

TOWN OF LYME, NEW HAMPSHIRE

NATURAL RESOURCES INVENTORY

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INTRODUCTION AND OBJECTIVES

The Town of Lyme, New Hampshire contains approximately 55.0 square miles (35,215.8 acres) of total area which includes 1.62 square miles (1,033.8 acres) of inland waters, including 0.73 square miles (468.4 acres) of the Connecticut River according to GRANIT data. Out of 55 square miles of land, approximately 20.9 square miles are owned by a governmental agency or in some sort of conservation easement leaving roughly 35.0 square miles (22,400 acres) or 62.0% of the land in Lyme that is already developed or available for future growth or development. This project focuses on the entire Town of Lyme but was directed toward locations and sections of Town selected by the Lyme Conservation Commission. In 1790, the year of the first census, Lyme's population was 816 residents. In the 2005 census Lyme had a population of 1,704 residents, ranking 150th out of New Hampshire's incorporated cities and towns. (Economic & Labor Market Information Bureau 2006) Lyme has seen a steady population growth since 1950, but has experienced a shift in residential location within its borders as depicted by "A Town That Has Gone Downhill" (Goldthwait, 1927 – reprint 2006). The majority of Lyme's working population commutes to other NH towns or into nearby Vermont for employment (approximately 75% commute to work).

Lyme was one of many towns granted along the Connecticut River in 1761. Lyme takes its name from Old Lyme, Connecticut, which lies at the mouth of the Connecticut River. For many years the town's name was spelled as Lime in official state documents however this eventually was decreed a misspelling. From a natural resource perspective, the spelling as Lime seems appropriate as numerous higher pH bedrock areas of lime and calcareous inclusions provide unique habitat, soils, plants, and natural communities that are not ordinarily found in the granite, lower pH bedrock common to New Hampshire, i.e. The Granite State. Most of the original grantees were from Palmer and Brimfield in Massachusetts, or from Londonderry, New Hampshire. Lyme was one of the 16 towns involved in a protracted border dispute with the independent state of Vermont, before it was admitted to the Union in 1791 (Economic & Labor Market Information Bureau 2006).

The majority of Lyme's business currently is centered on small high tech companies. Lyme is very scenic with several outdoor recreation opportunities. Post Pond, Trout Pond, Pout Pond, Little Clark Pond, portions of Reservoir Pond and Mud Pond, many unnamed ponds, approximately 8.3 miles along the Connecticut River, several brooks, and vast forested lands, are some of the places available for people to enjoy. Hiking, swimming, fishing, boating (predominantly kayaking and canoeing), hunting, rock/ice climbing, bicycling, skiing (alpine and nordic), snowmobiling, snowshoeing, and scenic viewing opportunities exist. The Dartmouth Skiway, portions of the Appalachian Trail, a network of hiking trails, several scenic overviews, and public parks draw people to Lyme. Opportunities for wildlife viewing, particularly birds, and rare plant observation offer further unique natural resource assets to Lyme. Some lodging facilities operate in Lyme including two bed and breakfast inns, and a seasonal cabin resort. The New England Regional Office (a branch office) of The Appalachian Trail Conservancy (ATC), a nonprofit manager of the 2,175 mile long Appalachian Trail, is located in Lyme, far north of the trailhead at Springer Mountain in Georgia. Lyme has evolved into a 'commuter town' with a number of small businesses focused on services and has managed to retain its rural small town character. The combination of natural resources and small town character of Lyme is the number one draw for residents and visitors to the area.

Lyme contains a wide variety of ecological habitats due to the great diversity in its landscape and geological composition. A large diversity of habitat types and natural communities were observed, such as steep slopes, forested mountainsides and valleys,

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regenerating clear-cuts, riparian and various wetland complexes. Most of the land in Lyme that is not part of the residential and downtown areas is forested at this time, differing dramatically from the height of the Agricultural Era when approximately 85% of the land was cleared. Only a small acreage of land is currently farmed and limited permanent openings exist. Lyme's higher pH soils and rough terrain allow for a significant amount of oak, pine and beech stands, mixed with stands of bitternut hickory. There are also areas of wetlands where red maple, grey birch, balsam fir, and hemlock dominate.



Many ledges offer scenic overviews of portions of Lyme with spectacular views such as this overlook on Post Hill.

The largest river in Lyme is the Connecticut River, which flows along the western boundary of Town, abutting Thetford, Vermont. Hewes Brook, Grant Brook, Trout Brook, and Clay Brook are some of the named brooks that flow within Lyme where numerous unnamed brooks are also present. The majority of flowing waters are in the Connecticut River Watershed but a small area in the northeast flows into the Baker River and eventually the Merrimack River. Numerous wetland and riparian habitats occur along the Town's watercourses; they do not make up a large percentage of the land cover but are a significant component of the ecosystem within Lyme.

This project provides a base Natural Resource Inventory (NRI) with digital data that can be integrated with the existing Lyme GIS database, other studies, and future data. For example, newly digitized data from this project, such as permanent openings and dense softwood cover, is projected in NH State Plane Coordinates, NAD 83, and compatible with existing Lyme GIS data.

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Even on lower elevation rolling knolls, the Town's spectacular views make its hillsides potential building sites. Note the hot-air balloon near the center of this photograph, exhibiting yet another form of recreation and viewing perspective of Lyme.

One of the goals of this project is to provide inventory, management recommendations, and planning tools for the Town including incorporation into an update of the Master Plan. Another goal of the project is to integrate all existing data for Lyme, with new data created and field verified from this project, wetlands being a prime example. This produces a seamless comprehensive town-wide composite, and provides an educational and planning tool. It promotes conservation of riparian habitat, wetlands, and unique co-existing natural resource features throughout the town.

Measurable objectives of this project include the following:

1. Provide the Town of Lyme with new accurate, standardized coverages that will integrate with the Town's existing GIS.
2. Incorporate natural resources, scenic vistas, riparian buffers and other related elements for comprehensive planning.
3. Increase awareness of the values of the rural characteristics of the Town including scenic view areas, recreation areas, riparian buffer habitat, and wetlands with associated wildlife habitat through a public presentation and discussion.
4. Provide the Town with the ability to produce hardcopy printouts of this new data as requested or needed.
5. Provide the Town with the ability to continue to build upon and update the digital database.

METHODOLOGY

The Lyme Conservation Commission (LCC), including LCC chair, Lee Larson and Planning and Zoning Administrator, Victoria Davis assisted Watershed to Wildlife, Inc. (WTW) by providing general information, existing tax parcel maps, and additional sites for field verification and documentation within the Town. Lee Larson, Alice Schori, Mike Smith, and Alfred Balch joined WTW during field inventory work.

Field Work

Victoria Davis compiled all data collected from several Lyme residents who took the time to record information on natural resource features collected during their own field work and observations. Fieldwork included several years of song bird surveys and observations, rare plant documentation, black bear patterns and habitat observations, bobcat den site documentation, deer yards and migration pattern tracking, and other general wildlife habitat and movement observations. (See field observation documentation in Appendix IV.) This fieldwork was supported by a grant from the *Connecticut River Partnership Program*.

Fieldwork was conducted, first to get an overall view of Lyme and secondly with a focus on previously identified target areas. This work included inventories and assessments on several wetland complexes, beaver ponds, portions of the Connecticut River, forested habitats, rock outcrops, and agricultural uses of the land throughout the Town. Existing roads and trails were followed to access most field sites, while in some cases compass-based orienteering and topographic maps were used. One field day was dedicated to kayaking the entire Lyme reach of the Connecticut River for a unique perspective of natural resources from the water. GPS data were collected at points of interest including monuments, brook crossings, vernal pool locations, dense softwood stands, rare plant species, and unique or interesting habitats. In addition, photographs were taken with a digital camera along points of interest throughout the Town. During fieldwork sessions any unique habitat co-occurrences were noted and located on a map. Observed invasive plant species were also documented. Lyme residents volunteered by conducting winter documentation of wildlife movements taking advantage of the snow cover as a tracking medium. GPS points were collected as well as numerous photographs. All data collected from Lyme residents were drawn on a plot of the USGS topographic map or compiled as ArcView shape files (.shp) and were sent to WTW. WTW digitized the points or drawn lines into the GIS using ArcView as separate themes where appropriate and integrated the shape files into the main GIS Project.

All digital information belongs to Lyme and was delivered on CD-ROM(s) with hardcopy formats where appropriate.

Gather Existing Digital Data

Existing maps and data for the Town of Lyme were collected. The Town has some digital data including parcel data, commonly known as Tax Maps. The following table shows which maps were obtained, their scale, and the national mapping standard accuracy measure. Since many decisions are based on parcels as they relate to rivers, roads, trails, ponds, wetlands and other features, it is important to point out the working accuracies of these data sources. Combining these sources in various overlays provides an excellent overview and planning tool but does not replace the need to perform site-specific investigations for many subdivision requests. Please refer to the table below to better understand some of these accuracy issues.

Accuracies of Existing Maps

| Data | Source | Ratio | Scale | National Mapping Standard Accuracy |
|---|--|--------------|--------------|---|
| 1992, 1998, and 2003 Digital Orthophoto Quadrangle (DOQ) | GRANIT -.sid version | 1:5,000 | 1" = 416.7' | Acceptable accuracy within 12.48 feet |
| Topographic Maps (DRGs) | GRANIT | 1:24,000 | 1" = 2,000' | Acceptable accuracy within 60 feet |
| Roads and Trails, Power Lines, Railroads, Watershed Boundaries, Hydrology, and Conservation Lands | GRANIT | 1:24,000 | 1" = 2,000' | Acceptable accuracy within 60 feet |
| Soils | Natural Resource Conservation Service (NRCS) | 1:20,000 | 1" = 1,667' | Acceptable accuracy within 50 feet |
| Geology & Aquifers | USGS & NH –Dept. of Environ. Services | 1:24,000 | 1" = 2,000' | Acceptable accuracy within 60 feet |
| National Wetland Inventory | U.S. Fish and Wildlife Service | 1:24,000 | 1" = 2,000' | Acceptable accuracy within 60 feet |
| GPS Points | Garmin III plus | N/A | N/A | Generally within 30' but dependent upon satellite availability, PDOP, refraction, and topology. |

Compile Existing Data into Arcview and ArcGIS

GIS analyses were conducted by WTW. Digital data were gathered from GRANIT, Natural Resource Conservation Service (NRCS), NH-DES, the US Fish and Wildlife Service, and Lyme. These data include the following:

1. DOQs – Aerial photography
2. Topographic maps
3. Hydrology (rivers, streams, lakes and ponds)
4. Roads and trails
5. Power lines and rail roads
6. Conservation lands
7. National Wetlands Inventory
8. Soil Information
9. Aquifers, and Subwatersheds
10. Geology

Existing available maps were then integrated using ArcView and ArcGIS software. Using the 1998 and 1992 Digital Orthographic Quadrants (DOQ), USDA 2003 aerial photography,

topographic maps, and soils maps, features were digitized and overlaid onto a base map. These include: permanent openings, dense softwood stands, and field verified wetlands. Potentially significant wildlife habitat areas were noted.

Wetlands – Wetlands were reviewed and analyzed using the Digital Orthophoto Quadrangles (DOQs), National Wetland Inventory (NWI), and Natural Resource Conservation Service (NRCS) soils maps (displaying hydric soil map units). New Hampshire state laws require that three parameters be met for classification as a jurisdictional wetland: the presence of hydric soil (very poorly and poorly drained soils); sufficient hydrology; and hydrophytic¹ vegetation. When soils maps alone are used, they could potentially over-estimate the number of wetlands throughout the Town. This is particularly true given that up to 35% of a soil classification can be inclusions (for example, upland areas within NRCS hydric soil units or wetland areas within NRCS upland units). On the other hand, examining the NWI data alone would under-represent the number of wetlands, due to the U.S. Fish and Wildlife Service’s method of using aerial photography to identify wetlands. Open water, emergent, and scrub-shrub wetlands can readily be identified using aerial photography alone, but forested wetlands are often missed. Some types of wetland delineations require extensive fieldwork beyond the scope of this project. Despite differences and potential errors, data provided from these sources are important tools, and can be built-upon in future studies.

Farmland Soils – Prime farmland, farmland of statewide importance, and farmland of local importance throughout Lyme were determined using the NRCS soils map data. Data were displayed in ArcView and queried so only those soils classified as important farmland were displayed in the Town. Much of the prime farmland, farmland of statewide importance and some of the farmland of local importance are now used for crops (including hayland). Land used for pasture, woodland, recreation, or land uses other than urban, built-up or disturbed areas can still qualify as prime farmland, farmland of statewide importance, or farmland of local importance. The rationale for this approach is that land not already committed to irreversible (urban) uses is still available for cropping. Three categories of important farmlands have been described by the NRCS and they are:

1. Prime Farmland as defined by the U.S. Department of Agriculture is the land that is best suited for food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained yield of crops in an economic manner. These soils are generally flat and free of stones.
2. Farmland soils of statewide importance are lands, in addition to prime farmland, that are of statewide importance for the production of food, fiber, forage and oilseed crops. Criteria used to define this agricultural land were determined by State and local agencies in New Hampshire. The soils on the list are important to agriculture in New Hampshire, yet they exhibit some properties that exclude them from prime farmland. These soils can be farmed satisfactorily by greater inputs of fertilizer, soils amendments and erosion control practices than those necessary for prime agricultural farmland. They produce fair to good crop yields when managed properly.
3. Farmland of local importance is land, in addition to prime and statewide farmland, that is of local importance for the production of food, fiber, forage and oilseed crops. The criteria used to define this farmland were determined by local agencies in

¹ Hydrophytic vegetation are plants that grow in water or on a substrate that is at least partially deficient in oxygen as a result of excess water; plants typically found in and adapted to wet habitats.

Grafton County. Relative values from 100 to 0 were assigned to each of the county's soils based on each soil's potential to grow corn silage or grass-legume hay. The local agencies then determined that soils with relative value of 54 or greater would qualify as farmland of local importance.

Permanent Openings & Dense Softwoods – Permanent openings (areas dominated by grasses, forbs², brambles, or shrubs) were digitized from the DOQs with additional field verification. With the ability to utilize smaller map scale compilation and field verification, these data are more accurate than the coarser LandSat data often used in GRANIT analysis. The regions digitized include only those openings managed as permanent opening habitat. They do not include clear-cuts where the intent is for timber harvesting and regeneration for future logging. Dense softwood (or conifer) cover areas were also digitized from the DOQs. These areas have been recognized as significant wildlife habitat and could be deer and moose wintering areas. Steep slopes were determined using the NRCS soils maps. Data were displayed in ArcView and queried so only those soils map units with 15% slope and greater were displayed in ArcView.

Maps were created at the end of this project with the features described above. All information gathered, compiled, and mapped for this report was delivered to the Town of Lyme in digital format.

GIS Training Workshop and Installation of Project Data

A two-hour 'hands on' training session in accessing and viewing the data, and plotting maps was conducted on September, 2007 as part of this project for Conservation Commission, Select Board, and Planning Board members that had an interest in providing GIS access for the Town of Lyme. Future training was offered at a per diem rate.

Public Information Presentation

At the completion of the fieldwork, and GIS analyses for the natural resources, a public information meeting was held on September, 2007 to explain results from the NRI. The goal of this meeting is to increase public awareness of the importance of the natural resource inventory including; scenic and recreation areas, riparian habitat, dense softwood stands, wetlands, and associated wildlife habitat. In addition, work done for this project was displayed for public viewing at the meeting.

² A forb is a non-woody, broad-leaved plant other than a grass, especially one growing in a field or meadow.

RESULTS

Rivers, Streams and Ponds

Lyme contains about 1,033.8 acres of inland waters, including 8.3 miles bordering the Connecticut River. The Town's largest waterbody, (with the exception of the Connecticut River), is Post Pond, which is just over 114 acres and can be seen from Route 10. Reservoir Pond, most of which is in Dorchester, is nearly 162 acres. The ponds offer excellent open water wildlife habitat as well as good recreation potential. Many are stocked with fish by New Hampshire Fish and Game Department.



Pout Pond lies between Demmick Hill to its north and Flint Hill to the south.
It is nearly 40 acres and its outlet feeds into Grant Brook.

The Connecticut River is the largest river or stream in Lyme, flowing for 43,800 feet (8.3 miles) along the western boundary of Lyme. Being the largest river in New England, it was designated into the NH Rivers Management and Protection Program. It has also been designated an American Heritage River by President Clinton. Protecting its biological diversity and scenic value has been a priority for the states of NH and VT since the 1980's.

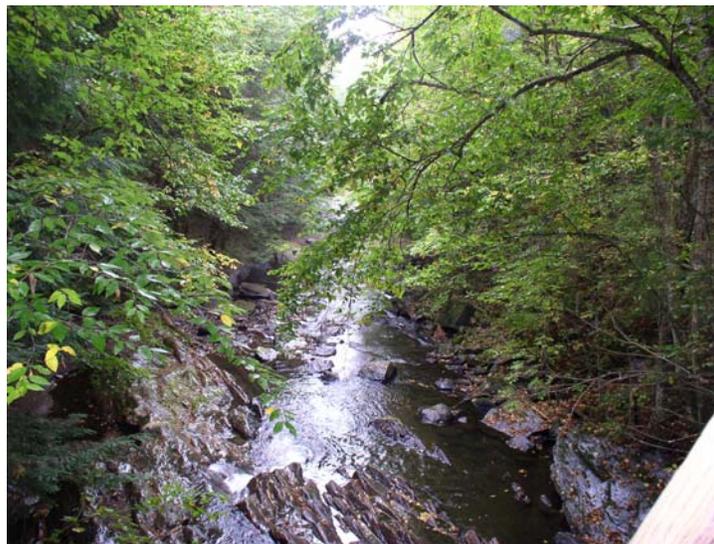
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Edgell Covered Bridge on Clay Brook at the confluence with the Connecticut River. Built in 1885, it is 132 feet long.

There are three main named stream systems. The first main complex consists of Trout Brook which originates on the west slope of Smarts Mountain and flows into Post Pond. The outflow of Post Pond is Clay Brook which flows north until its confluence with the Connecticut River. The second main tributary in Lyme is Grant Brook which originates in the eastern part of Town on the south side of Smarts Mountain, flows west and has its confluence with the CT River approximately 2.5 miles southwest of Lyme Center. Hewes Brook starts in the south-central portion of Town, flows WNW, and has its confluence with the Connecticut River near the SE corner of Town.

Lyme's running water system contains several minor named and unnamed perennial and intermittent streams that flow in all directions, north, south, east and west, dependent on topography and aspect, reflective of its rugged terrain. These cold water systems are generally pristine with little to no turbidity, and very picturesque. With a few exceptions which flow through farmlands, water bodies and streams are well buffered with excellent riparian corridors.



Grant Brook to the north of Lyme Hill. The Riparian Buffers here offer excellent habitat and shading for the stream.

Sub-Watersheds

The ability to view the landscape from a watershed or sub-watershed perspective offers an opportunity to approach natural resources in varying plant communities. Sub-watersheds do not stop at town boundaries, which highlights the fact that all things downstream are affected by land management upstream, particularly in the headwaters.

Due to its rugged terrain and multiple ridgelines, Lyme contains the headwaters of eight sub-watersheds broken down to the level 12 hydrologic unit code (HUC) listings. The farthest west are the Hanover-Piermont tributaries and the farthest east are the Canaan Street Lake sub-watershed and a small portion of the South Branch/Baker River sub-watershed. The Clay Brook and Jacobs Brook sub-watersheds are located in the northern portion of Lyme with Goose Pond and Connecticut mainstem-Ompompanoosuc River to White River sub-watersheds located in the southern portion of Lyme. Located in the center portion and the only sub-watershed completely contained within Lyme, is the Grant Brook sub-watershed. As with their associated tributaries and streams, these sub-watersheds flow in all directions, north, south, east, and west, dictated by their respective aspect of topography at the landscape level. Please refer to the attached Sub-watershed map at the end of this report.

Riparian Habitat and Flood Plains

With miles of streams, brooks, and rivers, Lyme contains a significant amount of excellent riparian habitat. There are approximately 82 miles of rivers and streams flowing through the Town and just over 1,793 acres of wetlands creating opportunities for large amounts of adjacent riparian habitat. Lyme contains numerous riparian habitat types such as floodplain forests, scrub-shrub, grasslands, and meadows, with forested zones in the majority.



This photograph illustrates riparian habitat providing edge, grassland, and aquatic habitat along with excellent cover for a multitude of wildlife species: along the Connecticut River.

Riparian lands are an extremely significant and beneficial habitat type. These habitats are the plant and wildlife communities that are adjacent to rivers, streams, and other waterbodies. The habitats directly abutting these waterbodies are unique because of the varying water regimes that exist and periodic natural disturbances through events such as flooding. They also provide an important transition zone between terrestrial and aquatic habitats. Riparian lands are rich in

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bird species; numerous songbirds, raptors, ducks, herons, and others are commonly found utilizing the scrub-shrub, grasslands, meadows, and forests that make up these areas. Aquatic and terrestrial mammals such as muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), river otter (*Lutra canadensis*) and other weasel species, moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), raccoons (*Procyon lotor*), bats, red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and many others also rely heavily upon these habitats. Riparian areas provide important birthing, mating, feeding, and resting sites for these species. They are also commonly used as travel corridors. In many cases wildlife species may not linger within these habitats, but they are a relatively well protected mode for travel linking various uplands.

The riparian forests in Lyme which contain floodplain, wetland, and upland forests, are dominated by white pine (*Pinus strobus*), red maple (*Acer rubrum*), yellow birch (*Betula lutea*), white birch (*Betula papyrifera*), eastern hemlock (*Tsuga Canadensis*), and sugar maple (*Acer saccharum*) with some silver maple (*Acer Saccharinum*) and American basswood (*Tilia americana*). Much of this area has been used for agriculture in the past with its rich soils and flat terraces, ideally suited for crops and irrigation.

A specific riparian habitat type is floodplain forests which are relatively narrow strips of land in much of Lyme. The largest floodplain areas are found along the Connecticut River. They are diverse and dynamic ecosystems affected by periodic, temporary flooding. Sediments are transported from upstream and deposited where water slows and spreads out across the floodplain terraces.



The photo on the left illustrates excellent riparian and forested flood plain habitat found in Lyme. On the right is a hay field, which has been used for years for agriculture. Buffer enhancement along the CT River would help minimize erosion and runoff.

Intact riparian areas are also essential for creating and maintaining a healthy aquatic system. Overhanging vegetation such as shrubs and trees provide important shade to aquatic habitats allowing them to maintain cooler water temperatures and adequate amounts of dissolved oxygen. The root systems of the riparian vegetation are also important for reducing the amount of erosion that the constant moving water and flooding situations could potentially cause. By reducing erosion, relative stream bank stabilization and sedimentation are controlled. Riparian habitats also slow and hold floodwaters reducing far reaching damage and can work as a filtration system removing nutrients and toxicants from the water. Riparian vegetation can also provide habitat structure to aquatic systems through dead or broken limbs (or sometimes whole trees) that fall into the water.

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For all these reasons and more, conserving riparian areas is a vital part of conserving Lyme's natural resources. In some areas along the Connecticut River, vegetated buffers could be re-established to help prevent erosion into the River. This also applies to smaller streams flowing through open fields, particularly farmland.



Lack of vegetative buffer has probably increased erosion problems along this section of the Connecticut River in Lyme. Buffer enhancement would help to minimize erosion.

Despite a few areas noted during field work where buffers were minimal, riparian habitats as a whole throughout Lyme are relatively intact with the exception of sections where the River Road is very close to the riverbank. Though good diverse habitat, some sections of forested buffers could be widened between the riverbank and agricultural fields to improve wildlife travel corridors and water quality.

Wetlands

In Lyme, National Wetland Inventory (NWI) GIS analyses indicate there are 1,563 acres of wetlands while NRCS hydric soils data indicates there are 1,745 acres. Through the use of NWI, NRCS hydric soils data, and field observations during this project, approximately 1,793 acres of wetlands are currently documented in Lyme. This makes up approximately 5.1% of the 35,216 acres of land in Town. Despite the relatively low percentage of wetlands in Lyme, there is a significant amount of diversity within the existing wetlands. NWI data describe numerous types of ponded, emergent, scrub-shrub, forested, and riverine wetlands. Lyme contains a significant amount of upland soils and a very large amount of steep slopes reducing the Town's potential for containing high amounts of large wetlands. These conditions make Lyme's existing wetlands a very important natural resource for the Town to work towards conserving.

Wetlands are an essential habitat type for the majority of plant and animal species in New Hampshire. As a whole, wetlands are extremely diverse depending on the hydrology, soils, topography, and climate of an area. There are four general types of wetlands, marsh, swamp,

bog, and fen, and numerous sub-types within each of these categories. This diversity extends into each individual wetland where numerous plant and wildlife species and hydric regimes can co-exist. This creates numerous edge habitats within and around wetlands which are frequently used by a great deal of wildlife species. It is estimated that riparian areas and wetlands are used by over 90% of the region's wildlife species and provide preferred habitat for over 40% of local species. For these reasons wetlands provide plentiful wildlife viewing and hunting opportunities.



This forested wetland in the floodplain of a small perennial stream is a wetland type observed in Lyme. It is a relatively small part of a large wetland complex within a riparian zone, which lies along an unnamed tributary flowing off Lyme Hill into Grant Brook eventually into the Connecticut River. This wetland represents the diversity commonly found within wetland complexes. This general area contains colonies of walking fern, yellow lady-slippers, wild ginseng, and unique plants yet to be documented. These sapric³ soils offer a unique habitat abutted by uplands for many diverse plant and wildlife species.

Vernal Pools – Unique often isolated and important wetland types are vernal pools. Vernal pools provide essential breeding habitat for certain amphibians and invertebrates such as wood frogs (*Rana sylvatica*), spring peepers (*Pseudacris crucifer*), spotted salamanders (*Ambystoma maculatum*), marbled salamanders (*A. opacum*), and fairy shrimp (*Branchinecta lynchi*). These creatures depend on vernal pools as breeding sites because they are only temporary water bodies preventing fish and other aquatic predators from taking up residency. Reptiles such as Blanding's turtles (*Emydoidea blandingi*) and spotted turtles (*Clemmys guttata*) also rely on vernal pools as an important feeding area in early spring. Vernal pools fill annually from precipitation, runoff, and rising groundwater, typically in the spring and fall. By mid-summer, however, these wetlands are typically dry, making them a dynamic system inhabitable to specifically adapted plant and wildlife species. For this reason many unique, rare, threatened, and endangered species are linked to this wetland type. They are common in New Hampshire, and the State recognizes their value as important habitat. Twelve potential vernal pools were documented in Lyme and future studies would undoubtedly document more.

³ Organic soil material that has a fiber content after rubbing of less than one sixth (by volume), excluding live roots.



The Wood frog, such as this mature adult observed in uplands abutting a wetland complex north of Cole Hill, is a vernal pool obligate species that can be documented during the early spring breeding season by observation of its unique 'quacking' call, egg masses, or small black tadpoles as well as 'morphed stage' adults.

Along with providing important plant, wildlife, and fish habitat, wetlands are also an important protector of water sources. Because they often contain hydrophytic vegetation and mucky hydric soils, wetlands are able to store significant amounts flood/run-off water, minimizing serious damage in times of high water. They are also important contributors to groundwater recharge. This ability to retain water allows wetlands to act as a filtration source. As moving water is slowed and stored in wetlands, suspended sediments and particles settle to the mucky substrate and plant roots are given a chance to absorb excess nutrients, toxicants, pollutants, and contaminants. These functions make wetlands an important source in maintaining the health of aquatic systems.



This vernal pool is located within a large area of uplands and it would be valuable to document species during the spring in the future. This site also contains deep organic histosol soil.

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Wetland areas are dynamic and constantly changing. The general trend without severe weather or other outside influences is for wetlands to slowly fill in over time. The process begins with open water and as time passes, submerged plants appear. Floating-leaved plants, such as water lilies, eventually follow. Then further emergent plants such as reeds, sedges, and wetland grasses begin to flourish. Shrubs such as high bush cranberry (*Viburnum trilobum*), sweet gale (*Myrica gale*), and bog rosemary (*Andromeda glaucophylla*) begin to appear and heaths such as leatherleaf (*Chamaedaphne calyculata*) and labrador tea (*Ledum groenlandicum*) surface among the shrubs. Trees such as red maple (*Acer rubrum*) and gray birch (*Betula populifolia*) subsequently emerge. This natural successional process is often referred to as lakefill.

On the other hand, there are several environmental and human-induced reasons for wetlands to actually increase in size. Some examples of these follow:

- Human development including damming or excavation such as the mining of gravel and sand could increase wetland sizes and often create new wetlands
- Severe weather changes – an increase in rain will increase the wetland area, whereas a drought may diminish the area
- The cyclic movements of beaver as hardwood saplings regenerate in early succession. In Lyme there is abundant sign of beaver activities in most of the wetland complexes, large waterbodies, and streams, especially in the Connecticut River.
- Human activities such as logging and landscape alteration can dredge out wetland areas or increase the amount of runoff into wetlands



Though beavers are not currently active in this section of this large wetland complex located in the southeastern portion of Lyme, their impact is long lasting. The amount of open water is now less than when the beavers were living in this pond, and lakefill is beginning to occur, which is allowing plant communities common to wet meadows to become dominant. Moose, deer, muskrat, bear, turtle, fox, coyote, and duck activity was observed in and around this area. There is an active beaver pond just downstream of this site offering new open water habitat but impacting the town road.



This high elevation (1,420') forested wetland contains a pit and mound sphagnum mat providing unique habitat and important functions of water retention/filtration to the surrounding area. Adjacent to this wetland on three sides is an abrupt conversion to large upland forest. Forested wetlands such as this one can be overlooked by NWI data and field observation is needed for their documentation.

The 1,793 acres of wetlands still may be a conservative number, under representing the actual amount of wetlands. This project was not designed to focus solely on wetlands; therefore complete field delineation of all the wetlands present in Lyme was not conducted. Twelve potential wetlands, some new areas and other extensions of existing NWI areas, were observed in the field where at least two of the required New Hampshire wetland parameters were met, but could not be included in the Town's wetlands acreage because they were not field delineated. Their locations are provided to the Town through map and GPS locations in order that future field verification and/or wetland delineation can be conducted if desired. Most of these potential wetlands are forested wetlands making them difficult to verify and delineate through mapping techniques alone. Hillside wetlands play an important ecological role because of the functions they provide for the waterbodies, wetlands, and communities that exist in the adjacent valleys below. They are important wetlands for Lyme to be aware of due to the potential of residential development occurring on the Town's hillsides. Future field determinations would be necessary to comprehensively delineate all wetlands in the town. These can be incorporated over time with additional field verification.



Hillside forested wetlands are an important natural resource in Lyme. Due to Lyme's mountainous topography and large areas of upland soils, large expansive wetland complexes are not common. Even small wetlands are still important sources of water retention, filtration and wildlife habitat. These wetlands are often found along the hillsides which are potential residential building sites and future field verification should be considered to assess and delineate their locations.

There are two studies completed recently that could be built upon and used as reference for future work:

1. *'A Comparative Evaluation of Five Wetlands for the Town of Lyme, NH'*, prepared by Plymouth College students- Tim DeGraff, and Dean Turner in cooperation with the University of New Hampshire Cooperative Extension, 1998. (Encompassing areas of Mud Pond, Town Forest, Clay Brook, Wilder Brook, and Trout Brook.)
2. *'Post Pond, Lyme, NH: Wetland Evaluation and Impact Assessment'*, prepared by Normandeau Associates, Inc., December 2006. (A detailed analysis of Post Pond water levels and the effects on its wetlands.)

These reports can be reviewed by contacting the Town Office and/or Library. The Post Pond study can also be viewed in this report - Appendix V.

Permanent Openings

As farming was found to be more productive in areas such as the mid-west, it became increasingly less popular in Northern New England. As a result, most of New Hampshire has experienced a loss of working farms. In the height of the Agricultural Era, 85% of Lyme was cleared land. Some portions of Lyme, particularly in the eastern portion, where rugged terrain and ledge areas are located, were never cleared for farmland. The western portion of Lyme with its flatter, richer riparian floodplains along the Connecticut River was extensively farmed. There are some remaining agricultural practices, dairy, equine, and beef, but on a smaller scale involving less of the potential farmland acreage than the Town has to offer. This overall loss of working farms has caused a significant decrease in the percentage of non-developed, permanent

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openings over the past 50 years, and New Hampshire is now encouraging landowners to create or maintain permanent openings as important wildlife habitat. For a review of current farming practices in Lyme, locations, and acreages, please refer to the attached table in Appendix II.

Permanent openings are dominated by grasses, forbs, wild flowers, brambles and fruiting shrubs. It is estimated that they provide required habitat for about 22% of New England's wildlife species and are seasonally important for nearly 70% of species. Insects are not accurately incorporated into these figures, but a large number of these species occupy or use openings. White-tailed deer, black bears, numerous rodent species, such as deer mice (*Peromyscus maniculatus*), meadow voles (*Microtus pennsylvanicus*), shrews (*Soricidae* spp), and woodchucks (*Marmota monax*), commonly feed on the vegetation present in these habitats, and carnivores from weasels to coyotes in turn feed on these species. Permanent openings are heavily used by bird species as feeding and nesting sites, specifically by the eastern bluebird (*Sialia sialis*), and northern harrier (*Circus cyaneus*), which are both species of concern in New Hampshire. They also create important edge habitat utilized by numerous species. Wherever an open area meets the forest, the area of transition will attract the largest diversity of species, both plant and animal. Generally, there will be species adapted to permanent openings, those adapted to forested habitat, and those who specialize in the transition zone area, who will frequent these edge habitats. For example, many bird species that feed in openings are known to frequently nest within the edge habitat because there is typically more structural diversity and cover.



With the decline of agricultural practices in Lyme and throughout all of New England, large open fields such as this one off River Road are in short supply. These permanent openings are a frequently utilized habitat type by a diversity of wildlife species and New Hampshire is encouraging landowners to create and maintain them.

Though the positives of former farming landscapes far outweigh the negatives, it is often overlooked that vestigial unused fencing can be prohibitive to some wildlife travel and occasionally cause harm to wildlife. When possible it is a good practice to remove non-functioning fencing, such as barb wire and woven sheep fence.

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Agricultural fields are not the only source of permanent openings in Lyme. One non-traditional area in Town that provides permanent opening habitat is the Dartmouth Skiway (about 150 acres). Also several landowners are routinely brush-hogging former pastureland and hayfields to maintain them as permanent openings. These areas provide the characteristics of an open area and are surrounded by forested and wetland habitats, making them attractive for numerous wildlife species.

Currently Lyme has about 2,560 acres of permanent openings which make up 7.3% of the Town's landscape. This percentage is less than, but close to New Hampshire's State average of 10% permanent openings. A total of 450 different openings were documented during this project ranging in size from less than $\frac{1}{4}$ of an acre to just over 90 acres. Diversity in sizes is a good feature to maintain in permanent openings because varying sizes are preferred by different species. For example, northern harriers (*Circus cyaneus*) prefer larger openings while feeding, yet snowshoe hare (*Lepus americanus*) are more likely to feed in smaller openings where cover is more readily available. There are other permanent openings throughout Lyme that are too small to be mapped into the Town's overall acreage of permanent openings, such as lawns near homes and seeded woods roads. These openings, especially those in more isolated parts of Town, are still important habitat and help maintain Lyme's plant and wildlife diversity. A goal to retain, and ideally increase, permanent openings would be beneficial to the diversity of wildlife and vegetation throughout the Town.



Many former hayfields such as this one are no longer cropped each year and will quickly revert back to shrubs, saplings, and eventually forest if not cut.

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There are miles of old stonewall – evidence of former pasturelands in Lyme that have reverted back to forestland.



Remnants of an old mill located near Trout Pond.
(Photo provided by John Skelly)

Forested Lands

Roughly 90% of the 35,215.8 acres of land in Lyme is forested lands. Common tree species that make up these forested lands are white pine (*Pinus strobes*), eastern hemlock, red oak (*Quercus rubra*), yellow birch, white birch (*Betula papyrifera*), red maple, sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), poplar (*Populus* spp.), red spruce (*Picea rubens*), American basswood (*Tilia americana*), and balsam fir (*Abies balsamea*).

Forested areas include hardwood stands, softwood stands, and mixed hardwood and softwood stands. Approximately 5,773 acres of forested land, approximately 16.4% of Lyme's land mass, are dense softwood stands. These stands range in size from around an acre to nearly 700 acres. The largest softwood stand is in the northeastern portion of the town and continues into neighboring town of Dorchester. Most of the stands are isolated, but a few are connected allowing for excellent winter cover and travel corridors for wildlife. Dense softwood stands are an important habitat type to various wildlife species. They provide important cover and foraging habitat during harsh winter conditions by reducing snow accumulations and wind speeds. Therefore animals such as red squirrels (*Tamiasciurus hudsonicus*), snowshoe hare, ruffed grouse (*Bonasa umbellus*), and white-tailed deer are often found utilizing them during the winter months. White-tailed deer are not well adapted for traveling in and dealing with deep snow conditions and hence require dense softwood stands in order to survive New Hampshire's harsher winters. When they congregate in these stands they are referred to as winter deer yards. For the stand to be considered a deer yard two basic elements must be met: (1) A core area is identified by concentrations of dense softwoods, and; (2) Mixed hardwood and softwoods adjacent to, or within the core area will provide accessible forage. In 1985 the Lyme Conservation Commission mapped out 22 potential deer yards in the town, ranging in size 11 to 267 acres in size. Evidence of recently used deer yard areas was found during fieldwork for this project and it is a goal of the Lyme CC to further document existing deer yards. Deer yards cover only about 3% of the land base in New Hampshire so their identification and management is an important part of conserving the entire State's natural resources.



This grove of eastern hemlock was crisscrossed with a network of wildlife trails. This tree in the stand has been used by pileated woodpeckers foraging for insects.

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Black bear 'marking bites' on a red pine

Porcupine feeding marks on this yellow birch

(Photos provided by the Lyme Conservation Commission)

Lyme has several species of trees that are considered important because of their mast production. These include red oak, bitternut hickory (*Carya cordiformis*), beech, maple, hemlock, cherry, junberries (*Amelanchier* spp), and pine. Mast are the fruits produced by woody stemmed plants and can be either hard (seeds and nuts) or soft (fruits and berries). Wildlife species from nuthatches (*Sitta* spp.), chickadees (*Parus* spp.), squirrels, and eastern chipmunks (*Tamias striatus*) to white-tailed deer, black bears, turkeys (*Meleagris gallopavo*), and wood ducks (*Aix sponsa*) rely heavily on mast as a source of feed. Hard mast produced by oaks, hickory, beech, and some shrubs such as beaked hazelnut (*Corylus cornuta*), is considered extremely important because it is able to persist for a longer amount of time than soft mast and therefore is accessible to wildlife during times of the year when other food sources are limited. Several areas of oak, hickory, and beech stands have been located and mapped throughout town, most of which are found in the middle and western portion of Lyme. During field inventory several butternut trees (*Juglans cinerea*) were observed scattered throughout Town. Unfortunately, most were dead or dying. The Butternut is seriously threatened by an introduced canker disease, caused by the fungus *Sirococcus clavigenti-juglandacearum*.

Within the forestland there are special habitat compositions that offer various advantages to specific species. In Lyme, studies focused on black bear and whitetail deer have located and mapped well used trails, den sites, feeding sites, and even bear wallows. Another component identified within the forest is potential deer wintering areas and deeryards. Further observed areas are unique bobcat and coyote den sites. These studies have been conducted over several years by Lyme residents who are specialists in their fields.



Large trees such as the one shown on the left are important mast producers. The center photo shows a red pine which has been used as a marking tree for black bears for years, and the photo to the right shows bear claw marks on a beech tree as bear climb the tree to forage for beech nuts in the fall.

Bedrock Geology

The familiar pattern of a general southwest to northeast direction of the receding glaciers of over 12,000 years ago can be seen in Lyme as well as most all of New England. This process formed the rivers and lakes that we see today. We often forget that the soil variations found throughout a given area, such as in the Town of Lyme, exist because of the parent material (or bedrock) that lies beneath the surface and the deposits of materials left by the retreating glaciers. These parent materials influence the land formations, hydrology, and vegetation occurring above them. Ledge and rock outcrops are very common, with several sheer drops such as Holts Ledge, Winslow Ledge, Lamberts Ridge, Smarts Mountain, areas on Bear Hill and Post Hill, and numerous other unnamed ledge drops. These formations provide very unique wildlife and plant habitats such as bear and bobcat den sites and peregrine falcon nesting sites.

One type of rock formation that was sculpted by the glacial erosion is located in western central Lyme approximately one half mile east of the Connecticut River and one half mile west of Post Hill. This is known as a sheepback or roche moutonnée due to its elongated, rounded, asymmetrical, bedrock knob shape with a gentle slope on its up-glacier side and a steep to vertical face on the down-glacier side. In this process, the glacier abrades the smooth slope that it flows along, while rock is torn loose from the downstream side and carried away in ice, a process known as 'plucking.' Rock on this side is fractured by combinations of forces due to water, ice in rock cracks, and structural stresses (Reference.com, 2007). During fieldwork, two potential vernal pools were identified on the gentle slope or 'up-glacial side.' There are surficial bedrock formations assigned with codes such as Oalx (Bimodal volcanic rocks), Op (Partridge Formation- sulfidic-graphitic slate or schist), DI (Iron bond mountain formation- interbedded gray phyllite, in places feldspathic metasandstone), Sfc (calcite-ankerite-muscovite granofels and interbedded gray metapelite), Db2b (Granite- Bethlehem Granodiorite), Oo2-3A (Granodiorite to tonalite), and Oo1b (Granite-Biotite granite). Although the mapping was done at a large scale and is coarse, it is available for download from the GRANIT data system. Further details about NH geology are available through the State Geologist – www.des.nh.state.us/geology/ and www.nhgeology.org.



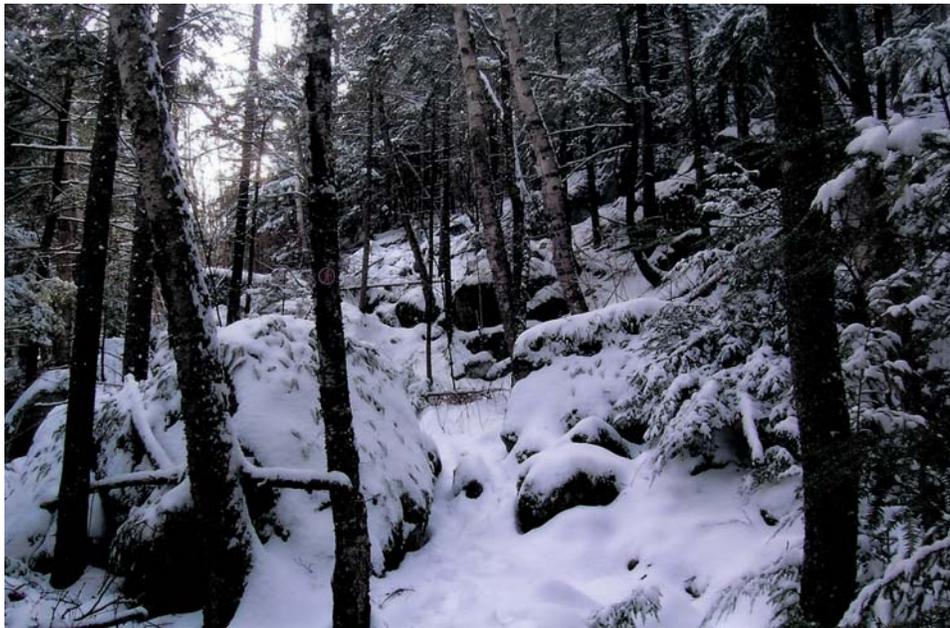
This fractured ledge provides unique plant habitat and den sites for animals.

There are areas in New Hampshire where bedrock contains traces of calcium deposits and calcareous seeps occur, causing higher pH soil conditions and unique habitat for rare plants. They are generally inclusions and not the majority of bedrock found in New Hampshire. There are some unique geological bedrock codes in Lyme with inclusions of calcites and limestone within the bedrock that provide a higher pH in the bedrock, soils, and water in these areas.

Lyme has a mesic temperature regime indicating that the mean annual temperature ranges from 45 to 52 degrees Fahrenheit – the frost free season ranges from 105 to 180 days. It is important to consider that some of the ridge tops in Lyme approach conditions found in the frigid temperature regime where mean annual air temperature ranges from 41 to 46 degrees F and the frost-free growing season ranges from 90 to 160 days. Temperature differentials can be roughly calculated to change 5.8 degrees Fahrenheit for every 1000 feet of elevation change (colder the higher the elevation and warmer the lower elevation). These varying temperature regimes in conjunction with the unique bedrock formations can support conditions for rare plant communities and habitat for rare and endangered plant and animal species in New Hampshire.



Some of the erratics found in Lyme are impressive in size.



Numerous nooks and crannies are offered beneath snow covered boulder fields.
(Photo provided by the Lyme Conservation Commission)

Soils

The nature of soil has a profound effect on plant growth. Whether it is rich with organic material, very poorly drained, or sandy, will affect the type of vegetation adapted to grow in those conditions. Scientists can learn much about the soil type by examining the vegetation. At the same time, examining the soil will predict the type of vegetation that can grow in the area. Because soils affect the vegetation that will grow in an area they also influence the habitat types and therefore the wildlife species that will occur in particular areas. As a result, understanding soil conditions and characteristics can be excellent indicators of critical areas such as wetlands,

agricultural lands, forestlands, and wildlife habitat. In descriptions of soil types, the NRCS evaluates soil types according to their capacity for agriculture, woodland, community development, recreation, and wildlife habitat.

Soil information is critical in making sound land use decisions. By examining soil types and morphology, many predictions can be made regarding forest management, erosion potential, and development possibilities. Certain soils are better suited for certain land uses such as agriculture or residential development. For example, residential development should be located away from areas with unstable soil conditions such as high water tables, and slow percolation rates due to constraints for building foundations and septic system placement.

Lyme is made up of a significantly large amount of well to excessively drained sandy soils. These soils tend to be forested with vegetation well adapted for drier conditions such as pines, oaks, and beech trees.

Several factors exert a major influence on soil development. These include climate, time, topography, parent material, biota, and human activities. Studying soil can also lead to an understanding of how that soil was formed. For example, a great deal of Occum fine sandy loam, occasionally flooded, and Hadley silt loam, frequently flooded soils are found along the Connecticut River in Lyme. These soils are very deep, well drained loamy soils formed in alluvial sediments (deposited by water). They are nearly level soils on flood plains, subject to common flooding.

Throughout the forested areas of Lyme, spodosol soils continue to develop under the organic litter. These soils take many years to develop identifiable horizons and typically have an albic or "E" horizon just under the organic or "O" horizon. The "E" horizon is generally 1 to 3 inches thick and is described as looking similar to wood ash. The phenomenon is caused by the actions of water and acidic decomposition or fallen needles and leaves stripping off the normal coatings of clay and or iron oxides. The spodosols are relatively young soils.

A unique soil formation found in the Connecticut River Valley and in Lyme, is named varves. In this area, they are most often associated with the ancient glacial Lake Hitchcock, formed during the Pleistocene ice ages. A varve is a layer of sediment deposited annually from warm summer melt flows and settling to the bottom of the lake during the cooler winter months. Commonly several varves or layers can be found on top of each other indicating several years of formation. These soils are important chronological measuring tools and indicators of former climate change trends. Due to their structure, varves are often considered unstable soils for development uses.

A parameter sometimes overlooked in soils is that of pH. New Hampshire soils are commonly slightly acidic due to the influence of granite, referencing the term 'The Granite State.' There are several areas in Lyme where there are calcareous soils with 'sweeter' higher pH due to small pockets of calcium within the granite bedrock. They tend to be near wet areas, often seeps. Such areas often offer opportunities for unique habitat and rare (at least to northern NH) plant life. Unusual or rare plant species in an area sometimes suggests higher pH soils. Many of the rare plant and plant communities located in Lyme are in these higher pH soils.

ArcView compatible shape files of the NRCS soils map and the USGS geologic bedrock of the Town of Lyme have been included with the digital data. It is important to recognize that these delineations are limited in detail as they are Category II and III Levels derived from large grid fieldwork done in 1983 and USGS Quadrant maps at 1:24,000 scales. These soil delineations are also limited for site-specific use in that minimum area polygons are three acres in size and can contain up to 35% inclusions of various soils and slopes.

Farmland



An old abandoned horse drawn mower left beside the Connecticut River from an era gone by.

As stated in the methodology section, prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It is land that still has the potential to serve agricultural uses and can be cultivated land, pasture, woodland, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well-managed soil to produce the highest sustainable yields with minimal inputs of resources while at the same time generating the least possible damage to the environment. Farmlands that hold state and local importance may not be as ideal for producing the highest possible sustainable yield as prime farmlands, but these soil types have been determined to be of agricultural importance on a more localized scale. Along with the factors outlined in the methodology section another factor that influences farmland is the presence of an abundant volume of moving water. The fact that water reacts much more slowly than air to temperature changes provides a mini-climate within the floodplain area, offering cooler temperatures in the extreme heat of summer and warmer temperatures (including the formation of fog) in the cooler fall temperatures extending the growing season.

Out of the 35,215.8 acres of land that make up the town of Lyme 1,423 acres (4.0%) of land have been classified as USDA prime farmland, 1,698 acres (4.8%) have been classified as farmland soils of statewide importance, and 4,939 acres (14.0%) have been classified as farmland soils of local importance. Most of the soils that make up these three categories are located in the western portion of the Town, particularly parallel to the Connecticut River and in the central area of Town. Some of this prime farmland has been lost, but most has not been developed yet.

Lyme contains a limited amount of soils that are conducive for farming when looking at the national level of designated prime farmlands. A significant amount of these lands however are not currently being used for agricultural purposes. Housing developments could encroach on some of Lyme's prime and state farmlands.

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Locally important farmland soils are fairly abundant in Lyme, but remain in jeopardy, as easily accessible upland soils tend to be flatter and more manageable for building. These lands could potentially see further losses in the future if land use is not managed.



Lyme contains some gentle sloped prime farmland for crops, such as hay in the center of the photograph.

The western portion of Lyme has a high potential for agricultural land use with 22.9% of the land being designated important farmland at the national, state, and local scales. Decision makers must be aware of the long term implications of various land use options for the production of food, fiber, forage and oilseed crop, and the trade-offs involved. Actions that put high quality farmland in irreversible uses should be initiated only if those actions are clearly in the public interest.



One of the last remaining working dairy farms in Lyme as viewed from the Connecticut River.



Red fox are one of many species that benefit from the woodland and open field habitat associated with farmland. (Photo provided by John Skelly)

Stratified-Drift Aquifers

Groundwater is a critical natural resource for the State of New Hampshire. Approximately 98% of public water systems rely on groundwater. There are three types of groundwater aquifers: Stratified-drift, till, and bedrock. The basic difference is that stratified drift and till aquifers are composed of unconsolidated glacial deposits (loose earth materials), while bedrock aquifers are fractured rock. In stratified drift aquifers, the materials are sorted sand and gravel. In till aquifers, the material is a gravel, sand, silt and clay mixture. In bedrock aquifers, the material is rock with fractures.

Stratified-drift aquifers are an important source of groundwater for commercial, industrial, domestic, and public-water supplies in the State of New Hampshire. They typically are the most productive sources of groundwater and therefore the most high yielding public water supply wells tap these aquifers. Stratified-drift or 'overburden' aquifers are most directly influenced by surface waters and land-use activities. They are therefore, perhaps most susceptible to contamination. Though the Town of Lyme does not have a municipal drinking water system, it is possible that the need could arise in the future. Approximately 14% of land surface in the State is underlain with stratified-drift aquifers. In Lyme most of the aquifers are in the western portion of Town.

Approximately 3,052 acres or about 8.7% of the area in Lyme is underlain with stratified-drift aquifers, below the State average. The majority lie along the Connecticut River, Clay Brook, Grant Brook, and Hewes Brook. In Lyme the large majority of the aquifers are made up of sand material with a very small amount made up of glacial till material. Stratified drift aquifers consisting of sand material tend to be more porous and have a higher potential for quicker transmissivity and recharge. Lyme is fortunate to have these potential drinking water

sources. These aquifers should be protected to insure their future quality and availability for Lyme.



Hewes Brook at its confluence with the Connecticut River; part of the aquifer system in Lyme.

Slope

Slope is an important component of an area's landform and influences the plants and animals living there. Soils tend to be shallower on steeper slopes, the volume and velocity of surface water runoff is higher, and the erosion potential is greater than on flatter areas. These conditions create a unique habitat where in some cases plants and wildlife have special adaptations for dealing with the limitations associated with steep slopes.

Slopes provide opportunities for panoramic views and for this reason tend to be sought out areas for residential development. Slope has numerous limitations for building such as structural problems and a greater chance of erosion. The consequences of erosion are loss of soil resulting in sedimentation of surface waters and loss of the productive capacity of the land. Slope is traditionally expressed as a percent and represents the amount of rise or fall in feet for a given horizontal distance. For example a 15% slope means that for a 100 foot horizontal distance, the rise or fall in height is 15 feet. As slope becomes steeper the expenses associated with building increase. In general, slopes between 15% and 25% are considered areas where development would be restrictive and slopes greater than 25% are considered too steep to provide adequate sites for structures such as roads, homes, and septic systems.

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Steep hillsides and rock/ledge faces are common occurrences throughout Lyme's landscape. These areas create unique habitats for plants and wildlife along with potentially beautiful view sheds. The photo on the right is taken from Post Hill looking towards Post Pond.



Bobcat tracks and den sites associated with steep slopes and rock/ledge outcrops were documented in the Lily Pond area by the Lyme Conservation Commission. (Photos provided by the Lyme Conservation Commission)

The NRCS soil data incorporates slope for each soil type. This data was used to determine areas in Lyme with slopes equal to and greater than 15%. Using this method, approximately 23,144 acres or 65.7% of the land in Lyme contains slopes that are over 15%. Of that 9,047 acres or about 25.7% of Lyme land mass contains slopes over 25%. These are high percentages for a town and are a unique feature of Lyme. These areas provide habitat for plant and wildlife species such as peregrine falcons (*Falco peregrinus*). They also contribute to the Town's tourism industry, and create numerous hiking, rock and ice climbing opportunities, as well as downhill skiing at the Dartmouth Skiway.

Rare Species and Exemplary Natural Communities

The Town of Lyme has many occurrences of rare species and communities documented within its borders. Through numerous studies, there are additional rare species and communities beyond those listed by the Natural Heritage Bureau (NHB), the State agency that houses all reported occurrences. Just during the relatively brief fieldwork time dedicated to this portion of the project, several additional occurrences were recorded throughout Lyme.

Plants that require rich soils such as Maidenhair fern, wild ginseng, blue cohosh, Goldie's fern, dogbane, and many more, are common in Lyme. With its rich soils and diverse habitats, it would be well worth the effort for the Town to consider conducting a comprehensive botanical search in the future. One study that could be built upon is '*Rare, Threatened and Endangered Plants and Animals and Exemplary Natural Communities in the Town of Lyme,*' by Richard G. Jones, April 2002, see References in this report.



Numerous sites of walking fern (*Asplenium rhizophyllum*) were documented in several areas of Lyme during this study.



Rare plant species such as the Stiff Gentian (*Gentiana quinquefolia*) were recorded in Lyme.



Yellow Ladyslippers (*Cypripedium pubescens*) documented in Lyme. (Photo provided by the Lyme Conservation Commission)

Aquatic species are often poorly understood or recognized by many people but play an important role in the ecosystem. Some of the best remaining habitat for some mussel species such as the federally endangered Dwarf Wedge Mussel (*Alasmidonta heterodon*), are found in the Connecticut River, particularly in the northern upper reaches. Though recent studies have not found the Dwarf Wedge Mussel in Lyme (Nedeau, 2006), the species is listed as “Historic” and has been documented in the past. Several other mussel species and snails have been documented in Lyme and it maybe possible that a Dwarf Wedge Mussel population exists or could exist in the future.



Aquatic species such as these freshwater snails depend on specialized habitat like the Connecticut River in Lyme. Similar to plants there are numerous species found in NH, some are common and plentiful, others are threatened or endangered, while others are invasive species.

Some NHB listed species within the animal kingdom found in Lyme are the common loon (*Gavia immer*), peregrine falcon (*Falco peregrinus anatum*), and wood turtle (*Glyptemys insculpta*). There are also bobcats (*Felis rufus*) in Lyme, given full protection statewide in New Hampshire.

Lyme residents Richard & Deborah Holmes and John Skelly have documented many species of birds. The information they have gathered over many years is interesting and informative and can be viewed in Appendix IV.



Sometimes the benefits of a pond are forgotten during the winter months when the surface is locked in ice and snow covered, but there still remains an abundance of activity during this time of the year. Beaver, muskrats, mink, river otter, fish, and some aquatic insects do not hibernate and remain active, though unseen, in ponds, streams, and rivers.

Often red fox, gray fox, coyotes and other animals change their travel routes taking advantage of the snow and ice surface. A diversity of wildlife sign can be found along the edge where water, land, and ice meet offering a dynamic blending of habitats only found during the winter months.

Lily Pond in the winter of 2006-2007.
(Photo provided by the Lyme Conservation Commission)

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New Hampshire is home to more than 500 species of vertebrate animals. Many of these animals live in Lyme and the surrounding towns. The number would be considerably larger if a complete list of invertebrates (insects, crustaceans, clams and snails) were included. About 75 percent are nongame wildlife species – not hunted, fished or trapped. Twenty-one species are endangered and thirteen are threatened in the state. The New Hampshire Fish and Game Department maintains a list of Endangered or Threatened animal species in New Hampshire, which is shown on the next page. Minimal information is available relative to their occurrence in Lyme, but their habitats, when identified should be protected.



Peregrine Falcon chicks on Holts Ledge. (Photo courtesy of Lee Hansche via Chris Martin – Audubon Society of New Hampshire)

With its large area of mostly unfragmented forestland and diverse habitat types, and unique bedrock geology, Lyme has potential for containing many rare and endangered plant and wildlife species, beyond those currently recorded.

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NH Natural Heritage Bureau Listing for Lyme



| Town Flag | Species or Community Name | Listed? | | # reported last 20 | |
|--|--|---------|-------|--------------------|-------|
| | | Federal | State | Town | State |
| Lyme | | | | | |
| Natural Communities - Terrestrial | | | | | |
| ** | Circumneutral rocky ridge | - | - | 1 | 2 |
| *** | Montane circumneutral cliff | - | - | 2 | 16 |
| ** | Red oak - ironwood - Pennsylvania sedge woodland | - | - | 1 | 10 |
| ** | Rich mesic forest | - | - | 3 | 49 |
| Natural Communities - Palustrine | | | | | |
| ** | Circumneutral seepage swamp | - | - | 1 | 3 |
| Plants | | | | | |
| ** | Beaked Sanicle (<i>Sanicula trifoliata</i>) | - | E | 1 | 13 |
| | Canadian Germander (<i>Teucrium canadense</i> var. <i>virginicum</i>) | - | T | Historical | 11 |
| *** | Creeping Juniper (<i>Juniperus horizontalis</i>) | - | E | 2 | 2 |
| * | Ebony Sedge (<i>Carex eburnea</i>) | - | E | 1 | 1 |
| | Fringed Gentian (<i>Gentianopsis crinita</i>) | - | T | Historical | 25 |
| *** | Ginseng (<i>Panax quinquefolius</i>) | - | T | 4 | 59 |
| ** | Goldie's Fern (<i>Dryopteris goldiana</i>) | - | T | 2 | 40 |
| ** | Hackberry (<i>Celtis occidentalis</i>) | - | T | 1 | 15 |
| | Knotty Pondweed (<i>Potamogeton nodosus</i>) | - | E | Historical | 15 |
| ** | Large Yellow Lady's Slipper (<i>Cypripedium parviflorum</i> var. <i>pubescens</i>) | - | T | 1 | 17 |
| | Long-fruited Anemone (<i>Anemone cylindrica</i>) | - | E | Historical | 11 |
| | Purple Clematis (<i>Clematis occidentalis</i>) | - | T | Historical | 2 |
| | Ram's-head Lady's Slipper (<i>Cypripedium arietinum</i>) | - | E | Historical | 14 |
| | River Bank Quillwort (<i>Isoetes riparia</i>) | - | E | Historical | 13 |
| | Sago Pondweed (<i>Stuckenia pectinata</i>) | - | E | Historical | 7 |
| ** | Scirpus-like Sedge (<i>Carex scirpoidea</i>) | - | T | 2 | 11 |
| | Sessile-fruited Arrowhead (<i>Sagittaria rigida</i>) | - | T | Historical | 7 |
| *** | Showy Lady's Slipper (<i>Cypripedium reginae</i>) | - | E | 1 | 7 |
| * | Slender Cliffbrake (<i>Cryptogramma stelleri</i>) | - | T | 1 | 6 |
| * | Smooth Woodsia (<i>Woodsia glabella</i>) | - | E | 1 | 3 |
| *** | Snowy Aster (<i>Oligoneuron album</i>) | - | E | 2 | 2 |
| *** | Squirrel Corn (<i>Dicentra canadensis</i>) | - | T | 1 | 35 |
| ** | Stickseed (<i>Hackelia virginiana</i>) | - | T | 1 | 18 |
| | Thin-leaved Alpine Pondweed (<i>Potamogeton alpinus</i>) | - | E | Historical | 8 |
| | Tiny Cowwily (<i>Nuphar microphylla</i>) | - | E | Historical | 1 |
| | Vasey's Pondweed (<i>Potamogeton vaseyi</i>) | - | E | Historical | 9 |
| *** | Walking Fern (<i>Asplenium rhizophyllum</i>) | - | E | 1 | 6 |
| | Water Stargrass (<i>Heteranthera dubia</i>) | - | E | Historical | 3 |
| | Yellow Lady's Slipper (<i>Cypripedium parviflorum</i> var. <i>makasin</i>) | - | E | Historical | 10 |
| Vertebrates - Birds | | | | | |
| ** | Common Loon (<i>Gavia immer</i>) | - | T | 1 | 225 |
| *** | Peregrine Falcon (<i>Falco peregrinus anatum</i>) | M | E | 1 | 11 |
| Vertebrates - Reptiles | | | | | |
| ** | Wood Turtle (<i>Glyptemys insculpta</i>) | - | - | 1 | 110 |

Listed? E = Endangered T = Threatened W = Special concern (watch list) M = Monitored
Flags **** = Highest importance These flags are based on a combination of (1) how rare the species or community is and
 *** = Extremely high importance (2) how large or healthy its examples are in that town. Please contact the Natural
 ** = Very high importance Heritage Bureau at (603) 271-2214 to learn more about approaches to setting priorities.
 * = High importance

Natural Resource Inventory for Lyme, NH

Endangered and Threatened Wildlife in New Hampshire

ENDANGERED

| Common Name | Scientific Name |
|----------------------------|-----------------------------------|
| MAMMALS | |
| Canada lynx | <i>Lynx canadensis</i> |
| Small-footed bat | <i>Myotis leibii</i> |
| BIRDS | |
| Pied-billed grebe | <i>Podilymbus podiceps</i> |
| Bald eagle* | <i>Haliaeetus leucocephalus</i> |
| Northern harrier | <i>Circus cyaneus</i> |
| Golden eagle | <i>Aquila chrysaetos</i> |
| Peregrine falcon | <i>Falco peregrinus</i> |
| Piping plover* | <i>Charadrius melodus</i> |
| Upland sandpiper | <i>Bartramia longicauda</i> |
| Roseate tern* | <i>Sterna dougallii</i> |
| Common tern | <i>Sterna hirundo</i> |
| Least tern | <i>Sterna antillarum</i> |
| Purple martin | <i>Progne subis</i> |
| Sedge wren | <i>Cistothorus platensis</i> |
| FISH | |
| Sunapee trout | <i>Salvelinus alpinus</i> |
| Shortnose sturgeon* | <i>Acipenser brevirostrum</i> |
| REPTILES | |
| Timber rattlesnake | <i>Crotalus horridus</i> |
| AMPHIBIANS | |
| Marbled salamander | <i>Ambystoma opacum</i> |
| INVERTEBRATES | |
| Dwarf wedge mussel | <i>Alasmidonta heterodon</i> |
| Brook floater | <i>Alasmidonta varicose</i> |
| Frosted elfin butterfly | <i>Incisalia irus</i> |
| Karner blue butterfly* | <i>Lycaeides Melissa samuelis</i> |
| Persius dusky wing skipper | <i>Erynnis persius persius</i> |
| Ringed bog hauer dragonfly | <i>Williamsonia lintneri</i> |

- = federally Threatened or Endangered

THREATENED

| Common Name | Scientific Name |
|--------------------|--------------------------|
| MAMMALS | |
| Pine marten | <i>Martes Americana</i> |
| BIRDS | |
| Common loon | <i>Gavia immer</i> |
| Osprey | <i>Pandion haliaetus</i> |

Natural Resource Inventory for Lyme, NH

| Common Name | Scientific Name |
|--------------------------------|---------------------------------|
| Cooper's hawk | <i>Accipiter cooperii</i> |
| Arctic tern | <i>Sterna paradisaea</i> |
| Common nighthawk | <i>Chordeiles minor</i> |
| Three-toed woodpecker | <i>Picooides tridactylus</i> |
| Grasshopper sparrow | <i>Ammodramus savannarum</i> |
| REPTILES | |
| Eastern hognose snake | <i>Heterodon platyhinus</i> |
| INVERTEBRATES | |
| Pine pinion moth | <i>Lithophane lepida lepida</i> |
| Pine barrens Zanclognatha moth | <i>Zanclognatha Martha</i> |
| Cobblestone tiger beetle | <i>Cicindela marginipennis</i> |

To learn more about threatened or endangered species or unique communities, contact the New Hampshire Natural Heritage Bureau office of NH Division of Forest and Lands for plant species (271-3623 website – www.dred.state.nh.us/divisions/forestandlands/bureaus/naturalheritage/index.htm), or the Nongame and Endangered Species Program of the NH Fish and Game Department (271-2461 website – www.wildlife.state.nh.us/Wildlife/nongame_and_endangered_wildlife.htm).



This moist, rich, land containing a diversity of plant species, mostly shaded with rock outcrop, is unique habitat with a high potential for rare or endangered species to exist. Additional findings are being documented to NH Natural Heritage Bureau by Alice Schori and the LCC.

Wildlife Action Plan

The New Hampshire Fish and Game Department worked together with partners in the conservation community to create the state's first Wildlife Action Plan. The plan, which was mandated and funded by the federal government through the State Wildlife Grants program, provides a tool for restoring and maintaining critical habitats and populations of the state's species of concern and their habitat. New Hampshire Fish and Game claim it to be a first step on a statewide scale to work towards helping keep species off the rare species lists. The NH Wildlife Action Plan was submitted to the U.S. Fish and Wildlife Service on October 1, 2005, and was approved in the spring of 2006.

In the GIS phase of the Wildlife Action Plan, biologists conducted co-occurrence analyses using a variety of large scale digitized natural resource features such as wetlands, riparian habitat, unique rock outcrops, dense softwood stands, alpine areas, etc. This analysis identified and ranked areas of conservation priorities throughout the state and at a statewide level. Approximately, $\frac{2}{3}$ of Lyme contains land that was classified as "Highest Rank Habitat by Condition in NH" and "Highest Rank Habitat by Condition in Biological Region." Nearly $\frac{1}{3}$ of the Town contained land classified as "Supporting Landscapes." Areas ranked relatively lower by this method are found along the Connecticut River region suggesting that agriculture and development have diminished the quality of wildlife habitat.

Because the Wildlife Action Plan was done at a broad scale, not all areas containing important wildlife habitat were identified in Lyme. It is also important to note that this analysis focused on 123 species and 27 habitats in greatest need of conservation throughout the State, which contains over 1,300 known species. Nevertheless, it is an important starting point for Towns, including Lyme. Future work, including this NRI, can be shared with Fish and Game, and incorporated into the Wildlife Action Plan to build upon and improve data and habitat analyses.

Scenic Resources

Lyme is known as one of New Hampshire's premier scenic towns because of its mountainous topography, complemented by numerous ponds, streams, and miles of frontage on the Connecticut River with associated floodplains. This diversity of topography and roughed landscape makes an important contribution to the Town's overall scenic resources. High points along the Appalachian Trail as it traverses Smarts Mountain and Mount Cube offer numerous scenic views as part of a national trail and include Lambert Ridge and Holts Ledge trails. Complementing scenic views can be found along the several local trails such as Grant Brook Trail, Chaffee Trail, Bigrock Trail, Town Forest Trails, Trout Pond Loop, and many unnamed trails such as to the top of Post Hill and Acorn Hill just to name a few. Many town roads and jeep trails also offer spectacular views.

Lyme's numerous mountains and ledges are not the only scenic resources the Town has to offer. The Connecticut River and several streams and ponds offer scenic views from a different perspective compared to hill tops. In all cases, wildlife and rare plant observation are available and diverse. Many of Lyme's larger wetlands also provide easily accessed scenic viewing areas. The wetlands and views along the Goose Pond Road, Bliss Lane, Grafton Turnpike Road, Dorchester Road, River Road, and Mud Turtle Pond Road through Skunk Hollow are just some of the numerous roads that provide a wide variety of scenery.

Many of Lyme's fields and permanent openings also provide scenic vistas, especially along River Road, Breck Hill Road, North and East Thetford Roads, the Dartmouth College Highway, and Baker Hill Road. A nearby hot-air balloon club offers a unique aerial way to view

Natural Resource Inventory for Lyme, NH

the Town's scenic resources providing the ability to get a "bird's-eye-view" of Lyme. In many cases, these scenic views include views into Vermont as well as New Hampshire. From a natural resource perspective, there are opportunities for scenic vistas throughout the entire town



There are many opportunities to enjoy the scenery throughout Lyme. Views from rolling hills with permanent openings to those from ledge top overviews can be found.

In recent years, development and population growth throughout the State and region have caused people to increase their appreciation of the natural scenery New Hampshire has to offer. In 2003, the Upper Valley Lake Sunapee Regional Planning Commission inventoried scenic resources along Route 10. Lyme has a high density of scenic opportunities and should consider this an important natural resource to maintain.



This old bridge has been modified to offer scenic views of the Connecticut River and into Vermont. Far reaching views can be seen from numerous ledge sites such as this one from the Winslow Ledges.

Conservation Land

Approximately 13,350 acres equaling 38.0% of Lyme is land conserved by governmental ownership or conservation easements, and is protected as conserved land. These easements are scattered throughout Town, with a majority of larger parcels in the eastern, particularly northeastern areas of Lyme. The largest easement is 1,330.34 acres.



This photo shows part of a large and diverse wetland complex off of Goose Pond Road and south of Holts Ledge. Part of this wetland complex is under Conservation Easement as part of the Appalachian Trail Tract. A perennial brook flows through open water and emergent wetland types, which then transition to scrub-shrub habitat, followed by dense softwood stands, and eventually into upland hardwood forest.

There are several ways to conserve land. A conservation easement on private land is a property right that can be bought or sold. It allows property owners to put limitations on their property when an easement is sold, or for another person to set limitations upon the property owner when an easement is purchased. Promoting landowners in Town to conserve and connect smaller parcels into a larger, contiguous area of land for conservation can be a great and important place to start when increasing conservation lands. This typically is a feasible place to begin because it does not necessarily put pressure on landowners to feel like they must give up extremely large parcels of land. Adding onto already existing conservation lands or working towards connecting nearby parcels is important for wildlife because it will increase the connectivity while decreasing the amount of fragmentation between parcels. Other methods of obtaining and conserving land are ownership by the State, Federal Government, or the Town.

In Lyme, conservation easements are owned by the easement holders, including the Upper Valley Land Trust, the Society for the Protection of NH Forests, Connecticut River Watershed Council, Town of Lyme, State of New Hampshire, and the Federal Government. In these cases, the land owners retain ownership of the land without certain development rights. Federal land is owned by the National Park Service, and includes the Appalachian Trail Corridor. State owned lands are primarily the Wilder Wildlife Management Area on River Road. Examples of Town owned lands are the Lyme Town Forest, Trout Pond Forest, Lower Grant Brook Trail Preserve, and many smaller parcels such as Chaffee Wildlife Sancturay and the Big Rock Nature Preserve.

Cultural Resources

As is the case in most New England towns, Lyme has a rich history of land use changes from its original settlement to current times. Before arrival of European settlers, Lyme was home to the Abenaki Indians, who spent time near Post Pond at a place they called Ordanakis. The first European settlers relied on farming as their livelihood, and they concentrated along the

Natural Resource Inventory for Lyme, NH

Connecticut River area. In the western portion of the Town, many acres of the land were cleared for croplands and pastures. Farming is far less common today, although it still occurs in Lyme with dairy farms, horse farms, and hay fields. It has been expressed by several residents that an overall goal of the community is to preserve these sites with permanent openings. There is still evidence of old farms and miles of stonewalls to be found in areas which reverted back to forest. Old stone cellar holes are scattered around various areas of Town. Forestry and logging continue and are still a part of the culture of the Town.



Stone walls show where former farms and fields have reverted back to forest, leaving remnants of cultural history.



One of the many cellar holes which can be found throughout Lyme.



Gilbert Cemetery where the first settlers in Town were buried.

Invasive Plant Species

There is an increase in public awareness and concern about the rapid growth of invasive species in NH and throughout New England. Invasive species are plant and wildlife species that are not native to an area, but take up residency and can out-compete native species. These species tend to be more common in wet areas such as lakes, wetlands, and riparian habitats. They can also be found at old farm sites where people have planted various fruiting and ornamental plants for agricultural purposes. Without counting plantings on people's lawns and gardens, six species were observed and documented during fieldwork for this project; Japanese barberry (*Berberis thunbergii*), tartarian honeysuckle (*Lonicera tatarica*), purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), black locust (*Robinia pseudoacacia*), and coltsfoot (*Tussilago farfara*). There are areas in Lyme where these plants have established themselves in quantities sufficient to be a concern. Purple loosestrife was observed in numerous locations, Japanese barberry and tartarian honeysuckle in old farming areas, and coltsfoot was observed in several locations. All species were observed along the Connecticut River. Other invasive species reported in Lyme are common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), and winged euonymus (*Euonymus alatus*). This NRI was not designed to be an all inclusive search and documentation of invasive species in Lyme. There may be other species and locations where invasive species occur in Town.

Natural Resource Inventory for Lyme, NH



A substantial clump of Japanese knotweed along the Connecticut River in Lyme.



Coltsfoot thrives in bare disturbed soils.



Purple loosestrife demonstrating its hardiness by establishing itself on the side of the North Thetford bridge pier in the middle of the Connecticut River.

A pilot project to release beetles (*Galurecella spp*) to control purple loosestrife has occurred at the Wilder Wildlife Management Area, Maple Leaf Farm on Route 10, Nichols Christmas Tree Farm on Route 10, and Post Pond.

The Town of Lyme should continue their efforts to help eradicate these invasive species, and may want to seek assistance from the Lyme Conservation Commission, Connecticut River Joint Commission, Invasive Plant Atlas of New England (IPANE), New England Wild Flower Society, and other organizations that have begun programs to control or eradicate invasive species. For further information on invasive species, and an update of the increasing list of these species, review the IPANE website at nbii-nin.ciesin.columbia.edu/ipane/ipanespecies/ipanespecies.htm.

Habitat Area Summary Table

The table displayed below is a summary of different habitat areas in acres and square miles.

| Habitat Type | Number of Acres | Number of Square Miles | Percentage of Town Land Mass |
|---|------------------------|-------------------------------|-------------------------------------|
| Lyme Town Boundary | 35,216 | 55.02 | 100% |
| Dense Softwood Cover | 5,773 | 9.02 | 16.4% |
| Wetland Complexes (from National Wetland Inventory data) | 1,562.5 | 2.44 | 4.4% |
| Hydric Soils (from Natural Resources Conservation Service data) | 1,752 | 2.74 | 5.0% |
| Wetland Analysis and Fieldwork results | 1,793 | 2.8 | 5.1% |
| Aquifers | 3,052 | 4.77 | 8.7% |
| Permanent Opening | 2,560 | 4.00 | 7.3% |
| Prime Farmland | 1,423 | 2.22 | 4.0% |
| Farmland of Statewide Importance | 1,698 | 2.65 | 4.8% |
| Farmland of Local Importance | 4,939 | 7.72 | 14.0% |
| Steep slopes – 15% and greater | 23,144 | 36.16 | 65.7% |
| Steep slopes – 25% and greater | 9,047 | 14.14 | 25.7% |
| Conservation Lands | 13,350 | 20.9 | 38.0% |

DISCUSSION – FUTURE APPLICATIONS AND BENEFITS

This project has compiled natural resource data into a digital database in GIS format and produced a written report for use in the Town of Lyme. It contains a database with a comprehensive, updatable, digital inventory of the entire Town in a compatible format with the existing Lyme GIS. It is also anticipated that efforts from this project will aid in future work and inventories, as well as provide data to guide future development throughout Lyme.

It is anticipated that results from this study will help the Town of Lyme in many ways. Town-wide zones based on habitat and vegetation can be identified and classified. Data gathered from this work will also assist the Conservation Commission, Planning and Zoning Boards, and Select Board, in foreseeing possible conflicts of future development. Perhaps the most powerful advantage of this project is that future studies and events can be integrated to build upon this database indefinitely.

Based on results from this study, Watershed to Wildlife, Inc. has identified areas for additional work. They include the following:

1. **Wetland Identification and Protection** - There are several wetland complexes adjacent to brooks and their tributaries, and along some hillsides. The importance of conserving these wetlands cannot be over emphasized. It is hoped that the Town will continue to pursue ways to further inventory the functionality and vulnerability of these wetlands with a ranking system, and a long-term goal of Prime Wetland designations.
 - a. An in-depth inventory of vernal pools throughout Lyme would also enable the Conservation Commission, Planning Board, and Select Board to critique and adjust future subdivision proposals if vernal pools are likely to be impacted.
 - b. The 1998 study by DeGraff and Turner (*A Comparative Evaluation of Five Wetlands for the Town Lyme, NH*) is a good start to designating Prime Wetlands in Lyme. The Conservation Commission should continue to explore designating some of these wetlands.
 - c. Compile previously delineated wetlands, documented wetland locations, and other areas containing wetlands; conduct future expanded wetland delineations according to the Routine Onsite Determination Method of the U.S. Army Corps of Engineers in the 1987 manual. This method meets New Hampshire requirements for standardized wetlands delineations.
2. **Shoreline Protection** - Most of the shoreline along the Connecticut River has adequate vegetative buffers. There are some sections in Lyme where enhancement of the buffer by plantings would help minimize erosion and the resultant loss of land. Most of these areas can be identified by using Lyme's GIS.
3. **Aquifer Protection** - Based on the locations of the underlying aquifers in Lyme, and the gravelly/sandy nature of the soils, it is important that steps be taken to protect the groundwater, brooks, and aquifers in Lyme. They are:
 - a. Implement Best Management Practices (BMPs) within aquifer areas.
 - b. Monitor septic system plumes with a focus on parcels adjacent to brooks, wetlands, and aquifers.
 - c. Monitor the placement of future septic systems keeping in mind the typically high permeability of many of Lyme's soils.

4. **Hillside and Ridgeline Protection** - Lyme's mountainous topography and abundance of steep slopes are directly related to the Town's tourism industry, scenic beauty, and assortment of natural resources (wetlands, streams and rivers, wildlife, plants, soils, etc.). Research and considerations should be made towards evaluating and possibly updating the zoning ordinance in Lyme to conserve these unique and important natural features.
5. **Dense Softwood Stand Protection** - Based on results from this project, there are relatively more dense softwood stands scattered throughout Town, when compared to the statewide average. Maintaining the existing stands for the benefit of the deer, moose and other wildlife populations is very important. Places to extend the existing softwood areas and connect patches of softwood in a continuum should be further investigated and willing landowners should be encouraged to do so, particularly with abutting wetlands and/or riparian buffers.
6. **Land Conservation** - Even though a high percentage of Lyme's land is already in conservation, continuing to explore lands to potentially conserve will further benefit the Town's natural resources. Focus should be on connectivity between already conserved parcels or looking at habitat types that are not currently well represented in conservation lands such as wetland complexes, permanent openings, and dense softwood areas. Lyme should continue to encourage landowners to place land into conservation easements.
 - a. Stewardship planning of these properties is recommended.
 - b. Investigating purchasing adjacent parcels to current conservation lands would increase and maintain existing wildlife travel corridors. It would be beneficial to the Town by maintaining the connectivity of forestlands, wetland complexes, and open space habitat.
7. **Scenic View Conservation** - The potential for a continued population increase throughout the Town makes it wise for landowners to sustainably conserve their land. By taking a proactive approach to deal with future development pressures, the scenic vistas and beauty will remain as impressive (or even better) tomorrow as they are today. Scenic easements are types of conservation easements that make protection of scenic resources possible.
8. **Interagency Cooperation** - It is hoped that Lyme will continue to work with other Towns, organizations and agencies throughout the region to share future data as it becomes available. This will avoid an all too common problem of separate entities replicating work.

Long-term uses of this project could include, but are not limited to: assisting the Town and others in determining "least-impact" sites for future development, telecommunication towers or wind farms; guiding refinement of the Master Plan based on impacts to natural resources; promoting a protection plan for the large aquifers under much of the Town, and further identification of land for purchase or easements for protection into the future. Furthermore, the Town is in a position to request that all future development plans be delivered in digital format, which would build upon the initial database as well as assist in updating the tax maps for assessment at little cost to the Town.

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Natural Resource Inventory for Lyme, NH

| Owner | Map | Lot | Total Acres | Hay | Corn | Xmas Trees | Comm. Maple | Blue-berries | Horses | Dairy Cattle | Beef Cattle | Chickens | Turkeys | Exotic Animals |
|---------------------------------|-----|------|-------------|-----|------|------------|-------------|--------------|--------|--------------|-------------|----------|---------|----------------|
| Bailey, Dan & Mildred | 407 | 58.1 | 40.5 | X | | | | | | | | | | |
| Bradley, Richard & Elizabeth | 407 | 64 | 14.2 | X | | | | | X | | | | | |
| Ryan, Brett | 407 | 86.6 | 7.61 | | X | | | | | | | | | |
| McIntyre, Jeanie & Geoff Little | 407 | 111 | 92 | X | | | | | X | | | | | |
| Darion, Joseph & Helen | 407 | 115 | 205 | X | | | | | | | | | | |
| Weins, Janine | 408 | 35 | 141 | X | | | | | | | | | | |
| Fowler, John | 408 | 52 | 14.4 | X | | | | | | | | | | |
| Sugar Top Farm Partnership | 408 | 53 | 13.5 | X | | | | | | | | | | |
| Sugar Top Farm Partnership | 408 | 54 | 30.3 | X | | | | | | | | | | |
| Penfield, Donald | 408 | 55 | 32.5 | X | | | | | X | | | | | |
| Hano, George | 408 | 57.3 | 110.62 | X | | | | | X | | | | | |
| Hano, George | 408 | 57.4 | 22.08 | X | | | | | X | | | | | |
| Furstenberg, Karl & Charlotte | 408 | 58 | 76 | X | | | | | | | | | | |
| Elder, Kenneth Trustee | 408 | 59 | 15 | X | | | | | | | | | | |
| Elder, Kenneth Trustee | 408 | 63 | 32 | X | | | | | | | | | | |
| Waterbury, Alan & Shirley | 408 | 67 | 67 | X | | | | | | | | | | |
| Maddock, Stephen & Margot | 409 | 5 | 112 | | | X | | | | | | | | |
| Perkins, Kathy | 409 | 67 | 47 | X | | | | | X | | | | | |
| Burgess, Geraldine | 410 | 50 | 63 | X | | | | | | | | | | |
| Hewes, Stephen | 410 | 51 | 8.1 | | | | | | | | X | | | |
| Dayton, Peter & Sherlie | 410 | 64 | 61.2 | X | | | | | | | | | | |
| Dayton, Peter & Sherlie | 410 | 69 | 79 | X | | | | | | | | | | |
| Dayton, Peter & Sherlie | 410 | 80 | 40.8 | X | | | | | | | | | | |
| Hewes, Stephen | 411 | 12 | 11.5 | X | | | | | | | | | | |
| Kilham, Benjamin | 413 | 14 | 105 | | | | X | | | | | | | |
| Tensen, Paula | 415 | 8 | 55.5 | | | | | | | | X | | | |
| Clark, Ray & Christina | 416 | 3 | 41 | X | | | | | | | | | | |
| VanVleck, Roy Trustee | 416 | 5 | 12.5 | X | | | | | | | | | | |
| Clark, Ray & Christina | 416 | 7 | 38 | X | | | | | | | | | | |
| Meyer, Robert & Jane (Nini) | 416 | 12 | 700 | X | | | | | X | | | | | |
| Meyer, Robert & Jane (Nini) | 416 | 14 | 65.7 | X | | | | | X | | | | | |
| VanVleck, Roy Trustee | 416 | 18 | 46.4 | X | | | | | | | | | | |

APPENDIX II
Conservation Land in the Town of Lyme

Lyme Conservation Easements 1/1/2007

| Map | Lot | Acres | Date Granted | Grantor | Holder 1 | Holder 2 |
|------------|------------|--------------|-------------------------|--|-----------------|-----------------|
| 201 | 31 | 10 | 1997 | A. Greenwood, R. and L. Bircher, B and E. Strout | UVLT | |
| 201 | 63 | 54.8 | 2001 | Upper Valley Land Trust | UVLT | |
| 401 | 5 | 23 | 1988 | Elizabeth Ladd | TofL | UVLT |
| 401 | 6 | 6 | 1988 | John Nemiah | TofL | UVLT |
| 401 | 7 | 73 | 1991 | Alexander, David and Jon Crary | TofL | |
| 401 | 8 | 70 | 1988 | John Nemiah | TofL | UVLT |
| 401 | 11 | 28 | 1988 | John Nemiah | TofL | UVLT |
| 401 | 12 | 81.6 | 1988 | Elizabeth Ladd | TofL | UVLT |
| 401 | 18 | 126.5 | 1991 | John Menge | TofL | |
| 401 | 23 | 4.9 | 1990 | William and Srimalai Nichols | TofL | |
| 401 | 30 | 2.4 | 1995 | William Nichols | TofL | |
| 401 | 43 | 28.8 | 1991 | John Menge | TofL | |
| 401 | 48 | 18.6 | 2001 | William and Joan Grant | TofL | |
| 401 | 51 | 3 | 1991 | Geneva Menge | TofL | |
| 401 | 55 | 18 | 1980,1988 | Bayne Stevenson | CRWC | TofL |
| 401 | 56 | 80 | 1998 | LHAVA | UVLT | |
| 401 | 67 | 4.4 | 2000 | Irvin and Robert Wilmot | UVLT | |
| 401 | 78 | 20 | 2000 | Irvin and Robert Wilmot | UVLT | |
| 402 | 17 | 80 | 1988 | Allen and Julian MacDonald | TofL | UVLT |
| 402 | 57 | 96.5 | 1997 | Grant Estate | UVLT | |
| 402 | 63 | 18 | 1997 | Donald and Margaret West | UVLT | |
| 402 | 67 | 45 | 1998 | Elizabeth McCann | UVLT | |
| 402 | 71 | 39 | 1999 | UVLT | UVLT | |
| 402 | 85 | 40 | 2000 | Irvin and Robert Wilmot | UVLT | |
| 402 | 88 | 2.1 | 2000 | Irvin and Robert Wilmot | UVLT | |
| 402 | 89 | 1 | 1990 | Upper Valley Land Trust | UVLT | |
| 403 | 1 | 52 | 2006 | Paul and Veronica Guyre | UVLT | |
| 403 | 5 | 41 | 1997 | Grant Estate | UVLT | |
| 403 | 8 | 22 | 1997 | Grant Estate | UVLT | |
| 403 | 13 | 2.4 | 1999 | UVLT | UVLT | |
| 403 | 24 | 3.7 | 1985 | LHVA, David Cole, Karen Henry | CRWC | TofL |
| 403 | 26 | 14 | 1980 | Ross and Jean McIntyre | CRWC | TofL |
| 403 | 26 | 14 | 2004 | Jean McIntyre | UVLT | |
| 403 | 29 | 58 | 1989,2005 | Gilbert and Eleanor Mudge, Eleanor Mudge | UVLT | St of NH |
| 403 | 36 | 97 | 1990 | Stuart and Jean Smith | TofL | UVLT |
| 403 | 36 | 13 | 1999 | Stuart and Jean Smith | UVLT | |
| 403 | 37 | 30 | 1988 | Ross and Jean McIntyre | TofL | UVLT |
| 403 | 37 | 8.1 | 1989 | Ross and Jean McIntyre | TofL | UVLT |
| 403 | 40 | 32 | 1989 | Jennifer Cooke | TofL | UVLT |
| 403 | 46 | 31 | 1998 | UVLT | UVLT | |
| 403 | 47 | 36 | 1989 | Walter Record | TofL | |
| 403 | 53 | 1 | 2003 | Carolynne Krusi | TofL | |
| 403 | 54 | 35 | 1989 | Walter Record | TofL | |
| 404 | 10 | 46 | 1990 | Frances and Bernard Tullar | St of NH | |
| 404 | 16 | 100 | 2000 | Carola Lea Trust | UVLT | |
| 404 | 29 | 0.8 | 1990 | Frances and Bernard Tullar | St of NH | |
| 404 | 30 | 29 | 1986 | LHAVA | SPNHF | |

Natural Resource Inventory for Lyme, NH
Lyme Conservation Easements 1/1/2007

| Map | Lot | Acres | Date Granted | Grantor | Holder 1 | Holder 2 |
|-----|-----|-------|-----------------|--|----------|----------|
| 404 | 32 | 64 | 1990 | Frances and Bernard Tullar | St of NH | |
| 404 | 35 | 13 | 1986 | LHAVA | SPNHF | |
| 404 | 38 | 5 | 1986 | George and Monique Guest | SPNHF | |
| 404 | 39 | 14.5 | 1987 | Katharine Beal | SPNHF | |
| 404 | 46 | 62 | 1988 | Katharine Beal | TofL | SPNHF |
| 404 | 49 | 0 | 1996 | Rae Welch | UVLT | |
| 405 | 2 | 6.9 | 1988 | Katharine Beal | TofL | SPNHF |
| 405 | 3 | 8.3 | 1986 | Doris Schriever | SPNHF | |
| 405 | 5 | 14.5 | 1987 | Annette Schmitt | TofL | SPNHF |
| 405 | 7 | 14.8 | 1997 | Richard and Sally Ramsden | UVLT | |
| 405 | 8 | 0 | 1997 | Richard and Sally Ramsden | UVLT | |
| 405 | 9 | 10 | 1986 | Henry and Freda Swan | SPNHF | |
| 405 | 11 | 6 | 1986 | Kenneth and Patrice Super | SPNHF | |
| 405 | 23 | 12 | 1987 | LHAVA | SPNHF | |
| 405 | 34 | 11 | 1986 | Don and Keita Metz | SPNHF | |
| 405 | 35 | 10 | 1986 | Don and Keita Metz | SPNHF | |
| 405 | 36 | 13.8 | 1986 | Bayne Stevenson | SPNHF | CRWC |
| 405 | 37 | 3 | 1988 | K. Hewitt, M. Lewis, B. Stevenson | TofL | SPNHF |
| 405 | 38 | 13 | 1988,2001 | K. Hewitt, M. Lewis, B. Stevenson | TofL | SPNHF |
| 405 | 38 | 5 | 1988,2001 | K. Hewitt, M. Lewis, B. Stevenson | TofL | SPNHF |
| 405 | 39 | 10 | 1986 | Timothy and Lynn Cook | SPNHF | |
| 405 | 40 | 7 | 1989 | Montshire Museum | SPNHF | UVLT |
| 405 | 42 | 14 | 1986 | Kenneth and Patrice Super | SPNHF | |
| 405 | 43 | 9 | 1986 | Henry and Freda Swan | SPNHF | |
| 405 | 44 | 25 | 1997 | Richard and Sally Ramsden | UVLT | |
| 405 | 45 | 19.8 | 1986 | Annette Schmitt | TofL | SPNHF |
| 405 | 46 | 25 | 1986 | Everett and Verna Rich | SPNHF | |
| 405 | 47 | 8 | 1986 | Doris Schriever, Linda Fox, Karen Laudon | SPNHF | |
| 405 | 48 | 14.8 | 1986 | Doris Schriever, Linda Fox, Karen Laudon | SPNHF | |
| 405 | 49 | 5 | 1988 | Katharine Beal | TofL | SPNHF |
| 405 | 50 | 15.2 | 1986 | Stewart and Margaret Dall | SPNHF | |
| 406 | 2 | 0 | 2000 | UVLT | UVLT | |
| 406 | 22 | 153 | 2000 | UVLT | UVLT | |
| 406 | 36 | 75 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 7 | 5 | 1988 | Dorothy Sears | UVLT | |
| 407 | 15 | 48.3 | 1996 | Rae Welch | UVLT | |
| 407 | 26 | 4.2 | 1996 | Rae Welch | UVLT | |
| 407 | 27 | 0 | 1996 | Rae Welch | UVLT | |
| 407 | 31 | 1.75 | 1988 | Dorothy Sears | UVLT | |
| 407 | 37 | 2 | 1996 | Rae Welch | UVLT | |
| 407 | 45 | 1.6 | 1986 | John Braasch | CRWC | |
| 407 | 46 | 2 | 1986 | Sarah Crocker | CRWC | |
| 407 | 53 | 2 | 1998 | Russell and Noreen Estes | TofL | |
| 407 | 53 | 1 | 1998 | Russell and Noreen Estes | TofL | |
| 407 | 53 | 1 | 1998 | Russell and Noreen Estes | TofL | |
| 407 | 53 | 2 | 1998 | Russell and Noreen Estes | TofL | |
| 407 | 60 | 5.6 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 60 | 5.8 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 60 | 8.3 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 60 | 21.1 | 1990 | Russell and Noreen Estes | TofL | |

Natural Resource Inventory for Lyme, NH
Lyme Conservation Easements 1/1/2007

| Map | Lot | Acres | Date Granted | Grantor | Holder 1 | Holder 2 |
|-----|-----|-------|-----------------|---|----------|----------|
| 407 | 61 | 8.6 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 61 | 5.1 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 61 | 5.1 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 61 | 29 | 2004 | Ann C. Griswold | UVLT | |
| 407 | 62 | 15.2 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 63 | 8.3 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 66 | 7.7 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 67 | 5.3 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 68 | 28.9 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 69 | 36.8 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 70 | 5 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 71 | 11.7 | 1990 | Russell and Noreen Estes | TofL | |
| 407 | 74 | 68.6 | 2000 | Cora P. Emlen | UVLT | |
| 407 | 76 | 13.5 | 1992 | Frances Lee | TofL | |
| 407 | 81 | 9 | 1985 | Donald Metz | CRWC | SPNHF |
| 407 | 85 | 5.8 | 2000 | Cora P. Emlen | UVLT | |
| 407 | 90 | 4.8 | 2005 | Roundabout Family Limited Partnership (Marcia Armstrong) | UVLT | |
| 407 | 96 | 43.1 | 1992 | Ralph and Lesley West | TofL | |
| 407 | 96 | 3.1 | 1992 | Ralph and Lesley West | TofL | |
| 407 | 96 | 5.6 | 1992 | Ralph and Lesley West | TofL | |
| 407 | 110 | 2.9 | 1999 | Carola Lea | UVLT | |
| 407 | 111 | 50 | 1990 | Carola Lea / George Talbot | UVLT | |
| 407 | 111 | 32 | 1999 | Carola Lea | UVLT | |
| 407 | 113 | 15.7 | 1992 | George Talbot | UVLT | |
| 407 | 114 | 21.3 | 1982 | Stevenson Northland, Inc. | CRWC | TofL |
| 407 | 115 | 23 | 1986 | Joseph and Helen Darion | CRWC | |
| 408 | 1 | 29.6 | 2001 | Upper Valley Land Trust | UVLT | |
| 408 | 1 | 95.2 | 2001 | Upper Valley Land Trust | UVLT | |
| 408 | 35 | 141 | 1993 | Louise Johnson | UVLT | |
| 408 | 38 | 1.4 | 1989 | Harold and Lillian Wing | TofL | |
| 408 | 50 | 11.9 | 1981 | Bayne Stevenson | TofL | CRWC |
| 408 | 51 | 14.9 | 1982 | Stevenson Northland, Inc. | TofL | CRWC |
| 408 | 53 | 13.5 | 1988 | Donald Carmichael | CRWC | TofL |
| 408 | 54 | 30 | 1987 | Mary Carmichael | CRWC | TofL |
| 408 | 55 | 33 | 1981 | Bayne Stevenson | TofL | CRWC |
| 408 | 57 | 5.4 | 1994 | George Hano | UVLT | |
| 408 | 57 | 7.3 | 1994 | George Hano | UVLT | |
| 408 | 57 | 118 | 1994 | George Hano | UVLT | |
| 408 | 58 | 82 | 1975 | Ruth Demarest | TofL | SPNHF |
| 408 | 65 | 0 | 1975 | Ruth Demarest | TofL | SPNHF |
| 408 | 71 | 26 | 1991 | Peter and Janice Treadwell | TofL | SPNHF |
| 408 | 71 | 2 | 1991 | Peter and Janice Treadwell | TofL | SPNHF |
| 408 | 75 | 57.1 | 2001 | John and Nancy Wing | TofL | |
| 409 | 47 | 1.3 | 2002 | Franklin and Nora Gould | TofL | |
| 409 | 54 | 7.2 | 1980 | Robert Hack | TofL | |
| 409 | 57 | 7.8 | 1980 | Baker Hill Associates | TofL | |
| 409 | 100 | 113 | 1988 | William Nichols | TofL | UVLT |
| 410 | 2 | 28 | 1988 | William Nichols | TofL | UVLT |
| 410 | 4 | 26.5 | 1991 | Sylvia Stockmayer | TofL | |

Natural Resource Inventory for Lyme, NH
Lyme Conservation Easements 1/1/2007

| Map | Lot | Acres | Date Granted | Grantor | Holder 1 | Holder 2 |
|-----|-----|-------|-----------------|--|----------|----------|
| 410 | 9.1 | 30 | 1990 | Katherine Hewitt | TofL | |
| 410 | 9.2 | 30 | 1990 | Katherine Hewitt | TofL | |
| 410 | 22 | 11 | 2003 | Katharine Hewitt | TofL | |
| 410 | 26 | 13 | 2003 | Katharine Hewitt | TofL | |
| 410 | 41 | 29 | 1991 | David and Barbara Roby | UVLT | |
| 410 | 42 | 37.7 | 1991 | Deborah Holmes | UVLT | |
| 410 | 45 | 98 | 1984 | Frederick Wagner Trust | USAAT | |
| 410 | 53 | 10.7 | 1991 | Deborah Holmes | UVLT | |
| 410 | 54 | 0 | 1991 | David and Barbara Roby | UVLT | |
| 410 | 57 | 21 | 1984 | William and Simalai Nichols | CRWC | |
| 411 | 7 | 15.1 | 1982 | Ronald Evans | USAAT | |
| 414 | 8 | 5 | 1988, 1999 | G. Movell, A. Robinson, H. and W. Liversidge, Doug and Joanne Wise | CRWC | TofL |
| 414 | 14 | 65 | 1988 | Jerome and Sherill Robinson | TofL | SPNHF |
| 414 | 15 | 76 | 2000 | Alfred Balch | TofL | |
| 414 | 17 | 39 | 1978 | Joshua Kilham | TofL | |
| 414 | 29 | 12 | 1992 | Finley family | TofL | |
| 414 | 30 | 7.6 | 1992 | Finley family | TofL | |
| 414 | 30 | 4.4 | 1992 | Finley family | TofL | |
| 414 | 31 | 3.1 | 1992 | Finley family | TofL | |
| 414 | 44 | 10.5 | 1983 | Guy and Esther Nichols | USAAT | |
| 414 | 52 | 0 | 1983 | Guy and Esther Nichols | USAAT | |
| 414 | 55 | 30 | 2000 | Ryan 2000 Trust, R. Bret and Tony Ryan | TofL | |
| 414 | 58 | 65 | 1992 | Dartmouth College | USAAT | |
| 414 | 61 | 3 | 1992 | Dartmouth College | USAAT | |
| 415 | 3 | 303 | 1990 | Bayne Stevenson | UVLT | CRWC |
| 415 | 3 | 80 | 1997 | Roy and Emily VanVleck | USA | |
| 415 | 8 | 55.5 | 2003 | Roy and Emily VanVleck | UVLT | |
| 415 | 9 | 23.8 | 1985 | Bayne Stevenson | CRWC | TofL |
| 415 | 12 | 145 | 1976 | Ruth Demarest, Bayne Stevenson | TofL | SPNHF |
| 415 | 13 | 13 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 14 | 5 | 1988, 1999 | G. Movell, A. Robinson, H. and W. Liversidge, Doug and Joanne Wise | CRWC | TofL |
| 415 | 15 | 5 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 16 | 6 | 1988 | G. Movell, A. Robinson and W. Liversidge | CRWC | TofL |
| 415 | 17 | 5 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 18 | 6 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 19 | 298 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 20 | 67 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 20 | 11 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 20 | 9 | 1988 | G. Movell, A. Robinson, H. and W. Liversidge | CRWC | TofL |
| 415 | 22 | 209 | 1997 | Lyme Timber Co. | USA | |
| 416 | 3 | 41 | 1998 | Ray and Christina Clark | UVLT | |
| 416 | 12 | 627 | 2000 | Baynes Stevenson | UVLT | |
| 416 | 13 | 63 | 2000 | Baynes Stevenson | UVLT | |
| 416 | 14 | 65.7 | 1991 | Roy and Emily VanVleck, Bayne Stevenson | UVLT | |
| 417 | 5 | 39 | 2002 | Dennis and Barbara Stern | TofL | |
| 418 | 5 | 1613 | 1997 | Lyme Timber Co. | USA | |
| 420 | 1 | 63 | 1997 | Lyme Timber Co. | USA | |
| 420 | 3 | 919 | 1997 | Lyme Timber Co. | USA | |

Natural Resource Inventory for Lyme, NH
Lyme Conservation Easements 1/1/2007

| Map | Lot | Acres | Date Granted | Grantor | Holder 1 | Holder 2 |
|------------|------------|--------------|-------------------------|-----------------------|-----------------|-----------------|
| 420 | 28 | 16 | 1998 | UVLT | UVLT | |
| 421 | 9 | 1.9 | 1978 | R.W. & C.A. Mortensen | TofL | |
| 421 | 21 | 207 | 1993 | Lyme Timber Co. | StofNH | |

Holders: Tof L = Town of Lyme, UVLT = Upper Valley Land Trust, CRWC = Conn. River Watershed Council,
 SPNHF = Society for the Protection of New Hampshire Forests

Natural Resource Inventory for Lyme, NH
APPENDIX III
DOCUMENTATION OF BIRDS IN TWO SECTIONS OF LYME
SouthEast (SE) 1967-2006 (Holmes)
NorthWest (NW) 1981-2006 (Skelly)

Bird Species of Southeastern & Northwestern Sections of Lyme, NH 1967-2006

| Common Name | Scientific Name | Comments <u>primarily from</u> <u>Holmes in SE</u> | SE | NW |
|---------------------------|----------------------------------|---|----|----|
| Bittern, American | <i>Botaurus lentiginosus</i> | breeds in swamp below lower edge of fields | x | |
| Blackbird, Red-winged | <i>Agelaius phoeniceus</i> | common breeder in swamp/wet areas | x | x |
| Blackbird, Rusty | <i>Euphagus carolinus</i> | spring and fall migrant | x | |
| Bluebird, Eastern | <i>Sialia sialis</i> | sporadic breeder, occurs in fields and nest boxes | x | x |
| Bobolink | <i>Dolichonyx oryzivorus</i> | common breeder in hayfields | x | x |
| Bunting, Indigo | <i>Passerina cyanea</i> | breeder along forest edge | x | x |
| Cardinal, Northern | <i>Cardinalis cardinalis</i> | occasional on feeder in fall and winter | x | x |
| Catbird, Gray | <i>Dumetella carolinensis</i> | common breeder | x | x |
| Chickadee, Black-capped | <i>Poecile atricapilla</i> | common breeder in forest, at feeders | x | x |
| Cowbird, Brown-headed | <i>Molothrus ater</i> | common breeder | x | x |
| Creeper, Brown | <i>Certhia americana</i> | breeder in forest, widely scattered | x | |
| Crossbill, Red | <i>Loxia curvirostra</i> | occasional winter visitor | x | x |
| Crossbill, White-winged | <i>Loxia leucoptera</i> | occasional winter visitor | x | x |
| Crow, American | <i>Corvus brachyrhynchos</i> | common in valley | x | x |
| Cuckoo, Black-billed | <i>Coccyzus erythrophthalmus</i> | irregular breeder | x | x |
| Cuckoo, Yellow-billed | <i>Coccyzus americanus</i> | occasional records in mid to late summer | x | x |
| Dickcissel | <i>Spiza americana</i> | one record in May | x | |
| Dove, Mourning | <i>Zenaida macroura</i> | common year round | x | x |
| Dove, Rock | <i>Columba livia</i> | used to nest in our silo, now gone | x | x |
| Duck, Black | <i>Anas rubripes</i> | seen flying along valley, on Roby's pond in '05 | x | |
| Duck, Wood | <i>Aix sponsa</i> | flying along valley | x | x |
| Finch, House | <i>Carpodacus mexicanus</i> | regularly seen in late 70s when they bred, not seen recently. | x | |
| Finch, Purple | <i>Carpodacus purpureus</i> | seen mostly in early spring and fall | x | x |
| Flicker, Common | <i>Colaptes auratus</i> | common breeder and migrant | x | x |
| Flycatcher, Alder | <i>Empidonax alnorum</i> | fairly common breeder and caller | | x |
| Flycatcher, Great Crested | <i>Myiarchus crinitus</i> | occasional breeder in forest | x | x |
| Flycatcher, Least | <i>Empidonax minimus</i> | formerly bred along forest edges, less common recently | x | x |
| Flycatcher, Olive-sided | <i>Contopus cooperi</i> | heard occasionally from hillside across valley | x | x |
| Flycatcher, Willow | <i>Empidonax traillii</i> | common breeder in alders along swamp edge | x | |

Natural Resource Inventory for Lyme, NH
Bird Species of Southeastern & Northwestern Sections of Lyme, NH 1967-2006

| Common Name | Scientific Name | Comments <u>primarily from</u> <u>Holmes in SE</u> | SE | NW |
|----------------------------|-----------------------------------|--|----|----|
| Goldfinch, American | <i>Carduelis tristis</i> | common breeder and present all summer | x | x |
| Goose, Canada | <i>Branta canadensis</i> | flyovers of flocks in migration, and in last 10 years, 1-2 pairs, probably breeding in swamp between us and Hewes. | x | x |
| Goose, Snow | <i>Chen caerulescens</i> | flyovers of flocks in both spring and fall migration | x | x |
| Goshawk, Northern | <i>Accipiter gentilis</i> | seen in winter 2-3 times | x | x |
| Grackle, Common | <i>Quiscalus quiscula</i> | breeder | x | x |
| Grosbeak, Evening | <i>Coccothraustes vespertinus</i> | common in some winters in 1970s-80s, less common recently | x | x |
| Grosbeak, Pine | <i>Pinicola enucleator</i> | occasional in some winters, not seen in recent years | x | x |
| Grosbeak, Rose-breasted | <i>Pheucticus ludovicianus</i> | probably breeds in forest, seen commonly in late summer | x | x |
| Grouse, Ruffed | <i>Bonasa umbellus</i> | breeding in woods | x | x |
| Harrier, Northern | <i>Circus cyaneus</i> | seen twice (5/95, 8/06) | x | x |
| Hawk, Broad-winged | <i>Buteo platypterus</i> | breeding in area | x | x |
| Hawk, Cooper's | <i>Accipiter cooperii</i> | common breeder | | x |
| Hawk, Red-shouldered | <i>Buteo lineatus</i> | breeding in area | x | x |
| Hawk, Red-tailed | <i>Buteo jamaicensis</i> | breeding in area | x | x |
| Hawk, Sharp-shinned | <i>Accipiter striatus</i> | seen most often in late fall, probably breeds | x | x |
| Heron, Great Blue | <i>Ardea herodias</i> | seen flying along valley occasionally | x | x |
| Heron, Little Green | <i>Butorides virescens</i> | seen a few times in swampy area | x | |
| Hummingbird, Ruby-throated | <i>Archilochus colubris</i> | common breeder in garden | x | x |
| Jay, Blue | <i>Cyanocitta cristata</i> | common breeder in forest, at feeders | x | x |
| Junco, Dark-eyed | <i>Junco hyemalis</i> | common migrant in late fall/early spring | x | x |
| Kestrel, American | <i>Falco sparverius</i> | seen several times along fields | x | x |
| Killdeer | <i>Charadrius vociferus</i> | bred in early years, only seen occasionally in spring recently | x | |
| Kingbird, Eastern | <i>Tyrannus tyrannus</i> | fairly common breeder | | x |
| Kingfisher, Belted | <i>Ceryle alcyon</i> | frequently heard along swamp/stream course | x | x |
| Kinglet, Golden-crowned | <i>Regulus satrapa</i> | seen usually as migrant in spring and fall | x | |
| Kinglet, Ruby-crowned | <i>Regulus calendula</i> | seen usually as migrant in spring and fall | x | |
| Lark, Horned | <i>Eremophila alpestris</i> | one present 02/21-25/99 along edge of field/road | x | |
| Loon, Common | <i>Gavia immer</i> | rare flyovers | x | x |
| Mallard | <i>Anas platyrhynchos</i> | seen once in April, flying up valley (pair) | x | x |
| Meadowlark, Eastern | <i>Sturnella magna</i> | bred in 1960-70s in Burgess field, not seen recently | x | x |

Natural Resource Inventory for Lyme, NH
Bird Species of Southeastern & Northwestern Sections of Lyme, NH 1967-2006

| Common Name | Scientific Name | Comments <u>primarily from</u> <u>Holmes in SE</u> | SE | NW |
|---------------------------|----------------------------------|---|----|----|
| Merganser, Hooded | <i>Lophodytes cucullatus</i> | common breeder | | x |
| Mockingbird, Northern | <i>Mimus polyglottos</i> | seen sporadically, usually in late summer | x | |
| Nighthawk, Common | <i>Chordeiles minor</i> | rare visitor | | x |
| Nuthatch, Red-breasted | <i>Sitta canadensis</i> | heard most often in fall and winter | x | x |
| Nuthatch, White-breasted | <i>Sitta carolinensis</i> | breeder in forest, widely scattered | x | x |
| Oriole, Baltimore | <i>Icterus galbula</i> | common breeder along forest edge | x | x |
| Osprey | <i>Pandion haliaetus</i> | seen flying down valley on 2-3 occasions | x | |
| Ovenbird | <i>Seiurus aurocapillus</i> | common breeder in forest | x | x |
| Owl, Barred | <i>Strix varia</i> | common year-round resident | x | x |
| Owl, Northern Saw-whet | <i>Aegolius acadicus</i> | occasional records in late fall/winter | x | |
| Peregrine Falcon | <i>Falco peregrinus</i> | seen occasionally flying along valley | x | |
| Pewee, Eastern Wood- | <i>Contopus virens</i> | heard occasionally in forest behind house | x | x |
| Pheasant, Ring-necked | <i>Phasianus colchicus</i> | seen occasionally, probably stocked by NH Fish & Game | x | |
| Phoebe, Eastern | <i>Sayornis phoebe</i> | breeds every year on garage or house | x | x |
| Rail, Virginia | <i>Rallus limicola</i> | one flying over (Pam Hunt, NH Audubon by call) | x | |
| Raven, Common | <i>Corvus corax</i> | common, often flying along valley | x | x |
| Redpoll, Common | <i>Carduelis flammea</i> | occasional in some winters | x | x |
| Redpoll, Hoary | <i>Carduelis hornemanni</i> | rare winter feeder | | x |
| Redstart, American | <i>Setophaga ruticilla</i> | breeder along forest edges & in forest | x | x |
| Robin, American | <i>Turdus migratorius</i> | breeds and common migrant | x | x |
| Sandpiper, Solitary | <i>Tringa solitaria</i> | two seen on 05/15/97 along edge of swamp | x | x |
| Sandpiper, Spotted | <i>Actitis macularia</i> | uncommon probable breeder | | x |
| Sapsucker, Yellow-bellied | <i>Sphyrapicus varius</i> | breeder along forest edge | x | x |
| Shrike, Northern | <i>Lanius excubitor</i> | one behind house on 10/15/95 | x | |
| Siskin, Pine | <i>Carduelis pinus</i> | common in some winters, absent in others | x | x |
| Snipe, Common | <i>Gallinago gallinago</i> | breeding in fields/edge of swamp | x | x |
| Sparrow, American Tree | <i>Spizella arborea</i> | uncommon winter feeder | | x |
| Sparrow, Chipping | <i>Spizella passerina</i> | common breeder | x | x |
| Sparrow, Field | <i>Spizella pusilla</i> | occasional breeder along edge of swamp in brushy areas | x | |
| Sparrow, Fox | <i>Passerella iliaca</i> | rare winter feeder | | x |
| Sparrow, House | <i>Passer domesticus</i> | straggler, seen once on 03/17/02 | x | x |
| Sparrow, Savannah | <i>Passerculus sandwichensis</i> | bred in wet pasture in late 60s/early 70s, not seen in recent years | x | |

Natural Resource Inventory for Lyme, NH
Bird Species of Southeastern & Northwestern Sections of Lyme, NH 1967-2006

| Common Name | Scientific Name | Comments <u>primarily from</u> <u>Holmes in SE</u> | SE | NW |
|------------------------------|---------------------------------|--|----|----|
| Sparrow, Song | <i>Melospiza melodia</i> | very common breeder | x | x |
| Sparrow, Swamp | <i>Melospiza georgiana</i> | breeder in wet marshy edges/alder thickets | x | |
| Sparrow, White-crowned | <i>Zonotrichia leucophrys</i> | uncommon winter feeder | | x |
| Sparrow, White-throated | <i>Zonotrichia albicollis</i> | used to breed commonly in shrubby/edge areas, scarce in recent years | x | x |
| Starling, European | <i>Sturnus vulgaris</i> | breeds occasionally in crevices in barn/house | x | x |
| Swallow, Barn | <i>Hirundo rustica</i> | breeder (in barn) | x | x |
| Swallow, Cliff | <i>Petrochelidon pyrrhonota</i> | used to breed on back of barn, but absent for last 20± years | x | |
| Swallow, Tree | <i>Tachycineta bicolor</i> | common breeder in boxes in field | x | x |
| Swift, Chimney | <i>Chaetura pelagica</i> | Flyovers in valley, less common in recent years | x | |
| Tanager, Scarlet | <i>Piranga olivacea</i> | breeder in forest | x | x |
| Teal, Blue-winged | <i>Anas discors</i> | seen on Roby's pond in 08/06 | x | |
| Thrasher, Brown | <i>Toxostoma rufum</i> | breeder in early years, but now only seen briefly in early spring | x | |
| Thrush, Hermit | <i>Catharus guttatus</i> | breeds in forest | x | x |
| Thrush, Varied | <i>Ixoreus naevius</i> | one record at feeder in winter | x | |
| Thrush, Wood | <i>Hylocichla mustelina</i> | breeds in forest, but less common recently | x | |
| Titmouse, Tufted | <i>Baeolophus bicolor</i> | first recorded 11/91, heard and seen regularly in spring and fall since about 2000 | x | x |
| Towhee, Rufous-sided | <i>Pipilo erythrophthalmus</i> | bred in shrubby areas in late 1960s, early 1970s, not since | x | x |
| Turkey, Wild | <i>Meleagris gallopavo</i> | first seen in 1997, and then regularly since | x | x |
| Veery | <i>Catharus fuscescens</i> | breeds in wooded areas swamp, seems more sporadic in recent years | x | x |
| Vireo, Red-eyed | <i>Vireo olivaceus</i> | breeder in forest | x | x |
| Vireo, Solitary | <i>Vireo solitarius</i> | breeder in forest, widely scattered | x | |
| Vireo, Warbling | <i>Vireo gilvus</i> | bred in early years in large tree in front of house, now rarely seen | x | |
| Vireo, Yellow-throated | <i>Vireo flavifrons</i> | a few sightings in the 1970s, none recently | x | |
| Vulture, Turkey | <i>Cathartes aura</i> | first recorded about 1995 increasing since | x | x |
| Warbler, Bay-breasted | <i>Dendroica castanea</i> | spring and fall migrant | x | x |
| Warbler, Black-and-white | <i>Mniotilta varia</i> | common migrant in spring | x | x |
| Warbler, Blackburnian | <i>Dendroica fusca</i> | common spring migrant, probable breeder | x | |
| Warbler, Blackpoll | <i>Dendroica striata</i> | migrant | x | |
| Warbler, Black-throated Blue | <i>Dendroica caerulescens</i> | scattered breeding pairs in forest | x | x |
| Warbler, Black-throated | <i>Dendroica virens</i> | common breeder in mixed | x | x |

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Bird Species of Southeastern & Northwestern Sections of Lyme, NH 1967-2006

| Common Name | Scientific Name | Comments <u>primarily from</u> <u>Holmes in SE</u> | SE | NW |
|-------------------------|--------------------------------|---|----|----|
| Green Warbler, Cape May | <i>Dendroica tigrina</i> | forest spring migrant | x | |
| Warbler, Chestnut-sided | <i>Dendroica pensylvanica</i> | breeder along forest/swamp edge | x | x |
| Warbler, Magnolia | <i>Dendroica magnolia</i> | occasional breeder | x | x |
| Warbler, Nashville | <i>Vermivora ruficapilla</i> | local breeder on hillside towards Roby's | x | |
| Warbler, Palm | <i>Dendroica palmarum</i> | two seen next to barn on 04/08/05 | x | |
| Warbler, Pine | <i>Dendroica pinus</i> | spring migrant | x | |
| Warbler, Yellow | <i>Dendroica petechia</i> | common breeder in alders below field. | X | x |
| Warbler, Yellow-rumped | <i>Dendroica coronata</i> | common in spring and fall, probably breeds in forest | x | x |
| Waxwing, Bohemian | <i>Bombycilla garrulus</i> | flock of 20 on 03/05/94, 8-10 on 02/22/96 | x | x |
| Waxwing, Cedar | <i>Bombycilla cedrorum</i> | breeds some years, regular in summer | x | x |
| Whip-poor-will | <i>Caprimulgus vociferus</i> | breeder through early 1970s, then absent | x | |
| Woodcock, American | <i>Scolopax minor</i> | breeding in fields, edge areas | x | x |
| Woodpecker, Downy | <i>Picoides pubescens</i> | breeder in forest | x | x |
| Woodpecker, Hairy | <i>Picoides villosus</i> | breeder in forest | x | x |
| Woodpecker, Pileated | <i>Dryocopus pileatus</i> | breeder in forest | x | x |
| Wren, House | <i>Troglodytes aedon</i> | common breeder in nest boxes | x | x |
| Wren, Winter | <i>Troglodytes troglodytes</i> | breeder in forest | x | x |
| Yellowthroat, Common | <i>Geothlypis trichas</i> | common breeder in thickets | x | x |

Bird Species in Southeastern (SE) Lyme: Recorded by Richard and Deborah Holmes at their home at 31 Bliss Lane in Lyme Center. Richard Holmes holds a Ph.D. in Zoology from the University of California, Berkeley, and was a Professor of Biological Sciences and Environmental Biology at Dartmouth College from 1967 to 2004. He is now a Research Professor, as well as an Emeritus Professor, at Dartmouth. Professionally, he is an ornithologist, specializing in avian ecology. His research for the last 40 years has been focused on forest birds in New Hampshire, with field studies conducted primarily at the Hubbard Brook Experimental Forest in West Thornton, NH. He is a former vice-president of the American Ornithologists' Union (AOU), and has received a lifetime achievement awards from the AOU, the Wilson Ornithological Society and the Cooper Ornithological Society.

Bird Species in Northwestern (NW) Lyme: Recorded species seen or heard by John Skelly in the area of his home at 22 Pony Hill Lane. Mr. Skelly is a forester and has lived in Lyme since 1981. He holds a bioecology degree and taught high school biology including courses on predatory birds. He did post-graduate work in forestry and wildlife at UVM. Ecological parameters - 360 degree view with best and furthest visuals east to Dimmick hill and Lambert ridge, and west to near Vermont hills on Connecticut river and "the Pinnacle" off Franklin Hill road. Habitat includes beaver meadow wetland, through which flows Trout brook, a man-made pond less than one half acre, white pine and mixed hardwood second growth forest spreading east and north into Lyme town forest (Trout pond area Q), and open farmland with mixed wood (soft and hardwood) quadrants and corridors to the south and west. Elevation is near 1100'.

Relative abundance of birds is indicated by the following: common - seen most years; uncommon - seen occasionally; rare - only one or two sightings since 1981. Breeders that are obvious, which are most summer inhabitants, are designated as such, though I may not have them nesting in my area. Birds that visit the feeder, either summer or winter, are designated as feeder birds. Birds that have killed his chickens are labeled accordingly. Birds that could be seen in this area of Lyme Center (such as Peregrine falcons!), and that are locally not uncommon, but have not been seen or heard from our property, are not included in this listing...yet. Birds that are actually more common than witnessed in our area are designated only according to his view of their relative abundance or obscurity.

APPENDIX IV

LYME VOLUNTEER FIELD OBSERVATION REPORT & INVENTORY FORM

J – Bliss Lane Area: Tax Map 410, Lot 42 & 53

Richard and Deborah Holmes have been compiling information about the birds they have sighted on their property for several years. Richard Holmes is an experienced ornithologist, and their findings are a great resource as a representation of the birds in Lyme and the surrounding area. Appendix III lists the birds by common and scientific name as well as when the sightings occurred.

The area is a mixture of open hay fields (mowed once per year), marsh edge with extensive alder thickets, and riparian wetlands along Hewes Brook, bordered by mixed deciduous and coniferous woodlands in the uplands. There is habitat for fringed gentian (*Gentiana crinita*) located on the property. Fringed gentian is listed as a threatened species by the New Hampshire Natural Heritage Bureau.

Property Details

The property is owned by Richard and Deborah Holmes. There are two parcels of land: one on the north side (lot 42 – 31.3 acres) and one on the south side (lot 53 – 10.7 acres) of Bliss Lane. Thirty-eight (38) acres of the total approximately 40 acres is in a conservation easement held by the Upper Valley Land Trust. The remaining two acres is occupied by the owners' residence on the north side of Bliss Lane. The easement is to retain the land as undeveloped, scenic, open space as well as to protect the fringed gentian habitat.

L – Mud Turtle Pond Road Area: Tax Map 407, Lot 77

Jackie Glass has walked the area around her home on Whipple Hill Road noting wildflowers. When she first moved here in 2000, she located a small area of yellow lady's-slippers (*Cypripedium parviflorum*) just off of Mud Turtle Pond Road (Class VI road) on an area about 15' wide sloping east and down from the road. The following year there was logging in the area, and it also appeared that someone may have dug up some of the lady's-slippers. Despite this disturbance, she found 15-20 plants in 2005. There is a small stream nearby perpendicular to the road. She also reported seeing evidence in the past of wildlife in the area including black bear, fisher, deer, coyotes, and turkeys.

Property Details

The property with the yellow lady's-slippers is currently in private ownership. There is no conservation easement on this 70 acre lot. Since Mud Turtle Pond Road is a Class VI road, there is no development in the immediate area including the Town Forest of about 370 acres just north of the subject site.

M – Smith Mountain Road/Lily Pond/Mousley Mountain: Tax Map 415 Lot 22 and Map 418, Lot 3

Alfred Balch is a hunter and tracker with years of experience in Lyme. He has walked the area within miles of his home over the years and has gained a sense of the wildlife and its habitat. Victoria Davis is the Lyme Planning & Zoning Administrator and is currently participating in a Keeping Track wildlife

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habitat program. Mr. Balch and Ms. Davis walked the area in December 2006 to document some of the wildlife. In just one day following a light snowfall, they documented recent evidence of moose, deer, coyote, black bear, porcupine, fisher, bobcat, squirrel, snowshoe hare, vole, beaver, turkey, and grouse. The area is clearly rich in wildlife habitat with a mix of coniferous and deciduous forests, wetlands, streams, and ponds. The property parcels in the area of this site visit consists of about 2,200 acres of land unfragmented by maintained roads though several logging roads, trails and the Class VI Smith Mountain Road dissect the properties. There are additional unfragmented lots contiguous to this site area making this a wildlife haven.

Property Details

Lot 415/22 (approximately 1900 acres) is currently in private ownership. A conservation easement was placed on the lot in 1997 and is held by the U.S. Department of Agriculture, Forest Service, Forest Legacy Program. The easement reserved timber rights and allows for public access. This property includes Lily Pond which is about five acres and flows into a series of smaller ponds and wetlands to the south. These ponds and wetlands are undoubtedly important wildlife habitat as shown by the wildlife sign in the area.

Lot 418/3 (approximately 314 acres) is currently in private ownership. There are no conservation easements on this property. A portion of the property was being logged during the site visit in December 2006. This lot includes the peak of Mousley Mountain at an elevation of about 2140 feet. Ledges on the south slope of the mountain are known bobcat habitat according to Mr. Balch as evidenced by bobcat tracks found near the peak in December 2006. Tracks were not found that day around the ledges however.

Q – Trout Pond Area: Tax Map 415 Lot 3 and Map 416 Lots 22 and 24

The Skellys have lived near this area for over 20 years and have walked here exploring during that time. Helen Skelly is a school teacher who took a tracking class and is interested in wildlife habitat. John Skelly is a forester interested in wildlife habitat as well as a former biology teacher.

In December 2006, the Skellys walked a loop including the western edge of Trout Pond for this project. There was fresh snow cover over the three day period they walked the area. They found evidence of red fox, coyote, deer, ruffed grouse, mice, barred owl, squirrel, and porcupine. The area includes Trout Pond, Trout Brook, riparian wetlands, beaver meadow, rough and rocky areas, and hilly to level terrain. During other times, the Skellys have seen or seen evidence of moose, black bear (with young), fisher, otter, mink, short-tailed weasel, bats, skunk, beaver, turkey, and vole. *Appendix III* includes a list of birds which John Skelly has recorded near this site at his home property.

Ben Kilham, Black Bear Researcher, has seen several red pine trees with bear markings on the ledges above Trout Pond.

Property Details

Map 415 Lot 3 is owned by the Town of Lyme. There are 385 acres in this lot. About 300 acres is in conservation easement with the Upper Valley Land Trust to protect the property from development and provide public access. Permitted uses include forestry, recreation, habitat management, education, and scientific research. The remaining approximate 80 acres is in conservation easement with the U.S. Department of Agriculture Forest Service under the Forest Legacy Program to protect the land for “scenic, cultural, fish, wildlife, and recreational resources, riparian areas and other ecological values...

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while at the same time allowing for use of the area for commercial forestry and public recreation purposes....”

Map 416 Lot 22 is in private ownership. There are 135 acres in this lot with no conservation easements. There was a camp on this property which burned down in 2002. There are old foundations marked “Davison” on a 1968 survey as well as “High Walls” of an old mill site.

The Map 416 Lot 24 ownership is currently private. The lot is 378 acres, and there is no conservation easement.

R – Lambert Ridge Area: Tax Map 419 Lot 1

Kathy Wohlfort, Biologist & Matt Stevens, Conservationist at the Appalachian Trail Conservancy did a site visit in January 2007. There was fresh snow cover. They found much evidence of black bear foraging in a large beech stand. There are steep drainages and the slope is primarily an eastern slope. The deciduous forest is of mixed ages. The Appalachian Trail traverses the ridge.

Property Details

Map 419 Lot 1 is a 777 acre lot owned by the United States Department of Interior for the Appalachian Trail. It is part of a much larger complex of lots for the Appalachian Trail traveling through the town.

Just to the west of the visit site is Lot 415/22 (approximately 1900 acres) which is currently in private ownership and is part of the Smith Mountain Road/Lily Pond/Mousley Mountain study site previously described. A conservation easement was placed on the lot in 1997 and is held by the U.S. Department of Agriculture, Forest Service, Forest Legacy Program. The easement reserved timber rights and allows for public access.

X – Bear Hill Ledges Area: Tax Map 410 Lots 14 & 20

Kathy Wohlfort, Biologist; Matt Stevens, Conservationist at the Appalachian Trail Conservancy; and Lee Larson, Lyme Conservation Commission Chair did a site visit in December 2006. The Bear Hill Ledges area is locally known for its cliffs and bobcat habitat. There was fresh snow cover and they saw or saw signs of fisher, deer, porcupine, ermine, coyote, snowshoe hare, pileated woodpecker, and raven. The area visited is the base and lower portion of a very steep south-facing cliff. A boulder field is at the base of the cliffs with a mix of small trees. The cliff is about one-half mile long with very steep sections up to 500’ in height. Several potential bobcat dens were noted in areas with broken rock although no bobcat tracks were found during the site visit.

Ben Kilham, Black Bear Researcher, has seen several red pine trees with bear markings in the Bear Hill area.

Property Details

Map 410 Lot 14 is owned by privately. This is a 150 acre parcel which is not in conservation easement. Map 410 Lot 20 is owned privately. It is a 116 acre lot with no conservation easement.

Y – Holt’s Ledge Area: Tax Map 414, Lot 61.1 and Tax Map 414, Lot 66

Alice Schori, Botanist has been walking this property looking at plants for years. She and Scott Bailey, Geologist of the White Mountain National Forest Service have documented many rare and endangered plants as detailed below. Chris Martin, Biologist of the New Hampshire Audubon Society has been studying the site for another reason: it is a nesting site for Peregrine falcons.

Plants at Holts Ledge

The area of Holts Ledge has a variety of bedrock types including Ammonoosuc volcanic, Oliverian granodiorite, quartz veins, a diabase dike, and felsic tuff. Outcroppings of amphibolite and patterns of seepage that leach nutrients and deliver them to the surface contribute to an exceptionally rich habitat with relatively high pH. Topography adds to the richness of the area below, as debris from the cliffs and steep slopes accumulates on the lower slopes. The same general conditions exist at Winslow Ledge, which is a continuation of the same formation and supports many of the same species. As a result, the Holts-Winslow area has a few species found nowhere else in New Hampshire and several other state-listed rare species generally thought to be calciphiles. The following observations are restricted to the area around and below Holts Ledge.

There are two rare species found at the top of some cliffs. These are two of the species that are known in New Hampshire only from the Holts-Winslow area.

Juniperus horizontalis, or creeping juniper, is a low-growing, probably very long-lived shrub. At one time (back in the 1970’s) it reportedly covered much of the top of the cliff, but trampling by visitors apparently contributed to the loss of most of it. Only one patch was found in September 2005, possibly consisting of one individual. Fortunately, it is thriving and has expanded since the chain-link fence was repaired a few years ago. This species, which is extremely rare in New Hampshire, is very common along the coast of Maine. A cultivated variety known as Bar Harbor juniper is commonly used in landscape plantings.

Solidago ptarmicoides (aka *Aster ptarmicoides* or *Oligoneuron alba*), or snowy aster, is a white, aster-like flower closely related to the goldenrods. In August of 2001, Schori counted over 100 plants in bloom at the top of the ledge and more than 400 on a trail of the Dartmouth Skiway. Since that time, extensive work has disturbed much of that area, and mowing of the ski slopes cannot always be delayed long enough to allow the plants to produce mature seed, so the population is down considerably. Nevertheless, the snowy asters would not be growing on that part of the hill if the ski slopes were not there, and they will likely rebound in the future as the area recovers.

At least one more creeping juniper grows on a shelf on the cliff face, well below the cliff-top plant, with at least 6 stout stems hanging out and over the edge. In September 2002, at least 40 snowy asters were seen scattered in various areas of the cliff, wherever small pockets of soil collect in crevices or on shelves. This is probably an undercount as they were randomly discovered.

The rarest plant at the site is *Carex eburnea*, or ebony sedge, a delicate, grass-like plant. Ebony sedge is common in limestone regions, but this is the only known location for it in New Hampshire. Twelve small clumps were found (rediscovered) on an almost inaccessible shelf of the cliff in 2002.

Another rare sedge, *Carex scirpoidea*, or Scirpus-like sedge, was observed in 2002.

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Another very rare plant at the site is the tiny fern *Woodsia glabella*, or smooth woodsia. The population observed in 2002 was small, with two mature plants, one dying plant, and a dozen immature plants clustered in a small, unique part of the cliff – north-facing, seepy, with a calcareous (diabase) dike. The plants were not vigorous, and this is the southern edge of its range, so long-term survival of this little population may be unlikely.

There is an area of very rich woods with a few scattered ginseng plants (*Panax quinquefolius*) and a large patch of Goldie’s fern (*Dryopteris goldiana*). The main threat to ginseng is collection, so it would be wise not to advertize the location of these plants.

The broad drainage area below the cliffs is a beautiful example of rich mesic forest dominated by sugar maple and white ash. The spring flowers here are spectacular. There are many acres full of rare Squirrel-corn (*Dicentra canadensis*) and the uncommon Dutchman’s breeches (*Dicentra cucullata*), as well as many other calciphilic species, such as Braun’s holly fern (*Polystichum braunii*), bulblet fern (*Cystopteris bulbifera*), rattlesnake fern (*Botrychium virginianum*), sweet cicely (*Osmorhiza claytonii*), blue cohosh (*Caulophyllum thalictroides*), herb robert (*Geranium robertianum*), and baneberries (*Actaea* spp.). One can also find the uncommon Selkirk’s violet (*Viola selkirkii*) near here.

A possible sighting of one other rare species occurred along the trail south of Holts Ledge in September 2005, when a single plant that was probably ciliated aster (*Symphyotrichum ciliolatum*) was found right on the edge of the trail.

State Rank and Status of Rare and Uncommon Species Found in the Holts Ledge Area

| | | | |
|---------------------|----------------------------------|----|----|
| Sedge, Ebony | <i>Carex eburnea</i> | S1 | E |
| Sedge, Scirpus-like | <i>Carex scirpoidea</i> | S2 | T |
| Fern, Bulbet | <i>Cystopteris bulbifera</i> | S3 | SW |
| Squirrel-corn | <i>Dicentra canadensis</i> | S2 | T |
| Fern, Goldie’s | <i>Dryopteris goldiana</i> | S2 | T |
| Juniper, Creeping | <i>Juniperus horizontalis</i> | S1 | E |
| Ginseng | <i>Panax quinquefolius</i> | S2 | T |
| Aster, Snowy | <i>Solidago ptarmicoides</i> | S1 | E |
| Aster, Ciliated | <i>Symphyotrichum ciliolatum</i> | S1 | E |
| Woodsia, Smooth | <i>Woodsia glabella</i> | S1 | E |

S1 – generally 1-5 known occurrences in the state

S2 – generally 6-20 occurrences in the state

S3 – generally 21-100 occurrences in the state

E – state endangered

T – state threatened

SW – state watch (possibly vulnerable to becoming threatened)

Peregrine Falcons at Holts Ledge

The Audubon Society of New Hampshire’s staff and experienced volunteers have been observing a Peregrine falcon nesting site or “scrape” on Holts Ledge since 1987. They participate in this effort

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under authorization of a contract with the NH Fish & Game Department. The Audubon Society has done annual observations and report that from 1987 and 2006, 39 hatchlings have fledged: this is an annual average of two. There is typically one breeding pair at the site. The individuals change over the years probably due to mortality as Peregrine falcons tend to return to a nesting site.

Virtually exterminated from eastern North America by pesticide poisoning in the middle 20th century, restoration efforts have made the falcons a regular sight in many areas. Peregrine falcons were on the federal endangered species list until 1999. They remain on the State of New Hampshire endangered species list. The property owners at the Holt's Ledge site allow Audubon and NH Fish & Game to post a temporary closure in the nesting area to minimize human-related disturbance.

Powerful and fast-flying, the Peregrine falcon hunts medium-sized birds, dropping down on them from high above in a spectacular swoop. Food remains found at the Holts Ledge site indicate the peregrines have eaten wood duck, lesser and greater yellowlegs, spotted sandpiper, short-billed dowitcher, mourning dove, common flicker, hairy woodpecker, blue jay, thrush, cedar waxwing, European starling, red-winged blackbird, common grackle, Baltimore oriole, scarlet tanager, evening grosbeak, sparrow, and various other unidentifiable birds. Although falcons nest on cliffs, they typically hunt in open areas.

Property Details

Map 414 Lot 61.1 is a 200 acre parcel owned by the Dartmouth College for the Dartmouth Skiway. A three acre site at the top of the ski slopes including the ledges is under conservation easement with the United States for the Appalachian Trail. Structures at the top of the ski lift are located within the easement area as well. The three acre site is surrounded on the north and west side by the ski area and the south and east side by federally owned 600 acre Map 414 Lot 66 for the Appalachian Trail. Other than the existing skiway facilities, the three acre site is restricted to noncommercial, passive recreational use only.

CC – Deer Migration and Yarding Area in Southern Lyme

Ben Kilham, naturalist and black bear rehabilitator and researcher has walked this area since he began hunting in the late 1960s. It includes the Hewes Brook and Pressey Brook drainage areas. This is a regional corridor and winter range for deer traveling to Lyme to use this haven during the harsh winters. There are many south facing slopes, sheltered areas, and oak stands for high quality food sources. The climate of this lower area is relatively warm and deer travel in high numbers to this area in the winter. As many as 100 deer have been seen at feeding stations in people's yards. This indicates that there are substantially more deer in the woods. Ben Kilham has witnessed as many as 30 deer traveling together on the trails after the first significant snowfall. There is also activity on these trails during other seasons of the year.

Property Details

This study area crosses over 30 properties in southern Lyme as it is a migratory route for deer in winter. Almost all of these properties are privately owned with no conservation easement. The U.S. government owns tracts going northerly through the migratory trail area for the Appalachian Trail.

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EE – Little Clark Pond Area, Tax Map 412 Lot 1.1 and Map 422 Lot 1

Matt Stevens, Conservationist at the Appalachian Trail Conservancy visited the site in January 2007. This site is located in the southeast corner of Lyme on the town line with Canaan to the south and near the town line with Dorchester to the east.

There was fresh snow cover and they saw signs of fisher, porcupine, squirrel, and black bear as well as obscured tracks. There had been logging in adjacent upland areas accessed by a well-defined road. The pond has a sizeable heath wetland at the northeast with a small riparian area and large boulders adjacent to the wetland. The forest is mixed hard and softwood of mixed ages. The slopes are predominantly eastern, southeastern, and southern.

Property Details

Map 412 Lot 1.1 is a 1,362 acre parcel on the east side of Grafton Turnpike which is owned in private ownership with a 714 acre parcel on the west side of the road. There is no conservation easement on this lot. Map 422 Lot 1 is a 770 acre lot in private ownership. There is no conservation easement on this lot.

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Lily Pond Area – Site Visit Notes

December 29, 2006

Alfred Balch and Victoria Davis (*Note: GPS points are in Lyme GIS*)

- GPS #3: Photos: Moose tracks and bark stripping; Snowshoe hare tracks; coyote tracks; hardwood, pole sized; 1,760' el.
- GPS #4: Lily Pond Dam: photos of pond to north; nearby deer rub; from dam area south along Lily Pond Brook
- GPS #5: Photos: Trail and porcupine
- GPS #6: Photos: Bobcat ledges
- GPS #7: Photos: Grouse tracks near top of Mousley
- GPS #8: Photos: Top of Mousley
- GPS #9; Photos: Bobcat tracks; balsam and spruce, sloping north, just passing thru
- GPS #10: Photos: Soapstone quarry
- GPS #11: Fisher tracks near road
- GPS #12 near headwaters Smith Mountain Brook w/views of mountains

At 7:00 am, we left Alfred's home on ATVs. We followed Smith Mountain Road noting many coyote, snowshoe hare, and turkey tracks along the way. Alfred also pointed out bobcat tracks and old bear clawings on a beech tree on the road on the way back.

It was a clear cold day with temperatures in the mid-teens (F above zero) in the morning. The wind chill made it substantially colder, and I did not take off my gloves for writing unless I absolutely had to. There had been a light snow the evening before so the tracking was excellent and showed very recent activity. There has not been much snow this year so the walking was comfortable in boots.

We turned off Smith Mountain Road onto a trail headed west to Lily Pond. We parked the ATVs when we were close to the pond near the Nichols logging project and continued on foot. Along the trail we stopped to GPS and photograph moose sign as well as snowshoe hare and coyote. The moose had been stripping the bark on the trees in the area. Further along, we stopped at Lily Pond. It is a spectacular pond with several beaver lodges. We walked to the dam to take photographs north and south and GPS the location. We documented a nearby deer rub.

We headed back from the pond and stopped at a set of porcupine tracks to document them. Alfred took us up to some bobcat ledges he is familiar with from his bobcat hunting. We found no bobcat tracks here, but they would have needed to be very recent to be visible. We continued uphill toward the top of Mousley. There are several small natural openings around the top of the mountain due to ledge. Grouse tracks crossed these openings.

We did not find bobcat tracks near the monument at the top so Alfred suggested walking into the spruce and balsam thicket. We walked through a thicket and came out into another opening where Alfred found tracks of a small bobcat. Pretty exciting!

We headed back down the mountain to the ATVs and headed back toward Alfred's. Along the way there was a deep, long hole along the road. We stopped and Alfred said it was a soapstone quarry. We continued on and found fisher tracks crossing the road. We then took a detour to head toward the Smith Mountain Brook headwaters. We stopped at the end of the trail where Alfred pointed out a tree with new and old bear clawings. Alfred said there is a beaver pond more toward the headwaters, but it would be a long walk.

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We arrived back at Alfred's house at 3:00 pm. A great day!

Sign Sightings:

Moose
Deer
Coyote
Black Bear
Porcupine
Fisher
Bobcat
Squirrel
Snowshoe Hare
Vole
Beaver
Turkey
Grouse

Natural Resource Inventory for Lyme, NH

December 28, 30, & 31, 2006

John & Helen Skelly (Note: GPS points are in Lyme GIS)

Site Q – Trout Pond Area – Site Visit Notes

- GPS #1: Photos: Red fox hunting both sides of Trout Brook; fox tracks (12/30/06); near farmland; brook frozen in level beaver meadow, open, alders, shrub.
- GPS #2: Photo: Stone retaining walls about 15' apart, 10' tall, and 30' long; terrain rough and rocky; old mill? (12/30/06); parallel to Trout Brook; wooded upland, rough and rocky, mostly large, mature coniferous trees, S slope aspect.
- GPS #3: Photos: Coyote tracks and coyote tracks on deer tracks (12/31/06); human woods trail; wooded upland, hilly terrain with thick second growth hardwoods; mostly larger, mature deciduous trees; NE slope aspect.
- GPS #4: Photos: Grouse tracks and habitat along pond and Smarts Mountain; ground feeding (12/31/06); near Trout Pond; along/near Trout Pond hiking trail; very rocky, boulder terrain; mostly larger, mature coniferous -- Spruce/Hemlock with some hardwood; E aspect of slope.
- GPS #5: Photos: Rodent Crossing (12/31/06); good predator perches in trees to aid the resident Barred Owl population as they hunt these rodents; heard owls at night; wooded upland with mostly larger, mature mixed trees; E aspect of slope.
- GPS #6: Photos: Coyote trail on rodent tracks (12/31/06); fresh coyote trail with multiple individuals working the log road network; fairly new, wide woods road; wooded upland, mostly larger, mature deciduous trees; no slope.
- GPS #7: Photos: Squirrel tracks and boulder habitat (12/31/06); very rocky, boulder slope down to edge of Trout Pond; wooded upland, mostly large mature coniferous trees; E slope aspect.
- GPS #8: Photos: Yellow birch with "rodent" gnaw marks (12/28/06); faint unspecified tracks; boulder-type terrain; mostly larger, mature deciduous trees; NE slope aspect.
- GPS #9: Photos: Coyote scent markings along log road (12/31/06); wooded upland, hilly to level terrain at base of unnamed "mountain," mostly larger mature deciduous trees; W slope aspect.
- GPS #10: Photos: Deer trail crossing log road (12/31/06); wooded upland, hilly to level terrain, mostly larger, mature deciduous trees; level.

12/28/06 – clear; 28 degrees F; fresh cover of snow

12/30/06 – heavy overcast; 22 degrees F; fresh cover of snow with falling snow up to 3"

12/31/06 – clear; 28 degrees F; fresh cover of snow

Sign Sightings & Calls:

Red Fox

Coyote

Deer

Squirrel

Grouse

Mice

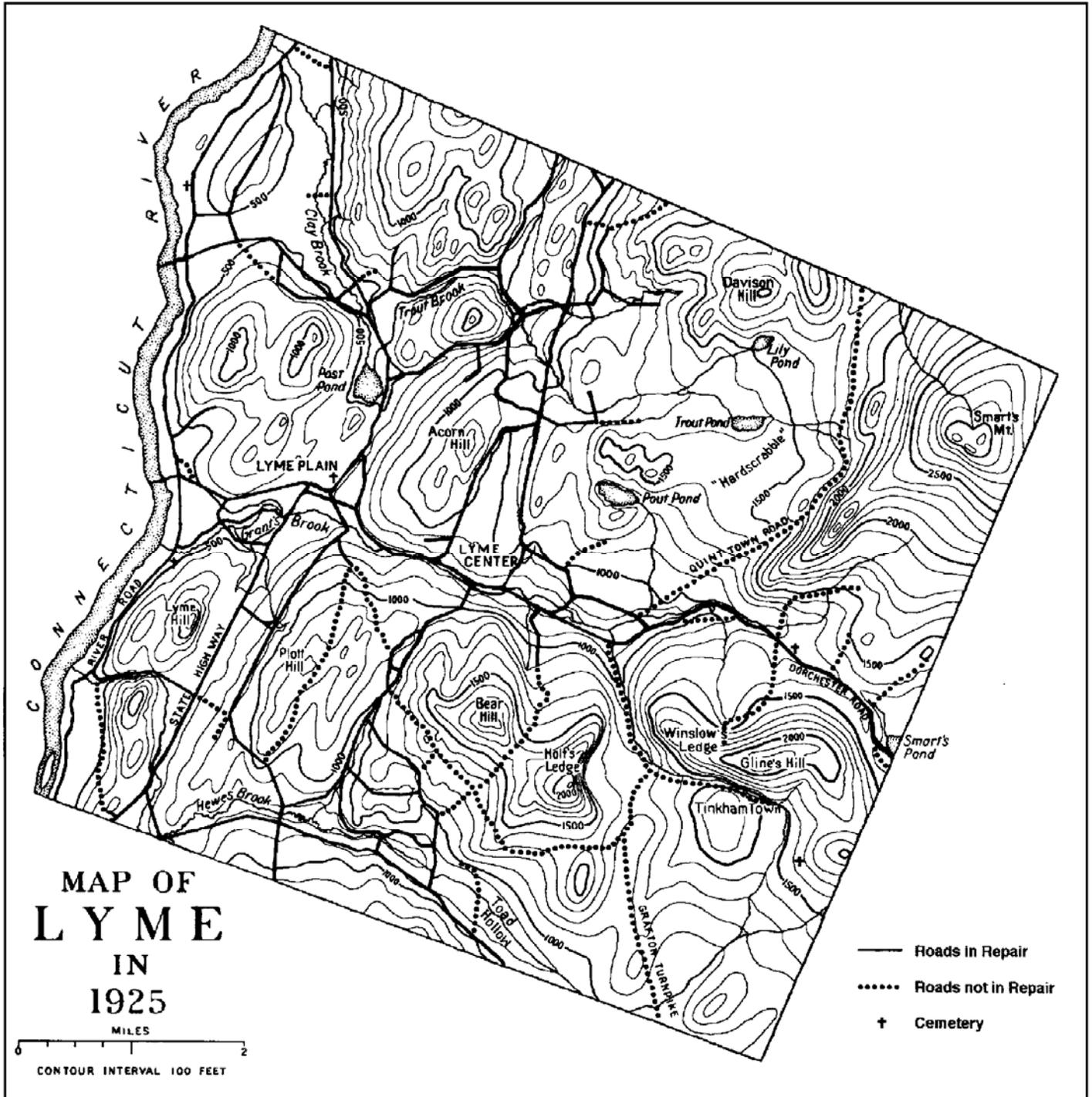
Rodent (porcupine???)

Barred Owls

APPENDIX V
Post Pond, Lyme, NH: Wetland Evaluation and Impact Assessment

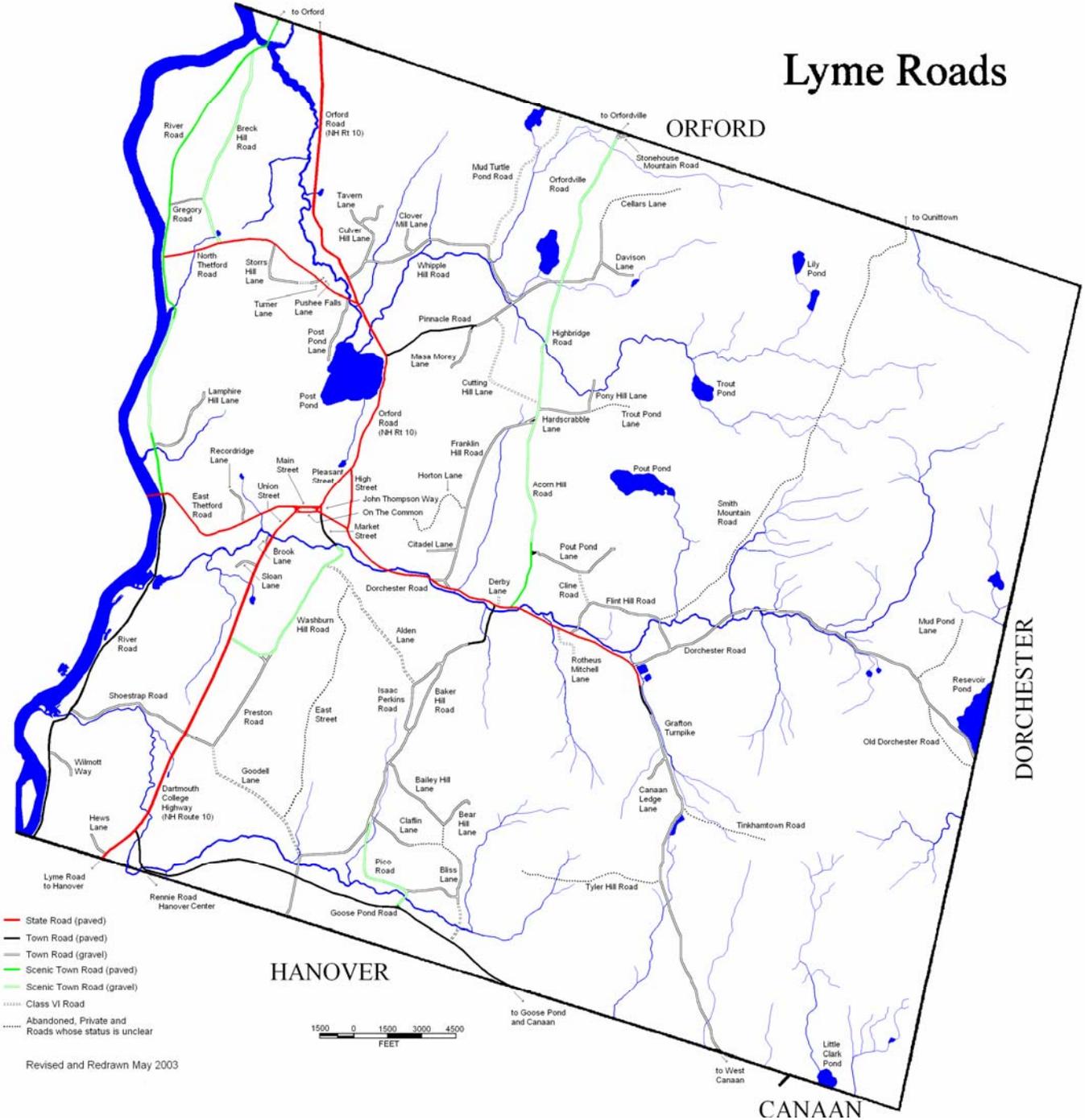
MAPS

ROADS DOCUMENTED IN 1925 – PROVIDED BY LCC

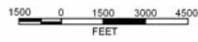


ROADS DOCUMENTED IN 2003 – PROVIDED BY LCC

Lyme Roads



- State Road (paved)
- Town Road (paved)
- Town Road (gravel)
- Scenic Town Road (paved)
- Scenic Town Road (gravel)
- Class VI Road
- Abandoned, Private and Roads whose status is unclear



Revised and Redrawn May 2003

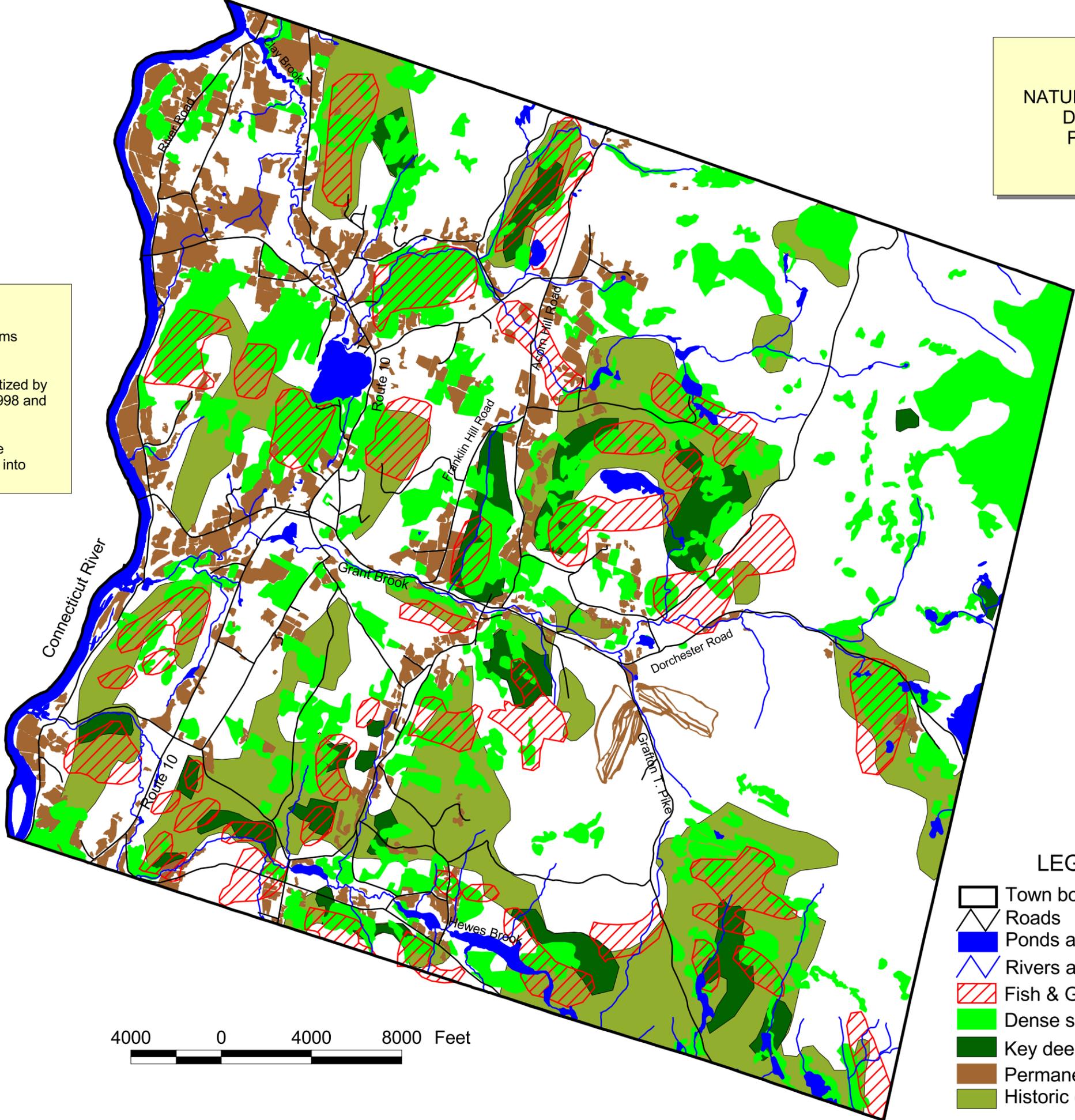
TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 DENSE SOFTWOOD AND
 PERMANENT OPENINGS
 AUGUST 2007

Data Sources

Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Dense Softwoods and Permanent Openings digitized by Watershed to Wildlife, Inc. 2007 using 1992, 1998 and 2003 aerial photographs.

1985 and 1998 Deer Yards and Wintering Range identified by NH Fish and Game. Data digitized into ArcView by Watershed to Wildlife, Inc.



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- LEGEND**
- Town boundary
 - Roads
 - Ponds and open water
 - Rivers and streams
 - Fish & Game Inventoried Deer Yards - 1998
 - Dense softwoods
 - Key deer yards - 1985
 - Permanent openings
 - Historic deer wintering range - 1985

TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 WETLANDS, HYDRIC SOILS AND
 CONSERVATION LANDS
 AUGUST 2007

Data Sources

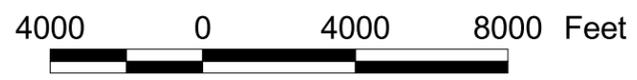
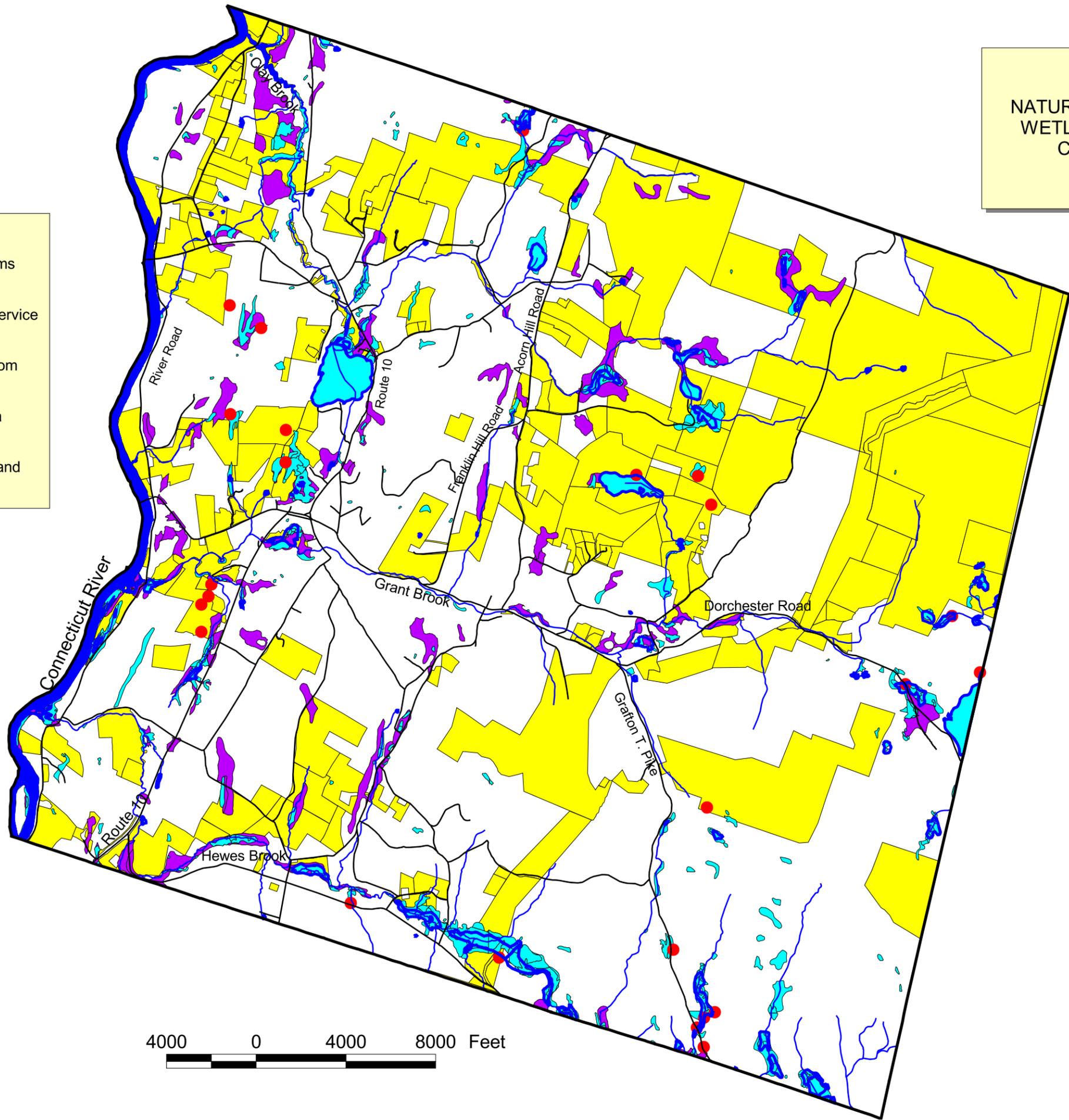
Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Wetlands obtained from U.S. Fish and Wildlife Service and GRANIT.

Poorly and Very Poorly Drained Soils obtained from the Natural Resource Conservation Service.

Potential Wetland site locations identified using a Garmin III+ handheld unit.

Conservation Land data obtained from GRANIT and The Town of Lyme.



- LEGEND**
- Town Boundary
 - Roads
 - Ponds and open water
 - Rivers and streams
 - Wetlands
 - Poorly drained soils - NRCS
 - Conservation land
 - Potential wetlands

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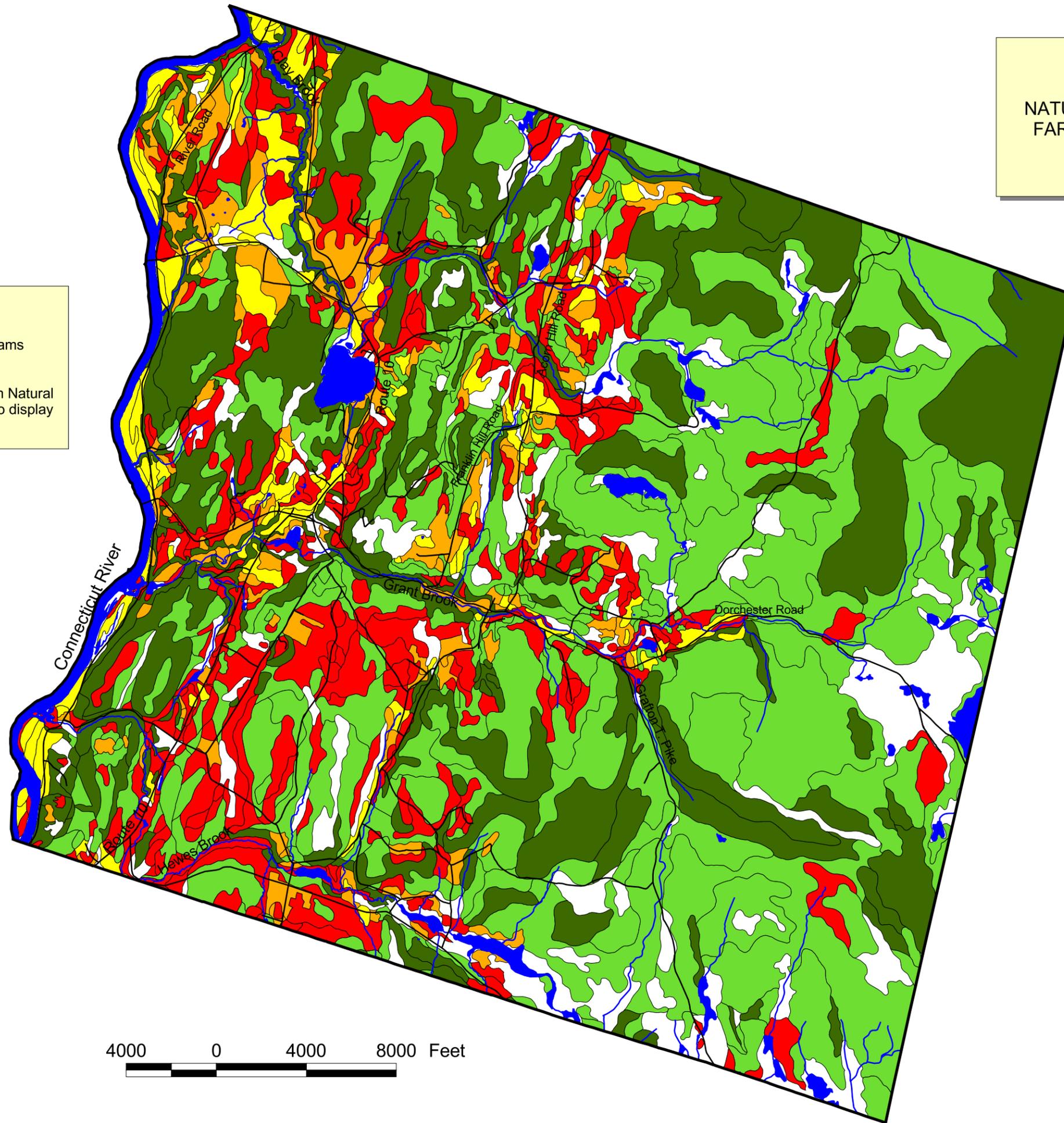


TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 FARMLAND AND STEEP SLOPES
 AUGUST 2007

Data Sources

Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Farmland Soils and Steep Slopes obtained from Natural Resource Conservation Service and queried to display farmland and steep slopes.



LEGEND

-  Town boundary
-  Roads
-  Ponds and open water
-  Rivers and streams
-  Prime farmland
-  State farmland soils
-  Local farmland soils
-  Slopes 15 - 25%
-  Slopes > 25%



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TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 WILDLIFE AND UNIQUE HABITATS
 AUGUST 2007

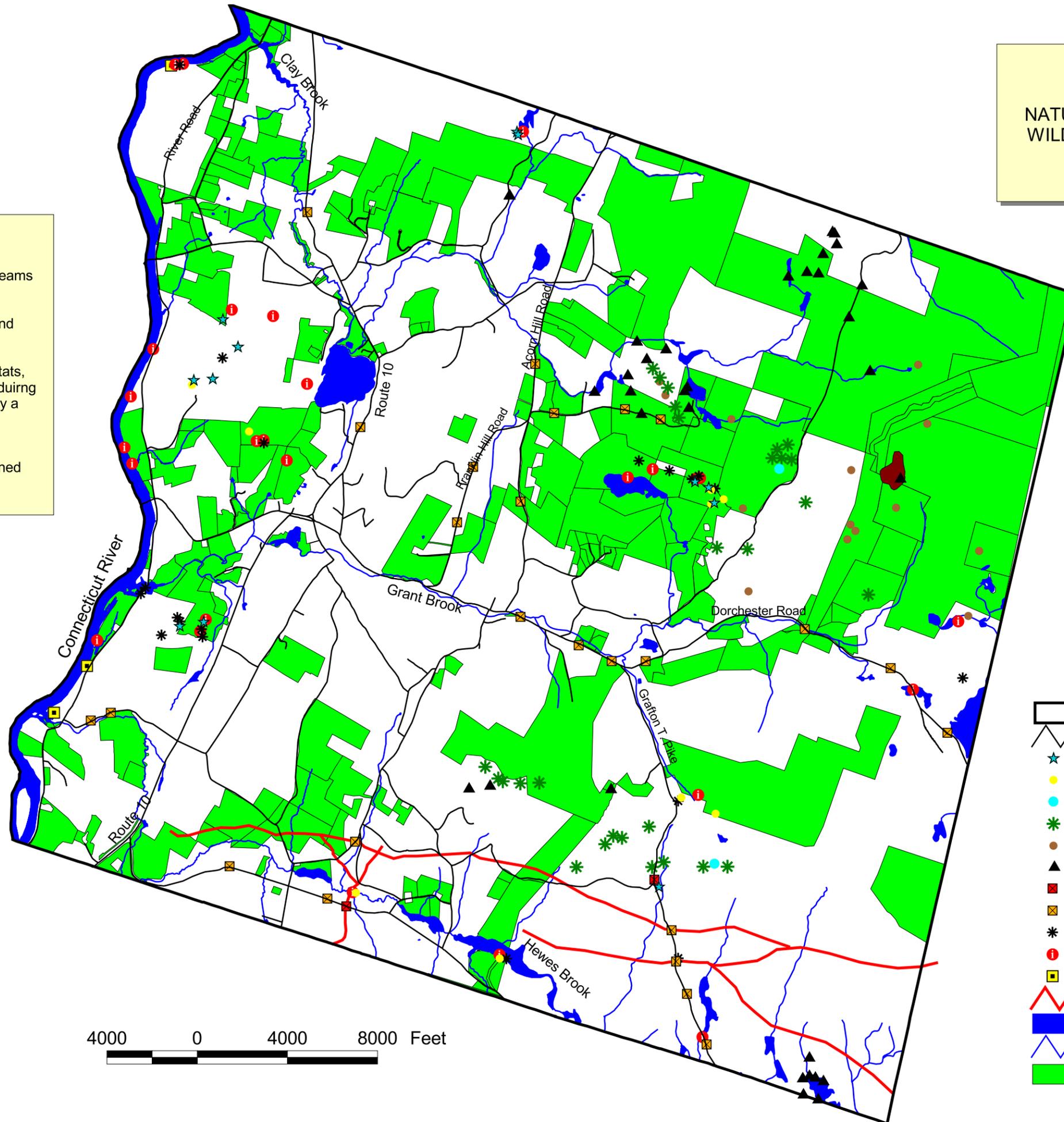
Data Sources

Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Conservation Lands obtained from GRANIT and the Town of Lyme.

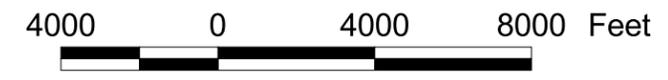
Vernal Pools, Erosion Problems, Unique Habitats, Unique Plants, Animals Observed identified during field work by WTW with a GPS point taken by a Garmin III+ handheld unit.

Bear habitat points and Lyme Conservation Commission (LCC) field inventory data obtained from the Town of Lyme.



LEGEND

- Town boundary
- Roads
- Vernal pools
- Unique habitats
- Bear wallows
- Bear trees
- Bear dens
- LCC Volunteer Fieldwork Inventory
- LCC wildlife crossings - 2007
- LCC Wildlife crossings - 1985
- Unique plants observed - 2006
- Animals observed - 2006
- Erosion problem areas
- Wildlife travel corridor
- Ponds and open water
- Rivers and streams
- Conservation land



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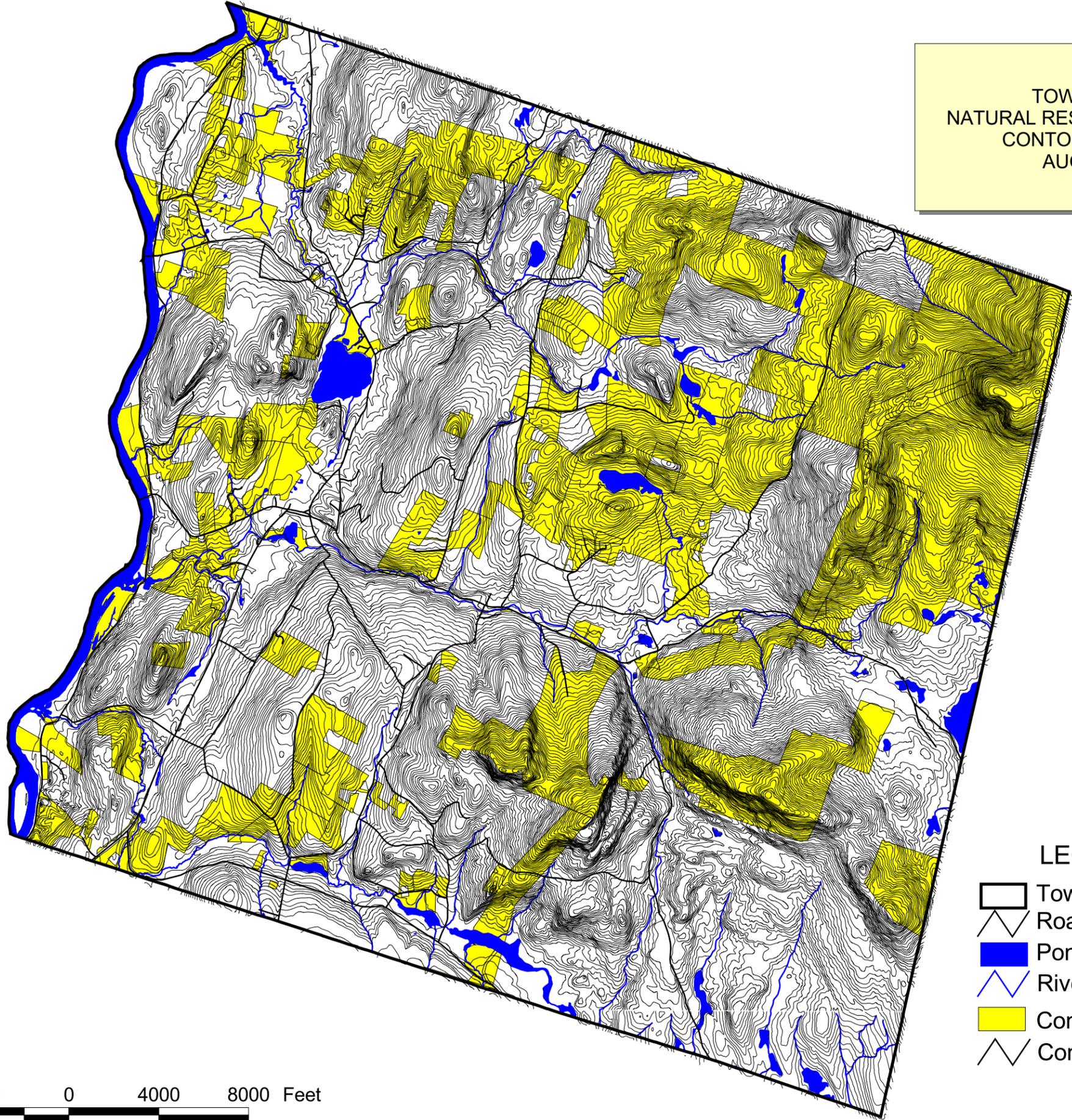
TOWN OF LYME
NATURAL RESOURCE INVENTORY
CONTOUR INTERVALS
AUGUST 2007

Data Sources

Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Conservation Land obtained from GRANIT and The Town of Lyme.

Contour Intervals obtained from the Town of Lyme and generated by Cartographic Associates, Inc.



- LEGEND**
- Town Boundary
 - Roads
 - Ponds and open water
 - Rivers and streams
 - Conservation land
 - Contour Interval

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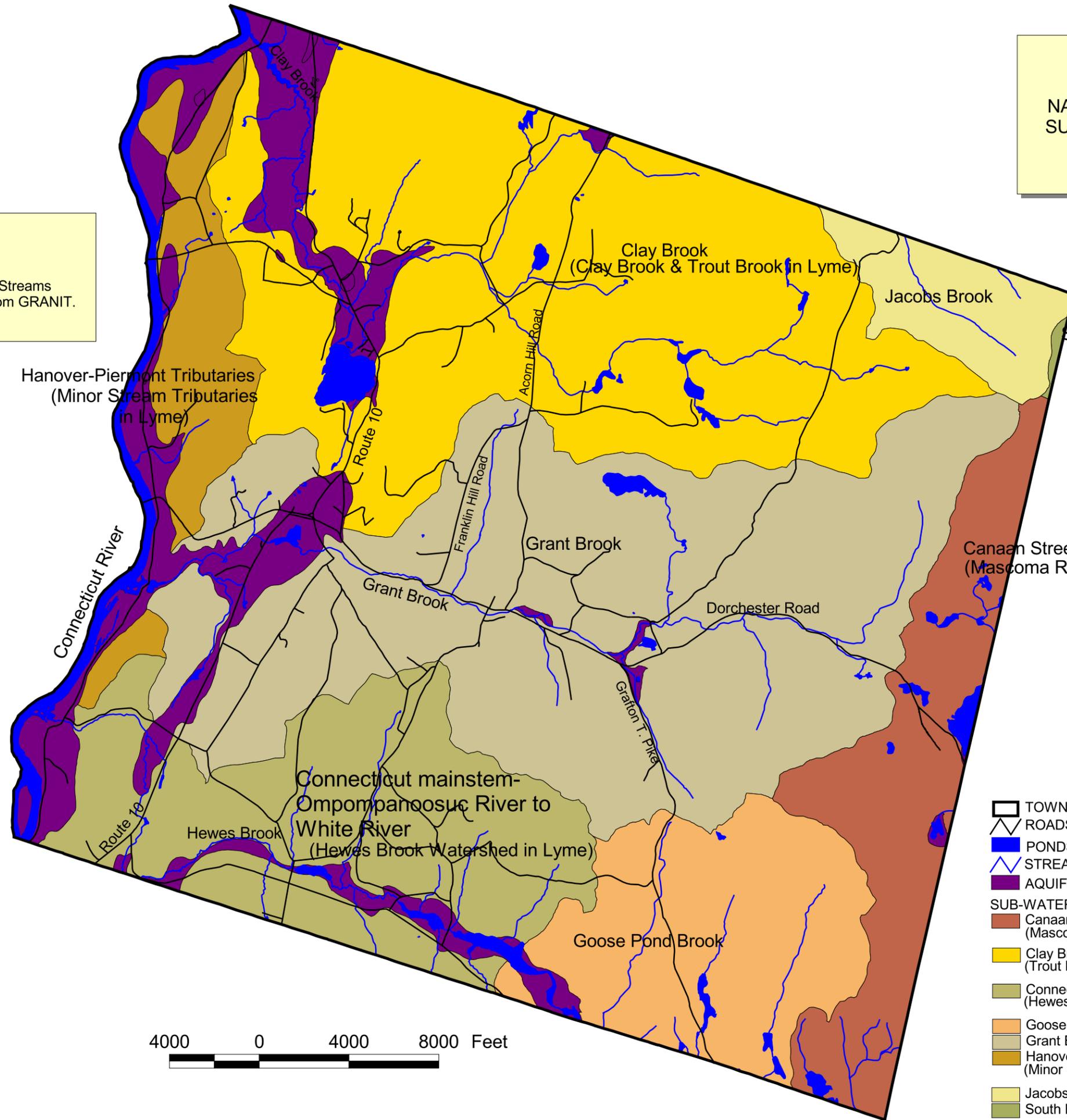
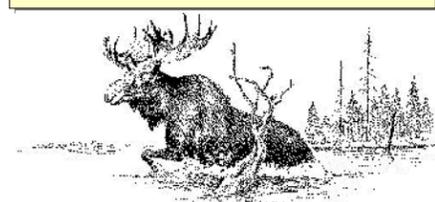
TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 SUBWATERSHEDS AND AQUIFERS
 AUGUST 2007

Data Sources

Town Boundary, Roads, Open Water, and Streams
 Subwatersheds, and Aquifers obtained from GRANIT.



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LEGEND

- TOWN BOUNDARY
- ROADS
- PONDS AND OPEN WATER
- STREAMS AND RIVERS
- AQUIFERS
- SUB-WATERSHEDS: NH-DES HUC 12 Names
- Canaan Street Lake (Mascoma River in Lyme)
- Clay Brook (Trout Brook & Clay Brook in Lyme)
- Connecticut mainstem-Ompompanoosuc River to White River (Hewes Brook Watershed in Lyme)
- Goose Pond Brook
- Grant Brook
- Hanover-Piermont Tributaries (Minor Stream Tributaries in Lyme)
- Jacobs Brook
- South Branch

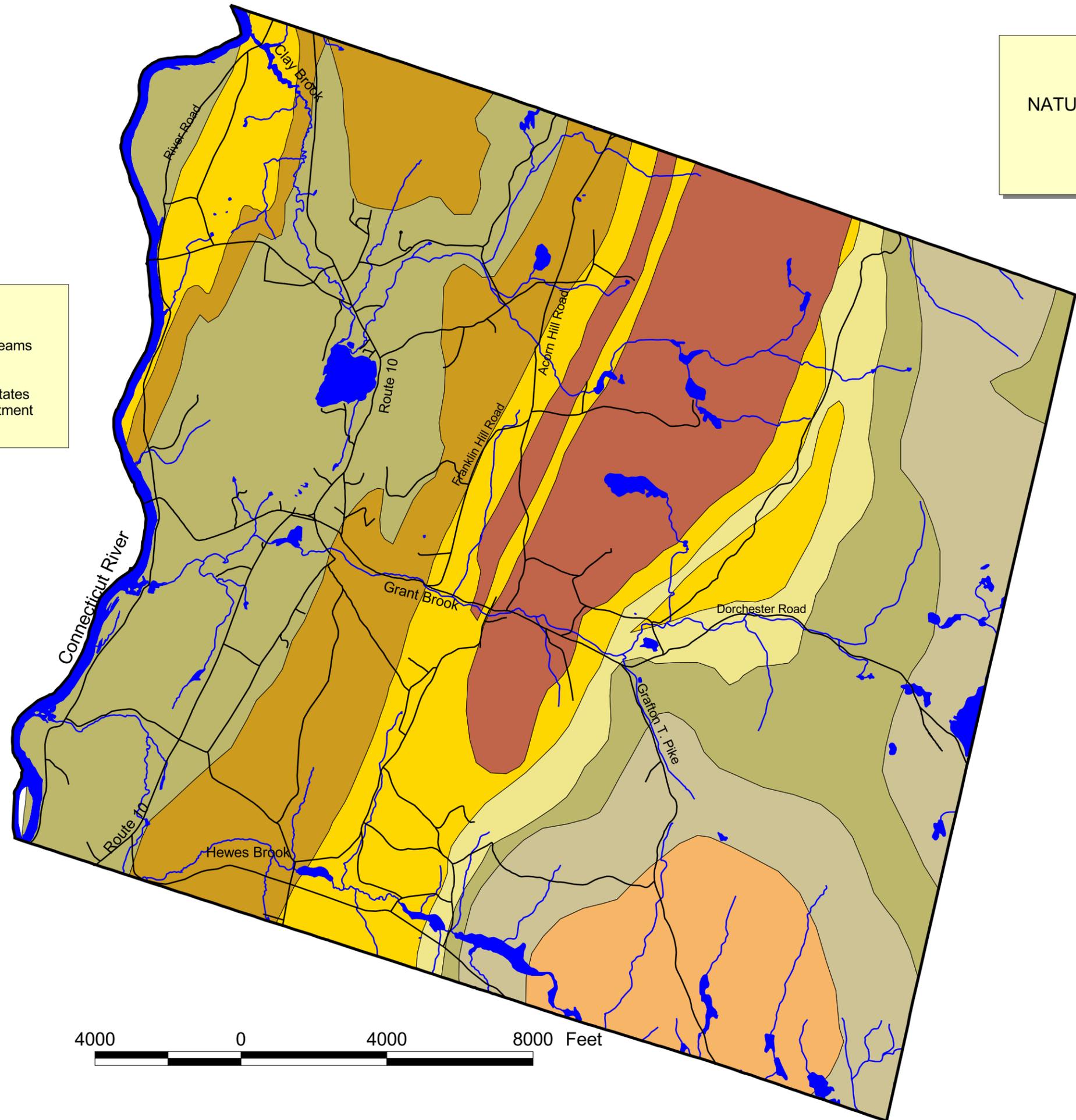


TOWN OF LYME
 NATURAL RESOURCE INVENTORY
 SURFICIAL GEOLOGY
 AUGUST 2007

Data Sources

Town Boundary, Roads, Open Water, and Streams obtained from GRANIT.

Surficial Geology data obtained from United States Geologic Survey and New Hampshire Department of Environmental Services.



- LEGEND**
- Town boundary
 - Roads
 - Ponds and open water
 - Rivers and streams
- Surficial Geology Codes**
- Db2b
 - DI
 - Oalx
 - Oo1b
 - Oo2-3A
 - Op
 - Sfc



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