these potential sources. This information should help Squannacook and Nissitissit watershed communities to identify areas suitable for development by eliminating unsuitable areas. In addition, existing inter-state working groups could focus on drinking water as a key watershed protection issue, to better utilize existing state protection programs.
- ❑ Support the protection of drinking water as a framework for growth management throughout the watershed. New residential development is a potential threat in water recharge areas and residential BMPs will be increasingly important. Nearly all communities do not currently meet state wellhead protection regulations. Consistent conservation and restoration strategies should be implemented in all jurisdictions to better direct development, meet state regulations and protect water supply areas.
- ❑ Adopt consistent water protection policies across jurisdictions. Where applicable, towns in the watershed should consider adopting or strengthening water protection overlay zones. Limited planning staff and technological capabilities in the towns in the watershed inhibit the ability to monitor and enforce such regulatory tools. Working with local institutions, regional planning organizations and consultants will help to fill the capacity gap for analysis and planning. More consistent land use regulations will also simplify staff challenges with monitoring and enforcement.

Targeted Landowner Outreach and Improved Land Management

Many private small agricultural and forestry landowners are not fully aware of the ecological value of their land and the value of managing the land for water quality benefits. Increased knowledge from this project and from ongoing work in the watershed can help target those properties where improved forestry, farming and stormwater management practices can have the greatest benefit.

There are very few mechanisms for encouraging or requiring appropriate stewardship of forests on privately owned land. The harvesting of forest products occurs on much of the forested land in the area, though most of this activity is not under certified forest management plans.⁸ State regulations regarding silviculture and forest management are not well understood or followed.

Although there are only a few farms remaining in the watershed, these lands can have significant impacts on water quality through erosion, sedimentation, and fertilizer and pesticide runoff. Farmers need technical assistance and resources to implement best management practices on their land that would protect water resources.

- Increase implementation of agricultural best management practices, particularly the restoration of buffers along streams, wetlands and other water bodies. There is a need for a mix of new incentives for farmers and additional support from the State agricultural department, local conservation districts, and extension services to encourage restoration of riparian buffers.
- Focus more resources on improvement of private and public forest management using state regulations and federal incentive under the Farm Bill with the goal of maintaining healthy forests and maximum forest cover.
- Create an annual goal for targeted outreach. Local jurisdictions should use their GIS-based information and other information to identify key landowners - with properties that can be of strategic importance for water resource protection - and work with those landowners on a longer-term strategy for protection, restoration or best management practices.
- Target key landowners whose properties are in close proximity to existing public lands within wellhead protection zones or over or near aquifer recharge zones.
- Develop a technical assistance program which can take the form of helping landowners complete management plans, sharing information on cost-sharing programs, providing information on tax incentives, and offering information on acquisition programs where landowners are interested in selling their property or development rights.

⁸ Squannassit ACED Application, Resources of Squannassit.

Forest and Farmland Protection

The protection of the existing 75% forest cover - particularly in contiguous tracts in riparian areas - should be a primary goal throughout the watershed. Much of the forested land in the watershed is owned by private landowners on small-to-mid-sized tracts, which leaves them highly vulnerable to development.

Efforts should be undertaken that look more carefully at making linkages between existing public lands in the name of water supply protection. The 11% of public lands in the watershed can, with more targeted efforts, be expanded to focus on wellheads, aquifer recharge areas and wetlands that can support supply and quality of drinking water.

The protection of forests and natural resource areas also presents an excellent opportunity to meet the growing demand for recreation lands throughout the watershed. Excellent trail systems are available and heavily used throughout the area.⁹ Expanding existing public lands with an eye toward water supply protection could further enhance the existing recreational opportunities.

Although there is currently very little farmland in the watershed, during the 1800s virtually all land in the area was in agriculture. The decline in agriculture and increase of forests in the watershed has led to improvements in water quality; however, protection of remaining farms is important for economic and cultural reasons and because farmland conversion now often leads to increased development rather than increased forests. According to the ACEC application, an inventory of current farms and farmland is being prepared to assist with future farmland conservation and stewardship objectives.

- ❑ Develop a watershed-wide strategy for forest protection. Jurisdictions should explore incentives for protection that prevent forest fragmentation, encourage connections with existing holdings and focuses on water supply protection. Areas identified as high priority for recreation use should be combined with areas identified as important for water quality protection, so that both goals can be met simultaneously.
- ❑ Increase public investment in forest and agricultural land preservation programs - with particular emphasis on forested buffers and protection of wetlands. The jurisdictions need to explore creative financing programs to increase the rate of easement purchase. Local funding options are offered below in the next section, which can be leveraged with state and federal sources.
- ❑ In Massachusetts towns, consider adoption of the Community Preservation Act (CPA) to specifically support water supply protection. See the "Paying for Protection Strategies" section of this report for more on CPA. Communities should also continue to seek state and federal funding to leverage local spending on water protection.

⁹ Squannassit ACED Application, Resources of Squannassit.

PAYING FOR PROTECTION STRATEGIES

A full analysis of conservation options is presented in Appendix B. Below is a summary of recommendations.

Land Acquisition Funding

If the effort to protect land within the Nashua River Watershed is to be successful, it is essential to move beyond assessing priorities to actually protecting land. The following options have been identified as feasible for consideration in a "funding quilt" that will support land acquisitions in the near term and sustain them over the long term. The specific recommendations listed here draw upon a combination of local, state, and federal funding to protect land in the Squannacook and Nissitissit Watersheds.

Local Funding

1. Support adoption of the Community Preservation Act (CPA). CPA gives watershed communities in Massachusetts the ability to levy a property tax surcharge and use a portion of the proceeds to protect open space. While CPA has been successfully passed in 58 communities in the state, none of the five towns in the watershed have approved it.
2. Support the passage of local bond measures and reallocation of LUCT revenues in NH: In New Hampshire, numerous communities have approved appropriations or bond measures for acquisition of open space including Brookline and Hollis. Another potential local revenue source is the Land Use Change Tax (LUCT). The LUCT is levied on landowners who take land out of current use taxation for development. Communities have the authority to allocate some or all of their LUCT revenue to a conservation fund.

State Funding

1. Support continued funding for statewide programs: With new governors elected in both Massachusetts and New Hampshire, and tight fiscal times, local conservation advocates will need to make a strong case for land protection and provide leadership to maintain funding programs.
2. Establish Land Acquisition as Drinking Water State Revolving Fund (DWSRF) Priority: Massachusetts and New Hampshire might follow the lead of Maine by explicitly including land acquisition as a goal of its DWSRF, and by setting aside funding for this purpose. Such actions might stimulate demand for land acquisition loans, if coupled with a public education effort on the value of land conservation as a source water protection strategy.

Federal Funding

1. Farmland Protection Program: With the significant increase in funding available under the newly signed Farm Bill, jurisdictions should apply for an FPP grant, possibly in conjunction with one of several local land trusts. Since these grants are competitive and require a 50 percent match, the municipalities might draw upon funds included in anticipated capital improvement plans or hopefully in successful bond measures.
2. Forest Legacy Program: In Massachusetts, the Nashua River Watershed Association has played a leading role in helping obtain federal Forest Legacy funds for a series of projects for the Nashua River Greenway. This effort should be recognized as a success and be continued. In New Hampshire, there have been some recent Forest Legacy Projects in the

southern part of the state, although none in the Squannacook-Nissitissit region. Although FLP funding has generally gone to the Northern Forest, it may be possible to work with New Hampshire's Member's of Congress to try and get some projects in the Squannacook-Nissitissit region

Restoration and Stewardship Funding

Among other sources for funding, the 2002 Federal Farm Bill will increase current baseline spending for USDA conservation programs by 80 percent. Existing programs are being expanded and some new ones have been created, that in partnership with states, will create the bulk of opportunities for funding restoration and stewardship. The Farm Bill provides greater access to the programs by making more farmers eligible for participation. The most significant programs are listed below, with more details to be found in the appendix. These programs, not unlike the land acquisition funding programs cited above, can also be woven together in a 'funding quilt.' The Natural Resources Conservation Service (NRCS), with state and local offices across the country administers the following programs and can provide assistance to landowners seeking funding:

Environmental Quality Incentives Program (EQIP): EQIP is a voluntary conservation program for farmers to treat identified soil, water and related natural resource concerns on eligible land with technical and financial assistance. Reauthorizes the program through 2007 with greater funding resources. Provides an overall payment limitation of \$450,000 per producer. Sixty percent is available for animal operators. Non-industrial foresters are now eligible for funding with a heavy focus on water quality protection. Federal funding must be matched in a 75%-25% formula, but allows up to 90 percent cost-share for beginning or limited resource farmers.

Conservation Security Program (CSP): A new national incentive payment program for fiscal years 2003 through 2007 to reward stewardship and provide an incentive for addressing resource concerns on farm properties, estimated at \$2 billion over ten years.

Conservation Reserve Program (CRP): Provides funding for long-term conservation easements at a funding level of \$1.5 billion over ten years. States must enroll in the program and landowners apply for funding through states. State funding support, in addition to federal, can transition "term" easements to permanent.

Wildlife Habitat Incentives Program (WHIP): WHIP is a voluntary program that encourages protection of wildlife habitats. Provides for up to 15 percent of annual WHIP funds for increased cost-share payments to producers to protect and restore essential plant and animal habitat using agreements with a duration of at least 15 years. States administer this program with a ranking system and there is typically less competition for funding here than in the EQIP program.

Wetlands Reserve Program (WRP): Reauthorizes the program through 2007 while increasing acreage cap for project eligibility. This program provides technical and financial assistance to eligible landowners to restore, enhance, and protect wetlands. Landowners have the option of enrolling eligible lands through permanent easements, 30-year easements or restoration cost-share agreements.

Also through the USDA, two forestry programs provide limited funding for stewardship. These programs are offered in partnership between the U.S. Forest Service and the State Forester:

Forest Stewardship Program (FSP): Provides professional natural resource management expertise to non-industrial private forest landowners to help them develop a management plan for their forested land. Brings the expertise of State service foresters, biologists, and private consultants to private landowners. Generally, FSP participants own less than 1,000 acres. There is no maximum acreage restriction, but some States do establish a minimum acreage. Participation is open to individuals and non-commercial landowners who agree to maintain the land as outlined in their management plan for at least 10 years. FSP is not a cost-share program. Instead, it provides technical and planning guidance.

Forest Land Enhancement Program (FLEP): Authorized in the 2002 Farm Bill, FLEP will provide \$20 million per year over the next 5 years. Through FLEP, State forestry agencies can provide incentives to achieve a wide array of objectives including forest stewardship plan preparation, afforestation and reforestation, forest stand improvement, agroforestry implementation, water quality improvement and watershed protection, fish and wildlife protection, forest health and protection, invasive species control, and wildlife related practices. Currently, guidelines are being prepared for implementation of this program, with initial start up in early 2003.

The analysis in this report is based on information from the following sources:

- Source Water Assessment and Protection (SWAP) Reports from:
 - Townsend Water Department (Draft) - Paul Rafuse
 - West Groton Water Supply District (Draft) - Gordon Newell
 - Witches Brook Water Company (Draft) - David Hicks
 - Ashby Elementary School (Draft) - Joseph Mazzola
 - Children's Garden Preschool (Draft) - Heather Bussell
- Transient Non Community (TNC) Public Water Systems Information from Lydia Thompson, MA DEP Drinking Water Program
- Drinking Water Source Assessment Reports for Brookline, Hollis, Milford, Greenville, Mason, and New Ipswich, NH from <http://www.des.state.nh.us/dwspp/reports.htm>
- Water Quality Consumer Confidence Reports from <http://www.awwa.org/ccrbuilder/1999/ccr0598.htm>
- The Nashua River Watershed 5 Year Action Plan 2002-2006, developed by The Nashua River Watershed Association and The Massachusetts Watershed Initiative Nashua Team, 2002.
- The Squannassit ACEC nomination, prepared by a group of local residents coordinated by the Nashua River Watershed Association.
- The 1995 to 2020 Vision for the Nashua River Watershed, prepared by the Nashua River Watershed Association, 1995.
- Surveys conducted by TPL with Amanda Amory (Montachusett Regional Planning Commission), Charles Thompson (New England Forestry Foundation), Ellen Fisher (Pepperell), Peter Bake (Hollis), Mark Archambolt (Nashua Regional Planning Commission), Stephen Fitzgerald (Brookline), and Russell Hicks (Witches Brook Water Company.)
- Funding Analysis, conducted by TPL's Conservation Finance Department
- Summary notes from the Source Water Stewardship Project Kick-off Meeting Watershed Modeling, conducted by the University of Massachusetts
- Securing our Water Future, Ensuring a Water Rich Massachusetts, presented to the Community Preservation Institute Alumni Class, September 30, 2002, EOEa.
- Data from Jennifer Palmiotto, Source Water Protection Specialist, Northeast Rural Water Association.