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## TOWN OF PELHAM NATURAL RESOURCES INVENTORY

### I. PROJECT SUMMARY

The Town of Pelham Natural Resources Inventory (NRI) is a geographically based catalog of natural resources and land use in Pelham. The NRI provides Geographic Information System (GIS) data and maps current as of February 2002 and other relevant and timely information to help local officials and appointed boards assess the status of natural resources. The NRI contains a narrative discussion, mapping and recommendations on the following: conservation efforts, drinking water resources and potential contaminant sources, wetlands and vernal pools, water resources, wildlife and plants, forest resources and lands of special importance.

The NRI Committee recognizes all natural resources as important due to the rapid pace of development in Pelham. In an effort to prioritize natural resources NRPC mapped multiple overlapping features or co-occurring resources of two or more in the Lands of Special Importance section. This visually illustrates the multiple resources parcels and their relationship to town-owned land, trails, surface waters or open space. Research can now be done to establish the significance of each property, available acreage, the imminence of development threats and land conservation costs. The parcels can then be prioritized for future conservation efforts. The prioritization should be an on-going process as Town needs and landowner status change. This document is intended to supplement the Town of Pelham Master Plan 2002. It can be used to review land use proposals, develop town programs and policies, and plan for future growth and economic development.

#### A. Possible Future Goals

- Develop a Conservation Plan
- Document current conditions so changes over time can be assessed
- Screen development proposals
- Evaluate existing and proposed land use and regulatory controls
- Develop amendments to existing zoning ordinances
- Educate local officials and the public about natural resources
- Initiate and support land protection efforts

#### B. Recommendations

The NRI contains specific recommendations in each section of the document. In an effort to initiate an effective conservation plan the NRI Committee recognizes the following as the most important:

- Research all overlapping features or two or more co-occurring natural resources on the Lands of Special Importance Map to establish the significance of the property, acreage, the imminence of threat of development and the cost of conserving the land.
- Prioritize the parcels based on the research and develop a conservation plan
- Amend subdivision regulations to require the identification of existing trails and include the conservation and/or relocation of trails to preserve connectivity.

- Establish a system for the Planning Board to automatically check for potential trail or corridor linkages during site plan review and use these areas as protected open space.
- Amend the Wetland Ordinance to increase the 50' buffer from the edge of all wetlands and surface waters.

## II. CONSERVATION, PUBLIC LANDS AND OPEN SPACE

### A. The Regional Environmental Protection Plan (REPP) Process

As part of a state-wide effort with funding provided by the New Hampshire Department of Environmental Services (DES), the Nashua Regional Planning Commission (NRPC) has been working with member communities, and regional and state organizations to identify the natural and cultural resource protection needs and priorities for the region.

The Regional Environmental Planning Program (REPP) is a response to statewide conservation efforts. During Phase One of the program representatives of each of NRPC's member communities were provided a series of maps containing region-wide natural/cultural resource information, a base map of their own community, instructions, and a summary of municipal conservation goals. In Pelham, Phase I was spearheaded by the Conservation Commission with input from the Forestry Committee, the Open Space Committee, and Board members. Information collected was compiled into a First Phase Report that includes a map showing the location and type of resources.

During Phase Two, the communities were asked to further prioritize the resources identified in the first phase by selecting their top five natural and cultural resource priorities in Pelham. They are: Spar and Spindle (Camp Runnels) Girl Scout Camp, a 130 acre farm abutting Pelham Fish and Game Club, a working 80 acre farm, and a 39 acre parcel in proximity to the Dunlop Wetland. The camp was Pelham's top priority because it encompasses one quarter of the watershed around Little Island Pond. Like other ponds in southern New Hampshire, water quality in Long Island is stressed by development. Four other properties were identified, with one property now under a conservation easement. Two farms and one property in the Gumpas Pond area were identified for protection.

**Table 1: Conservation Priorities from REPP**

Parcel Map/ Lot	Owner	Acres	Assessed Value	Comments
PE-1 008-017	Spar and Spindle Girl Scout Council	200.00	\$1,522,700	One of Pelham's largest open space and links with Windham's Southeast conservation lands, and established wildlife corridor

**Source: NRPC Regional Environmental Protection Program, 2000.**

REPP Phases Three through five have been primarily devoted to creating detailed databases and Geographic Information System (GIS) data layers. Since Phase II, the Town has asked that the Girl Scout Camp be moved to the fifth priority since the imminence of development at this time is minimal.

## **B. Existing Conservation Lands**

Pelham contains relatively few permanently protected conservation and publicly owned open space lands. Land in conservation was 5.33% of total land acres (16,820.80) according to the 1999 "New Hampshire's Changing Landscape" report.<sup>1</sup> More recent figures from the State of New Hampshire GIS GRANIT layer estimate that there are 1,402 acres or 8.3% of total land acres in open space.<sup>2</sup> However, the GRANIT layer includes parcels that are Town-owned but do not have any level of protection from development other than Town ownership. Therefore, further research needs to be done to determine the level of protection on all of the parcels. Map #1 illustrates that public and private recreation lands are widely distributed throughout town. In addition to showing town owned-land, the map also shows open space utilized by private organizations and individuals such as the Pelham Fish and Game Club, Pine Valley Golf Links, and scouting organizations.

## **C. Current Use**

The New Hampshire legislature has recognized the importance of open space and has found that its preservation is in the public interest:

*It is hereby declared to be in the public interest to encourage the preservation of open space, thus providing a healthful and attractive outdoor environment for work and recreation of the State's citizens, maintaining the character of the State's landscape, and conserving the land, water, forest, agricultural and wildlife resources. It is further declared to be in the public interest to prevent the loss of open space due to property taxation at values incompatible with open space usage. Open space land imposes few if any costs on local government and is therefore an economic benefit to its citizens. (RSA 79-A:1)*

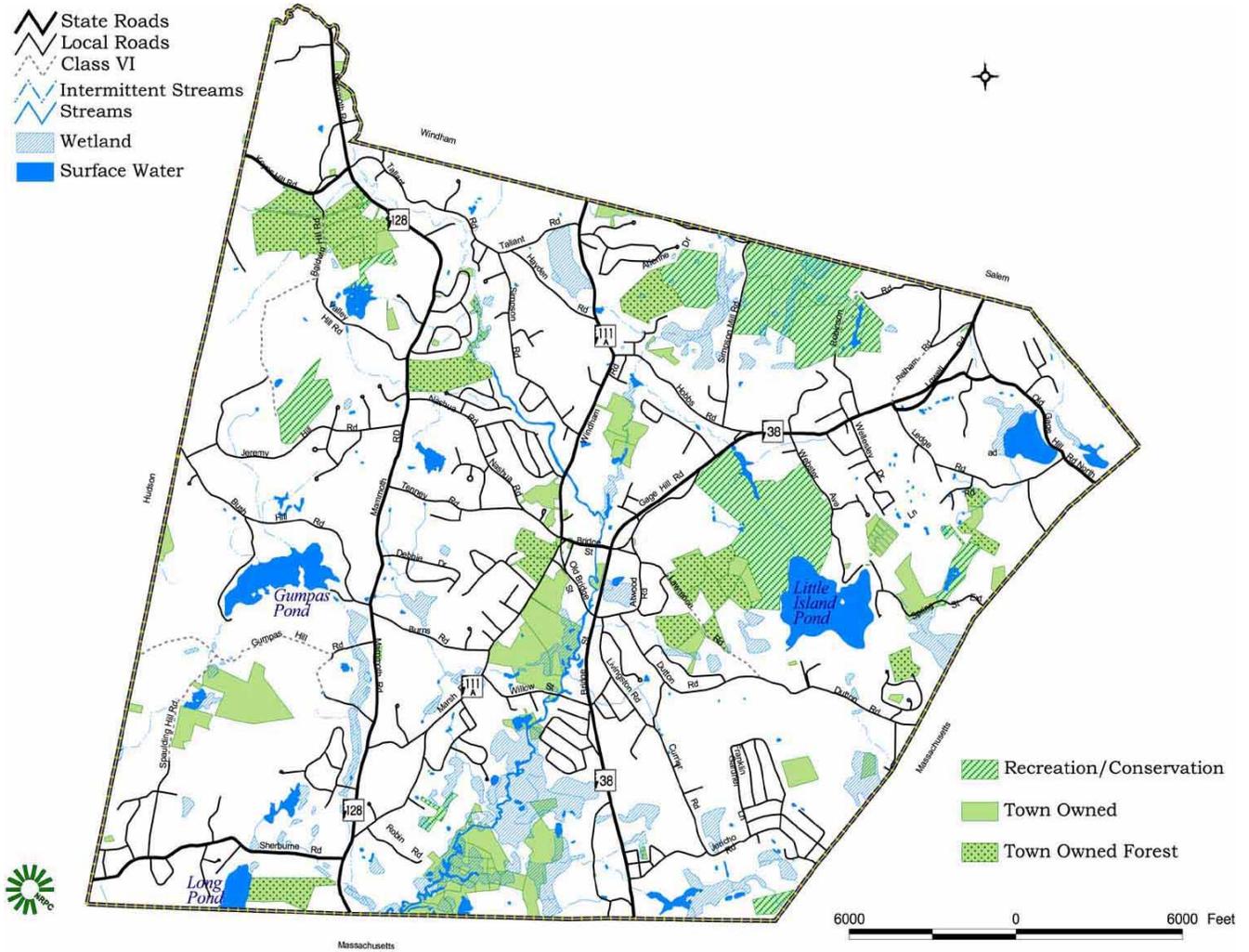
The current use program provides reduced property assessments for forests, farmland, and wetlands of ten acres or greater and for active farms with a minimum \$2,500 gross value of product on properties less than ten acres. It provides limited short-term protection because enrolled open land can easily be converted to other uses. Land in current use remains so until the land no longer meets the current use criteria. Land coming out of current use is subject to a land use change tax of 10% of the fair market value at the time of the change. The Town continues to rely on a 10 percent of the Land Use Change Tax and landowner donations. Of that 10%, 75% goes directly to the Conservation Commission and the remaining goes into the General Fund. According to the NRPC GIS database, 4,798 acres of land was enrolled in the "current use" program in 2002. The table below shows the percentage of the Land Change Use Tax given to the Conservation Commission in the rest of the NRPC Region.

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<sup>1</sup> Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Landscape, 1999*.

<sup>2</sup> NH Conservation and Public Lands GIS Layer distributed by GRANIT 2002 at:  
[http://granitweb.sr.unh.edu/granit\\_clv/viewer.jsp](http://granitweb.sr.unh.edu/granit_clv/viewer.jsp).

### Map #1: Public and Private Recreation Lands



**Note: Not all parcels illustrated above are permanently protected as open space**

**Table 2: Land Use Change Tax in the NRPC Region**

Community	Percentage/Cap
Amherst	50% directly to Conservation Commission 50% Conservation Fund - needs town vote
Brookline	100% directly to Conservation Commission - public hearing only
Hollis	50% directly to Conservation Commission
Hudson	100% to Capital Reserve Fund
Litchfield	10% directly to Conservation Commission
Lyndeborough	10% to Conservation Commission - no restrictions
Merrimack	100% directly to Conservation Fund
Milford	Tax goes to the General Fund to offset property taxes \$25,000 to Conservation Fund
Mont Vernon	25% directly to Conservation Commission \$30,000 to Conservation Fund
Nashua	100% directly to Conservation Commission
Pelham	75% to Conservation Commission/ 25% to Capital Reserve Fund
Wilton	10% to Conservation Fund - needs town vote

Source: Municipal Tax Assessors 2002.

The municipal properties under protection in the region are predominately managed by the Conservation Commissions, Town Foresters or a steward appointed by the Boards of Selectmen. The Table below breaks down the acreage and protected land by stewardship entity. An updated GRANIT GIS layer of New Hampshire Conservation and Public lands will be available in the fall of 2002.

**Table 3: Acreage of Protected Lands in the Nashua Region**

Community	Municipal	Federal	State	Semi-Public	Land Trust	Total	% of Land Area Protected
Amherst	1,796	764	18	14	77	2,669	12.3%
Brookline	1,074	-0-	1	-0-	238	1,313	10.3%
Hollis	1,349	-0-	277	29	2,080	3,735	18.3%
Hudson	1,008	-0-	-0-	199	46	1,252	6.8%
Litchfield	478	-0-	435	59	-0-	972	10.1%
Lyndeborough	35	58	626	-0-	470	1,189	6.1%
Merrimack	1,786	-0-	156	448	-0-	2,390	11.3%
Milford	1,006	-0-	305	-0-	311	1,622	9.9%
Mont Vernon	714	511	-0-	-0-	1	1,226	11.4%
Nashua	486	-0-	27	451	376	1,340	6.7%
Pelham	1,079	-0-	61	83	179	1,402	8.3%
Wilton	282	-0-	582	28	1,435	2,327	13.1%
Total	11,093	1,333	2,488	1,311	5,213	21,437	10.6%

Source: GRANIT, Statewide Conservation Land Update, 2002.

#### **D. Land and Community Heritage Investment Program**

The Land and Community Heritage Commission (LCHC) was established under Senate Bill 493 in 1999 "to determine the feasibility of a new public-private partnership to conserve New Hampshire's priority natural, cultural and historic resources." In 2000, Senate Bill 401 was presented in order to provide the LCHC with \$3 million to begin a matching grant program for local land conservation efforts.

A program called the Land and Community Heritage Investment Program (LCHIP) carries out the goals of Senate Bill 401 and the LCHC. The New Hampshire General Court created LCHIP in order to:

*"...conserve and preserve this State's most important natural, cultural, and historical resources through the acquisition of lands, and cultural and historical resources, or interests therein, of local, regional, and statewide significance, in partnership with the State's municipalities and the private sector, for the primary purposes of protecting and ensuring the perpetual contribution of these resources to the State's economy, environment, and overall quality of life."*

LCHIP was designed to achieve this mandate by providing grants to eligible applicants. Applicants must provide at least a 50% match (at least half of which must be in cash) to be eligible for funding through the program. The next grant round for LCHIP funds will take place in the fall of 2002. Communities use the conservation priorities established through the REPP process to propose parcels and projects for grant funding through LCHIP.

The bill, as introduced, dedicated full funding of LCHIP at the \$12 million level. The House Resources, Recreation, and Development Committee voted to amend the bill to \$4 million for LCHIP in 2002. The amended bill does not include the real estate transfer tax as the dedicated funding source, but relies on the state's general fund after 2002.

In the spring of 2001 the Town pursued funding with the Land and Community Heritage Investment Program. The Wolvern (4<sup>th</sup> Priority) property in the south central part of Pelham is viewed as an important corridor link to connect the natural gas pipeline and other open space to the north and the large Dunlop Wetland Conservation Area to the south. The Town did not receive funding in the first round but has since purchased an easement as a bargain sale with Conservation Commission funds.

#### **E. Recommendations for Conservation, Public Lands, and Open Space**

- Determine which Town-owned lands should remain as permanent open space and protect them in perpetuity through conservation easements.
- Determine where linkages to the lands and trails should be obtained.
- Establish a system for the Planning Board to automatically check for a potential trail or corridor linkages during site plan review.
- Continue to update and prioritize the natural and cultural inventory for future land acquisition.
- Contact Nashua Regional Planning Commission at least once a year to update the GIS database and mapping.
- Revisit REPP II to determine if the four properties designated are still a priority.
- Allocate 100% of the Land Use Change tax to the Conservation Fund to help contribute towards increasing the number of protected open space parcels and provide matching funds for potential funding sources.
- Establish a Capital Reserve Fund to raise funds for land protection.
- Consider using warrant articles for land acquisition.
- Encourage minimal clearing of lots on new subdivisions.
- Review Town Regulations and revise any that may lead to unnecessary clearing.

- Implement an educational program for the use of native plants and the identification of invasive species.
- Obtain copies of all easement deeds and keep duplicate copies at NRPC.
- Utilize existing town owned open space as recreational land, town forest, or conservation land.
- The Pelham Fish and Game land, Helgence Farm, and Camp Runnels should be recognized as a greenway corridor and expanded upon to provide for the north/south movement of wildlife.

### **III. OPEN SPACE TRAIL SYSTEM PLAN**

Traditionally the most functional trails in New Hampshire have been maintained and enhanced by snowmobile clubs. This is the case in Pelham where there are approximately 60 miles of existing, multiple use trails. The trails, however, are not permanently protected. The Trails Bureau of the New Hampshire Department of Resources and Economic Development (NH DRED) is encouraging passive three-season use of existing, expanded, and proposed new trails through the Open Space Trail System Plan (OSTS Plan).<sup>3</sup> Local trails can be recreational and economic assets to communities, especially if communities publicize them and create linkages to other established trail systems in the region. An official OSTs Plan should be considered for the following reasons:

- Alternative means of transportation reduce vehicle trips
- A developed trail system can stimulate the local economy
- The planning process encourages traditionally opposing groups to work together
- The planning process promotes cooperation on a regional basis
- The planning process can be inclusive and can foster community spirit

The first step in developing an OSTs Plan is to form a Trail Committee and inventory the conservation land easements, municipal, state, and federal conservation lands, land owned by land trusts and other public lands. A detailed listing and description of parcel right-of-way information will facilitate determination of appropriate trail usage, enhancements and landowner agreements. Topography, soils, surface water, and landowner permission for the type of use on their property should determine usage on trail segments. With assistance from NRPC, Pelham officials and residents have begun updating permanently conserved lands and other publicly owned lands by Tax Map and Lot number.

An unofficial map was created to show all known trails on conservation lands and Town Forests including trails used by the snowmobile club with private landowner permission. This map should be used as a planning tool only. Landowner permission should be sought before placing an existing private trail, including a snowmobile trail, in the Plan or on the official maps. The Master Plan Committee members estimated that between 100-175 miles of trails could be developed using a system of trail loops throughout Pelham. According the University of New Hampshire, which coordinates the Community Profiles for New Hampshire towns, trails consistently ranked in the top five of Town priorities. Trail Committees formed as a result of a Community Profile indicated that towns felt they maintain rural character and increase sense of community.

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<sup>3</sup> Central New Hampshire Regional Planning Commission, *A Guide to the Development of a Municipal Open Space Trail Plan*, 2001. [http://www.cnhrpc.org/environmental/openspace\\_trails.html](http://www.cnhrpc.org/environmental/openspace_trails.html)

The second priority identified in the Community Profile was the improvement, expansion and increased use of existing recreation areas. Increasing the amount of existing walking trails, a paved bike/roller blading trail and better maintenance/signage were identified as goals.

By using the Town's tax maps and tax assessor's database, information can be gathered on conservation easements and permanently protected lands. This should include public or private parcels, such as those owned by utility companies that could be potentially available for public use with landowner approval. Former railroad rights-of-way, utility line easements, Class VI roads, and existing trails should also be researched and included.

Once the detailed mapping is complete, the Trails Committee can determine the primary trail users and consider where trail connections would be most beneficial. These connections should be prioritized based on but not limited to the imminence of development, willingness of landowners, and ease of implementation. To aid in the adoption of an OSTS Plan by the Planning Board, it would be advantageous to focus on areas identified in the Master Plan.

#### **A. Community Environmental Outreach Program and Natural Resources Senior Projects**

The University of New Hampshire offers two environmental assistance programs. The Community Environmental Outreach Program (CEOP)<sup>4</sup> utilizes students from all academic majors and places them in consulting teams of two to four student, working with communities and non-profit organization for an entire academic year. The typical cost ranges from \$300 to \$800 with an additional administrative fee of \$150.

The Senior Project Course<sup>5</sup> is required for all natural resources majors. The teams consist of four to six students from various specialty areas that work together for one semester only. Generally these students have more expertise than CEOP students. The costs range from \$250 to \$550 with the administrative fee built into the cost.

The types of projects potentially include interpretive trail planning, wetland assessments and inventories. Project types are only limited by the availability of qualified students and the likelihood of completion within the given time frame.

#### **B. Recommendations for an Open Space Trail System Plan**

- Form a permanent Trails Committee comprised of representatives of the public and town boards to oversee the development of the OSTS Plan and implementations of the Plan's recommendations.
- Identify landowners and initiate discussions on trail easements or public access.
- Amend subdivision regulations to require the identification of existing trails on subdivision plans and include the conservation and/or relocation of trails to preserve connectivity.
- Pursue grants, volunteer labor, local donations, and technical assistance for expansion and maintenance of a trail system.
- Designate appropriate trails as official Class A & B trails [enforceable by local law enforcement.]
- Post all trails with allowable uses and consistent directional signage.

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<sup>4</sup> <http://pubpages.unh.edu/~pcj/ceop.html>

<sup>5</sup> <http://pubpages.unh.edu/~pcj/nr775.html>

- Pursue the adoption of the OSTs Plan by the Planning Board as a subsection of the Master Plan.
- Utilize the low cost programs of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects.

#### **IV. DRINKING WATER RESOURCES AND POTENTIAL CONTAMINANT SOURCES**

There are two key issues affecting water resources in the region. The first is the increased amount of impervious surface, which reduces the natural infiltration of stormwater and the recharge of groundwater resources. Stormwater contains many sources of contaminants, which are piped or flow over impervious surfaces and drain directly into surface waters without natural soil filtration. Map #2 illustrates the drinking water resources in Pelham and other potential threats to drinking water quality.

The second issue is the demand for water. Rapid growth in the NRPC Region has fueled increased demand. Increasing levels of water are consumed by industry and by households for personal use and lawn irrigation. As shown in the Table above, the amount of water supplied by the Pennichuck Water Works, the major water supplier to the NRPC Region, increased from 1999 to 2001. The 1987 Hydrogeological Study for the Region<sup>6</sup> projected a deficit in water supply, based on a year 2000 population projection, for the NRPC Region unless new sources were identified and protected. NRPC is currently working to secure funding for a comprehensive water supply and demand study.

**Table 4: Comparative Water Usage Between 1999 and 2001 (x100 Cubic Feet)**

<b>Community</b>	<b>1999</b>	<b>2001</b>
Amherst	143,125	160,509
Hollis	310	397
Litchfield	131,893	156,705
Merrimack	929,372	1,090,592
Milford	46,449	78,737
Nashua	5,274,542	5,087,210
Pelham	19,780	22,717

**Source: Pennichuck Water Works, 2002.**

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<sup>6</sup> United States Geologic Survey, *Water Resources Investigations Report 86-4358, 1987 Hydrogeology of Stratified-Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire.*

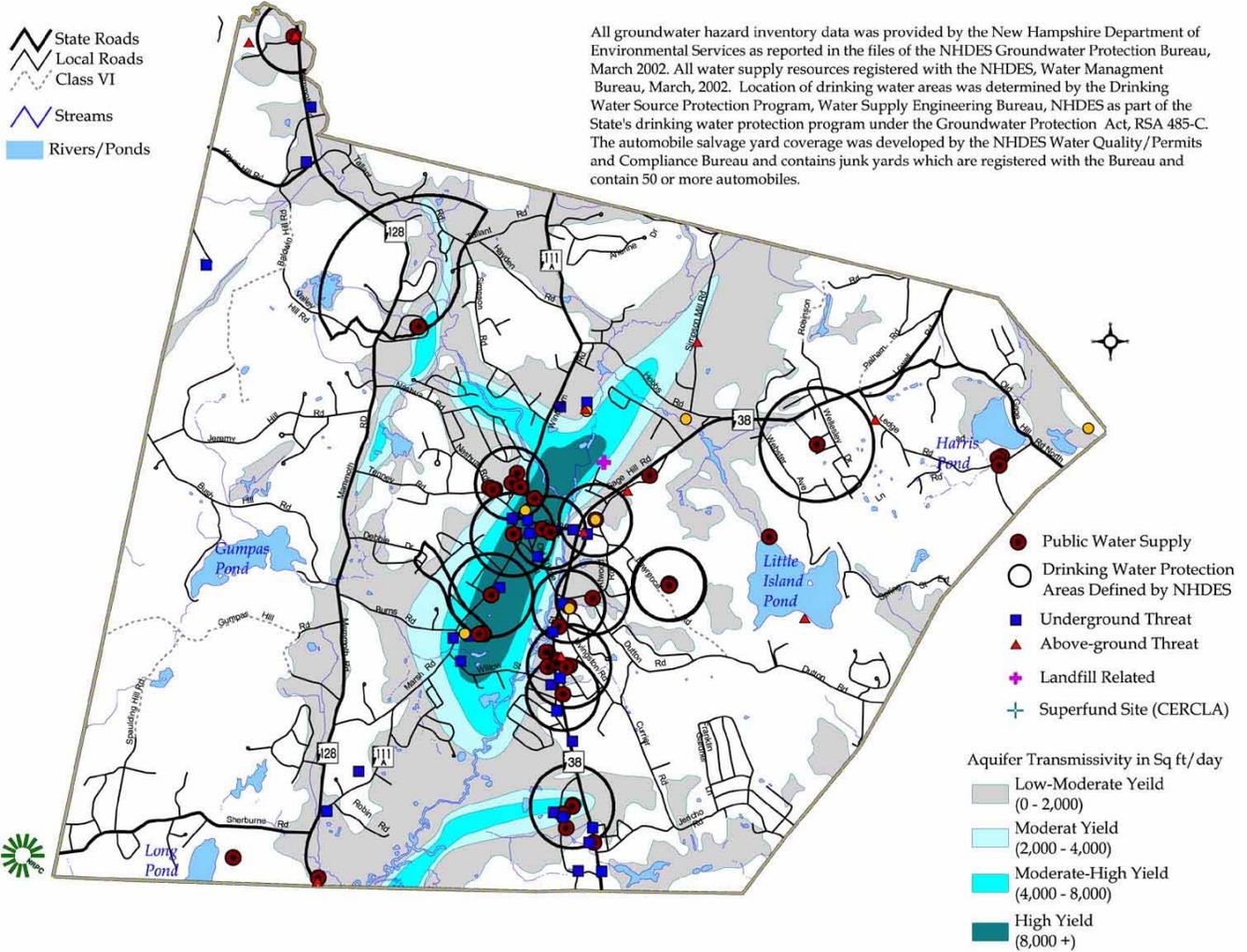
**Table 5: Status of Water Supply Lands in the Nashua Region**

TOWN	Total	Area of	% of Total		% of Water
	Area (acres)	Water Supply Lands	Area in Water Supply Lands	Area of Water Supply Lands Protected	Supply Lands Protected
Amherst	22,025	9,142	42%	560	6.1%
Brookline	12,924	4,340	34%	336	7.7%
Hollis	20,668	8,061	39%	1,573	19.5%
Hudson	18,780	7,522	40%	301	4.0%
Litchfield	9,784	8,933	91%	694	7.8%
Lyndeborough	19,370	1,665	9%	257	15.4%
Merrimack	21,412	13,155	61%	1,196	9.1%
Milford	16,299	6,402	39%	630	9.8%
Mont Vernon	10,820	507	5%	7	1.4%
Nashua	20,305	14,216	70%	917	6.5%
Pelham	17,151	7,147	42%	465	6.5%
Wilton	16,447	3,803	23%	508	13.4%

Source: New Hampshire's Changing Landscape, The Society for the Protection of New Hampshire's Forests, 1999.

Notes: The area of water supply lands in the second column refers to the entire watershed area that contributes to a water supply source. Protected water supply areas are lands that are under municipal or private control for water production, where development is prohibited.

## Map #2: Drinking Water Resources and Potential Contaminant Sources



**A. Underground Storage Tanks**

Leaks in improperly equipped underground storage tanks (USTs) are difficult to detect and may go unnoticed for a long time. Small leaks of only a few gallons can contaminate millions of gallons of ground water. The State regulates USTs where the cumulative volume of all tanks at the facility is 1,100 gallons or more. Some tanks, including those containing non-petroleum based chemicals and those containing heating oil for on-site residential consumption are exempted. As of 2002, 38 USTs in Pelham were registered with the NH Department of Environmental Services, Water Supply and Pollution Control Division.

**B. Household Hazardous Waste**

Household Hazardous Wastes (HHW) come from everyday products used in the home, yard, or garden. By definition, they are corrosive, flammable, toxic, or reactive. Examples include; paints, adhesives, solvents, pool chemicals, pesticides, fertilizers, drain openers and auto chemicals. Disposal in the trash, down the sink, into storm drains, or in the woods poses a threat to water quality and may kill fish and wildlife if the chemicals are released into the environment. Household toxins may also injure human and animal health through exposure due to careless storage and handling. NRPC coordinates the regions HHW collection program. Collection dates and other information can be found at [www.nashuarpc.org](http://www.nashuarpc.org).

**C. Junkyards**

The 2001 Groundwater Protection Recommendations and Implementation Plan<sup>7</sup> identified junkyards, hazardous materials, and septic systems as the top groundwater threats in Pelham. The Town's Junkyard and Automotive Recycling Regulation requires that all existing and proposed junkyards be licensed. Pelham has prohibited new junkyards within its Aquifer Overlay District but should enforce licensing requirements for junkyards operating prior to the Overlay District. State regulations apply to sites with two or more unusable vehicles. The Department of Environmental Services estimates that there may be as many as 40 sites that contain two or more vehicles. Recently enacted HB 141-L is a re-write of the definition of junkyard, but it also makes other changes to the municipal junkyard laws. It removes the general exception from municipal regulation for junk yards approved by DES under RSA 149-M<sup>8</sup> and instead lists specific types of solid waste facilities which are excluded from local regulation. This will allow DES to regulate junkyards and auto salvage facilities from an environmental perspective. This legislation also removes the word "unregistered" from the statute, closing the loophole, which enabled junkyard owners to simply register junk cars to avoid application of the statute.

The regulation of hazardous materials is generally done at the state and federal level. The New Hampshire Department of Environmental Services has identified 51 hazardous waste generators in Town. It is recommended that the Town pursue the following:

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<sup>2</sup>Comprehensive Environmental Inc., *Groundwater Protection Recommendations and Implementation Plan*, 2001.

<sup>8</sup> State of New Hampshire, *RSA 236:111-a Exception*.

- Improve the licensing checklist to include the review of the National Pollution Discharge Elimination System permit, especially the facility's Stormwater Pollution Prevention Plan.
- Enforce licensing requirements of all junkyard facilities.
- Conduct a site walk prior to license renewal to make further recommendations for the protection of natural resources.
- Update and increase the fines for violations.

#### **D. Arsenic and Radon/Uranium**

Southern New Hampshire is a rapidly growing region that has been identified as having higher than average concentrations of arsenic and radionuclides in drinking water from groundwater sources. This conclusion is based on the analysis of public bedrock wells as required by the Safe Water Drinking Water Act. According to the USGS, high levels in ground water are probably derived from geologic origins. However, in some areas, arsenic may originate from past human activity such as the use of arsenical pesticides. The quality of water obtained from private wells in New Hampshire is not regulated. Private wells are often not tested unless homeowners are made aware of the need to do so, or if testing is a condition prior to granting an occupancy permit. Fractured bedrock aquifers have the highest risk for arsenic contamination. The State of New Hampshire is aggressively promoting the testing of private wells. It is recommended that residents have their wells tested, and that information concerning arsenic and radon be added to the town website.

#### **E. Stormwater Runoff**

The development of land for residential, commercial or industrial purposes necessarily increases the amount of impervious surface area within any given site due to the construction of buildings, roads, driveways, parking lots and other improvements. Impervious surfaces reduce the natural infiltration of stormwater into the ground, reducing recharge of groundwater resources. This is particularly true where stormwater is discharged into a storm drainage system that exports stormwater off of a site and out of a watershed. Development can also reduce groundwater recharge through increased evaporation resulting from land clearing. Where increased imperviousness results in direct stormwater discharges into streams and rivers, the result is often alteration of the natural flow of the stream, causing erosion and sedimentation, loss of aquatic wildlife habitat and increased flood hazards.

Potential contaminants found in stormwater runoff include: nutrients such as phosphorous; nitrates; heavy metals; floatables and solids, pathogens such as virus and bacteria; organic compounds including oils, grease, MBTE (gasoline additive); and pesticides and herbicides. All of these materials singly and in combination can lead to the degradation of surface and groundwater. Non-point source pollution and urban runoff in particular, is now acknowledged as being the most serious threat facing surface and groundwater resources in New Hampshire.<sup>9</sup>

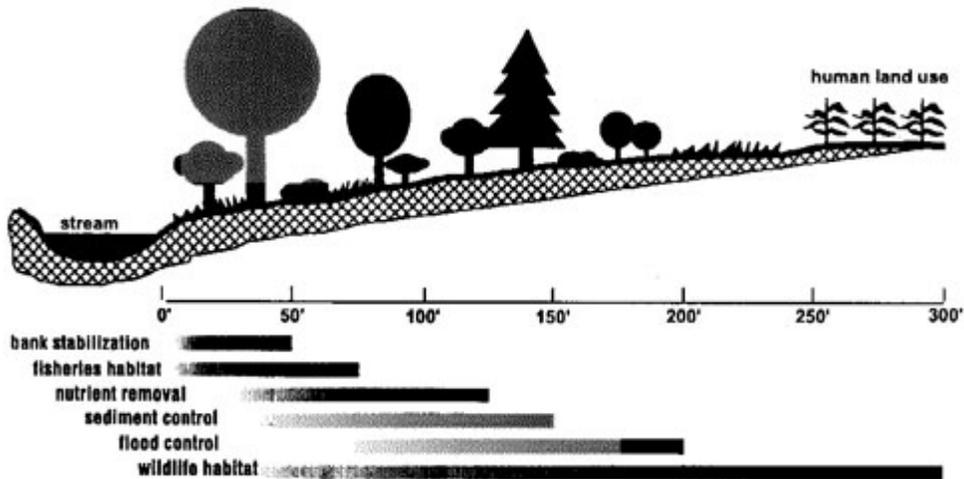
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<sup>9</sup> The NH Department of Environmental Services, *New Hampshire Non-Point Source Management Plan*, 1999.  
[www.epa.gov/npdes](http://www.epa.gov/npdes)

## F. Recommendations for Stormwater Management

- Prepare a stormwater management plan that addresses the 6 minimum controls outlined under the EPA's Phase II Stormwater Regulations.<sup>10</sup>
- Increase the setback of future land-uses to water supply wells located on shallow till deposits susceptible to land use related contamination (septic systems, fuel storage, fertilizers, road salt, etc.).

Figure 1: Recommended Buffers



Source: Connecticut River Joint Commissions of New Hampshire and Vermont

## G. Buffer Widths

The following discussion on buffer widths is adapted from the publication "*Riparian Buffers for the Connecticut River Watershed*" prepared by the Connecticut River Joint Commissions of New Hampshire and Vermont in 2000. The Commission is made up of Federal, state, and private organizations. There is no single generic buffer which will keep water clean, stabilize banks, protect fish and wildlife and satisfy human demands on the land. The minimum acceptable width is one that provides acceptable levels of all needed benefits at an acceptable cost, typically 50' from the top of the bank. Each foot of additional width increases the effectiveness of the buffer. Buffers are useful for the following purposes:

<sup>10</sup> Comprehensive Environmental Inc., *Phase II Stormwater Rule Summary and How Municipalities Can Prepare for Compliance*, 2000.

**To Stabilize Eroding Banks.** Good erosion control on smaller streams may require no more than shrubs and trees or a managed grass buffer. If there is active bank erosion, or on larger streams, more than 50' may be necessary. Severe bank erosion on larger streams requires engineering to stabilize and protect the bank – effective engineered solutions can be accomplished with selective vegetative cover.

**To Filter Sediment and Attached Contaminants from Runoff.** For slopes less than 15%, most sediment settling occurs within a 35' wide buffer of grass. Greater width is needed on steeper slopes, for shrubs and trees, or where sediment loads are particularly high.

**To Filter Dissolved Nutrients and Pesticides from Runoff.** A width up to 100' or more may be necessary on steeper slopes and less permeable soils to allow runoff to soak in sufficiently, and for vegetation and microbes to work on nutrients and pesticides. Most pollutants are removed within 100', although in clay soils, may require up to 500'.

## **V. WETLANDS AND VERNAL POOLS**

### **A. Wetlands**

Wetlands perform many irreplaceable functions within the hydrologic system of each watershed. Wetlands provide a vital link between incoming precipitation and aquifer recharge, flood storage and prevention; erosion control, water purification of sediment, contaminants, and problem nutrients (phosphorus/nitrogen). They also provide important habitat to a variety of vegetation and animal life, including: aquatic plants, insects, amphibians, fish, and waterfowl. The role of education in understanding the importance and sensitivity of wetlands cannot be over estimated. Promoting the development of school and public environmental education programs that utilize the outdoors as natural classrooms, such as the U.S. Fish and Wildlife's Schoolyard Habitat Program<sup>11</sup> is an effective way of increasing community awareness.

The designation of wetland areas is the first step in developing a protection plan or strategy. Wetland designation involves determining the location or extent of any areas that support typical wetland soils and vegetation. The existence of either wetland soils or vegetation is the result of water table characteristics, which cause frequent flooding or saturation of the soil.

As seen in Table 6 below, most of the municipalities of the Region define wetlands on the basis of hydric (poorly and very poorly drained) soils. While this is acceptable, it is not based on the most recent federal definition, which includes wetland hydrology and vegetation in addition to soils. More accurate wetland delineation is made possible by the 3-fold definition. Given the detrimental affects of excessive nutrient loading can have on water resources, it is important that septic systems and leachfields be set back far enough from wetlands to prevent their accelerated eutrophication.

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<sup>11</sup> U.S. Fish and Wildlife Service, *Schoolyard Habitat Project Guide*, 1999.

**Table 6: Summary of NRPC Region Wetland Ordinance Provisions**

Town	Wetland District Definition	Wetland Buffers/setbacks
Amherst	Poorly and very poorly drained soils, water bodies.	Septic tanks and leachfields: 75 feet No structures within 50 feet.
Brookline	Poorly and very poorly drained soils, water bodies.	All wetlands: 50 feet Septic tanks and leachfields: 75 feet except raid and very permeability-125 feet No new structures within 25 feet.
Hollis	Poorly and very poorly drained soils, water bodies.	Septic tanks and leachfields: 100 feet No new structures within 100 feet.
Hudson	3-fold definition: wetland soils (very poorly and poorly drained), wetland vegetation, wetland hydrology.	No new structures or parking lots within 25 feet. Septic tanks and leachfields: 25 – 75 feet depending on soils.
Lyndeborough	Poorly and very poorly drained soils, water bodies.	No buffers
Litchfield	3-fold definition: wetland soils (very poorly and poorly drained), wetland vegetation, wetland hydrology	Septic tanks and leachfields: 100 feet No new structures within 75 feet. Basin marshes, bogs, fens, and vernal pools: 200 feet
Merrimack	Poorly and very poorly drained soils, water bodies.	Septic tanks and leachfields: 75 feet No new structures within 40 feet.
Milford	3-fold definition: wetland soils (very poorly and poorly drained), wetland vegetation, wetland hydrology.	All wetlands: 25 feet Designated streams and wetlands: 50 feet No new structures within 50 feet.
Mont Vernon	Poorly and very poorly drained soils, water bodies	All wetlands except vernal pools: 25 feet
Nashua	3-fold definition: wetland soils (very poorly and poorly drained), wetland vegetation, wetland hydrology.	75 on prime 40 on critical
Pelham	Wetland soils and vegetation.	Septic and leachfields: 25 – 75 feet depending on soils.
Wilton	3-fold definition: wetland soils (very poorly and poorly drained), wetland vegetation, wetland hydrology.	No buffers

**Source: NRPC survey of local wetland ordinances, 2002.**

Accurate field surveys are essential for identifying wetlands. Trained botanists, wetland scientists, ecologists, soil scientists, and hydrologists, can provide the highest level of information needed. This information should be incorporated into any land use decision-making process. In 1987 the Conservation Commission prepared the Pelham Prime Wetlands Study based on nine criteria. The criteria included the following: Flora, Fauna, Food chain production, Hydrology, Historical, Archaeological and/or Scientific Significance, Geomorphologic Features, Aesthetics, Size, and other considerations. The Study identified 46 areas initially and narrowed the list down to 11 for further consideration. Seven wetlands were chosen for inclusion in a zoning overlay district at Town Meeting in 1988.

The New Hampshire Method of Evaluating Wetlands was developed 1993.<sup>12</sup> A prime wetland is a wetland that is worthy of extra protection because of its unspoiled character, uniqueness, or fragility. All prime wetlands must have over 50% hydric A soil, which are very poorly drained soils. The New Hampshire Method uses a ranking system based on 12 criteria. These criteria are as follows: Ecological Integrity, Wildlife Habitat, Fin Fish Habitat, Educational Potential, Aesthetic Quality, Water Based

<sup>12</sup> Amman, A., and A. L. Stone, *A Method for the Comparative Evaluation of Non-Tidal Wetlands in New Hampshire*, 1991.

Recreation, Flood Control Potential, Groundwater Use Potential, Sediment Trapping, Nutrient Filtering, Urban Quality of Life Potential, and Historical Site Potential.

The Town contracted with the University of New Hampshire in 1999 to continue the evaluations started in 1987.<sup>13</sup> Using the New Hampshire Method, the assessment concluded that four additional wetland systems were worthy of prime wetland status. The four wetlands were Little Island Pond, St. Patrick's Convent School, and the Sherburne Road Bog and Sherburne Wetland. The New Hampshire Memorial School Wetland did not meet the hydric A soil requirement for the New Hampshire Method by a small margin, and cannot be designated as a prime wetland according to the New Hampshire Code of Administrative Rules. Nevertheless, this wetland system did rank high in the 12 categories and should be re-evaluated and protected.

There are two other sources of information and technical assistance presently available to local Planning Boards. One is the Hillsborough County Soil Conservation District and Soil Conservation Service (SCS) Soil Survey. It should be noted that the former SCS is now the National Resources Conservation Service. The other is the U.S. Fish and Wildlife Service, National Wetlands Inventory classification system and map products.

Significant technical and scientific expertise has gone into the development of the Hillsborough County Soil Survey. The District also offers technical assistance at the local and regional levels to make the best use of this information. In mapping the region's soils, the SCS has delineated those soils having poor to very poor drainage based on individual soil properties. Soils in these categories are in the table below.

**Table 7: Very Poorly and Poorly Drained Soils in Pelham**

Very Poorly Drained Soils	Poorly Drained Soils
Borochemists (BoA, BpA)	Leicester-Walpole Complex (LtA, LtB, LvA, LvB)
Chocorua Mucky Peat (Cu)	Pipestone (PiA, PiB)
Greenwood Mucky Peat (Gw)	Ridgebury (ReA)
Scarboro (So, Sr)	Rippowan (Rp)

**Source: Soil Survey of Hillsborough County, New Hampshire, Eastern Part,  
US Department of Agriculture, Soil Conservation Service, 1980.**

The proximity of these soils to low-lying areas or to surface waters constitutes supporting evidence for the sensitivity of these areas and their importance as wetlands. The amount and location of incoming run-off, slope, accessibility of natural drainage features, and seasonal wet conditions are all important points to consider in documenting the sensitivity of a particular wetland areas.

Wetland areas are for the most part located adjacent to or very near open water as found in the Town's rivers, streams, and ponds. This relationship is the result of a localized higher water table and the source of greater quantities of soil water during periods of high stream flow. There are also some scattered pockets of wetland soils throughout the Town, usually at the bottom of low-lying areas or depressions.

The next step in protecting wetlands is setting the priority of wetland areas based on their location and the benefits provided. These efforts can be documented in a protection plan or strategy. For example, wetlands adjacent to a stream may warrant a higher local priority for protection than an isolated wetland "pocket". This does not mean that these pocket wetlands do not perform valuable functions. The University of New Hampshire is currently studying the value of these wetlands. Other available ways to

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<sup>13</sup> University of New Hampshire, *Pelham Prime Wetland Assessment*, 1999.

gain better control of wetland areas considered important are through town regulations, conservation easements, deed restrictions, and the fee-simple purchase of development rights or land. Since overcoming the problems in the development of sites with these conditions is quite costly, and since hazardous conditions may result if improperly developed, these areas are recommended for use as open space. This restriction will allow these areas to continue their functions as unique wildlife habitats and as natural purification sites for the recharge-discharge of groundwater supplies. It is recommended that development of wetland areas continue to be restricted in the future through the Town's Wetland Conservation ordinance. This, combined with active enforcement of State regulations governing the location of septic system and along with the possibility of the Town adopting greater setback distances than the State's minimum, will ensure that these areas may continue to perform the natural functions for which they are best suited.

## **B. Vernal Pools**

Vernal or "spring" pools are essential for the life cycle of many invertebrates and amphibians. These temporary forested wetlands serve as a home to many of these species, which feed on the nutrients from fallen leaves. Pools can range in size from a few feet to several acres. Vernal pools are generally associated with forested wetlands, but can also be found within larger wetlands, such as oxbows in river floodplains or scrub-shrub wetlands. Most vernal pool animals do not live their entire lives in the pool but migrate in response to snow melt and early spring rains. The pools generally dry up by mid to late summer. Depending on the groundwater, some pools will refill in the autumn. Mole salamanders and wood frogs spend 90% of their lives in the surrounding uplands, perhaps as far as a quarter mile from the pool. Adults migrate to the pool for a few weeks to reproduce and surviving juveniles leave before the water dries.

Other organisms (e.g., snakes, turtles, insects, and birds) migrate from nearby wetlands to breed or feed in the productive pool waters. These animals return to more permanent wetlands. Other animals develop entirely in the pool and most survive the dry season. Fingernail clams and air-breathing snails burrow beneath the leaves that remain to await the return of water. Fairy shrimp deposit eggs in the dry pool that hatch after the pool refills.

The New Hampshire Fish and Game Department advocates identification of vernal pools as important wildlife habitat and wetlands of significance and provides guidance for their protection.<sup>14</sup> Goals developed for future natural resources protection should include the documentation of important vernal pools and the protection of these natural resources to help ensure the biodiversity of the area. The identification and mapping of vernal pools on site plans and subdivision plans will provide an opportunity to mitigate the impacts to these sensitive areas.

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<sup>14</sup> NH Fish and Game Department, Nongame and Endangered Wildlife Program, *Identification and Documentation of Vernal Pools in New Hampshire*, 2001.

The only vernal pools noted in a public document were in the eight Forestry Management Plans for the Towns Forests. Although many pools may be known in the community, they are not recorded. The New Hampshire Fish and Game Department's Non-Game and Endangered Wildlife Program collects information on any reptile and amphibians sighted. Volunteers equipped with field guides and report forms identify these creatures on warm, rainy nights in the spring. The Reptile and Amphibian Reporting Program (RAARP)<sup>15</sup>, provides important baseline data for species in need of protection.

**C. Recommendations for Wetlands and Vernal Pools**

- Re-evaluate the Memorial School Wetland for Prime Wetland Status.
- Protect existing wetlands and surface waters by amending the Wetlands Ordinance to increase the 50' buffer from the edge of the wetland or surface water. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources.
- Coordinate with NH Fish and Game Department to host a Vernal Pool Workshop in Town or in concert with the Town of Hudson.
- Establish documentation teams to complete a vernal pool inventory on all Town owned properties.
- Create a central repository for information from field identifications and professional identification for site and subdivision plans. Report the information to the New Hampshire Fish and Game Department for a wide range of planning purposes.
- Post signs prohibiting ATVs in all wetlands and the fine for a violation of this State law.

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<sup>15</sup> [www.wildlife.state.nh.us](http://www.wildlife.state.nh.us)