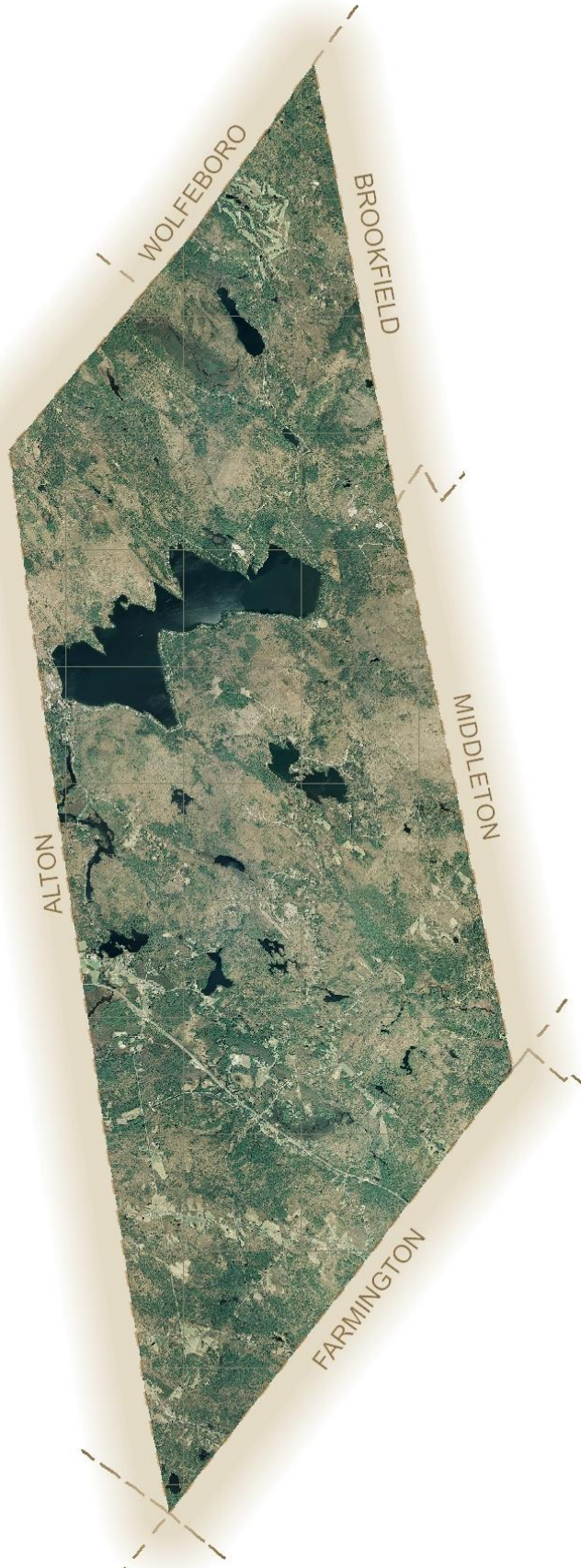


NATURAL RESOURCES INVENTORY

.....
Town of New Durham, NH



May 2011

Prepared for:

New Durham Conservation Commission
4 Main Street
New Durham, NH 03855

Prepared by:

FB Environmental Associates
97A Exchange St, Suite 305
Portland, ME 04101



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the Piscataqua Region Estuaries Partnership
with funding from the New Hampshire Charitable Foundation – Piscataqua Region.*



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William J. Malay

Robert Craycraft, Alternate

Terry Jarvis, Selectman's Representative

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1. Introduction

This report presents the details for the 2011 Natural Resources Inventory (NRI) of New Durham, New Hampshire. The New Durham Conservation Commission (NDCC) initiated this project, in part, to meet its statutory obligation under RSA 36-A:2 which states that a town, having established a conservation commission for the proper utilization and protection of its natural resources and watershed resources, shall prepare an index of all open space and natural, aesthetic or ecological areas within the town, for the purpose of recommending to the selectmen a program for the protection, development or better utilization of all such areas. The index referred to in this law is a natural resources inventory.

1.1 Purpose

What is a Natural Resources Inventory (NRI)?

An NRI is an index that identifies and describes important naturally occurring resources within a given locality by using maps, documentation of mapped data, and a descriptive report. A comprehensive NRI provides the basis for land conservation planning, and allows natural resources information to be included in local planning and zoning. As new and revised data emerge, NRIs may need periodic updating and refining, but the initial NRI provides a baseline for observing changes over time (Stone, 2001).

Why complete an NRI?

The reasons to prepare an NRI go beyond the statutory requirement mentioned above. In order to protect local natural resources, they must first be located and identified. Until an NRI is conducted and the information is compiled, many communities do not have a clear picture of where resources are located, which are significant to them and why.

The future of a natural resource base is largely dependent on land use decisions made at the local level. Communities frequently need to make decisions affecting natural resources, but very often don't have adequate data available to back those decisions. By identifying and describing natural resources in a local setting, a natural resources inventory provides communities with a strong foundation for more informed decision-making. It also encourages participation in identifying and protecting natural resources important to the community, and provides information that will support careful land use planning, voluntary land conservation, and improved resource protection measures.

A major accomplishment of an NRI is the creation and compilation of visual images (maps and photos), the associated data tables and descriptions, and a better understanding and appreciation of the community's natural resources (Stone, 2001).

How is an NRI used?

The results of an NRI should be available for use by town officials, other interested community groups and citizens. Some ways that an NRI can be used include the following (Stone, 2001):

- Documentation of current conditions so that changes over time can be assessed
- Development of a “Conservation Plan”
- Education of local officials and the public about the community’s natural resources
- Initiation and support of land protection efforts
- Identification and protection of habitat
- Providing a basis for land use efforts
- Development or updating the Natural Resources section of the municipal Master Plan
- Evaluation of the efforts of proposed land use and zoning changes
- Development of amendments to existing zoning ordinances
- Screening of development proposals

1.2 Background

In recent years, the Town of New Durham has been working on implementing the goals outlined in the New Durham Master Plan (2008). The Natural Resources section of the Master Plan includes policy goals, principles, standards, and implementation strategies related to protection, conservation and/or use of natural resources including aquifers, wildlife, forests, riparian environments, views, wetlands, night sky protection and other land, water and air resources. The New Durham Master Plan outlines a natural resources policy goal of *“improving the Town’s natural resources and rural landscape including prime agricultural soils, forests, wildlife habitat and water and air quality for the sustainable health, safety and welfare of current and future generations.”* To this end, one of the strategies outlined in the Master Plan is to support the New Durham Conservation Commission’s efforts to complete a natural resources inventory (Town of New Durham, 2008).

The New Durham Conservation Commission (NDCC) was established in 1969 to aid town boards, developers, and land owners in the protection of the natural resources in the town. The Commission's primary goal is to work with town residents to provide for the protection and appreciation of natural resources. The NDCC is committed to broadening public awareness of the natural resources of New Durham in the belief that it will inevitably lead to greater commitment to their careful stewardship.

The NDCC recognized the need for a comprehensive summary of the town’s natural resources that would assist the NDCC in public education and outreach and help build support for future conservation initiatives. Since NDCC members frequently rely on personal knowledge of existing natural resources, the NRI would compile existing information and be passed to new members over time. Furthermore, the NRI could assist the Planning Board in its efforts to review and amend regulations directed at protecting the town’s natural resources.

In 2010, the New Durham Conservation Commission was awarded a grant from the Piscataqua Region Estuaries Partnership (PREP) to develop a natural resources inventory. Through PREP's formal Request for Proposal process, the NDCC contracted with FB Environmental Associates to carry out the NRI which, when completed, will be adopted as a supplement to the New Durham Master Plan.

1.3 New Durham NRI Goals and Objectives

NRI Goals

The NRI should provide data to the town in its efforts to better address, at a more integrated level:

- How conservation initiatives are developed to target the most critical resources for protection efforts; and,
- How planning and zoning decisions are developed and implemented based on a clear understanding and consideration of the location and importance of natural resources.

NRI Objectives

- The NRI will bring together all available data to provide a comprehensive overview of the natural resources in New Durham. The compiled data will be used to identify high priority areas for conservation that can be targeted for protection and be considered as part of the development of any subdivision regulations and/or zoning ordinances.
- The NRI will provide maps of natural resources in town based on existing data.
- The results of the NRI will provide the framework, including informative GIS maps, necessary to educate the electorate of New Durham's Natural Resources. The resulting GIS natural resource maps would be posted on the New Durham Town website.

1.4 Methodology and Report Organization

This New Durham Natural Resources Inventory is based on the methodology outlined in *Natural Resources Inventories – A Guide for New Hampshire Communities and Conservation Groups* by the University of New Hampshire Cooperative Extension (Stone, 2001).

The following sections of this document describe the types, values, and potential threats to the different natural resources found in the Town of New Durham. Geographic Information System (GIS)-based data and maps related to each resource are presented. For each natural resource type included below, a description of the resource and its extent in the town is provided, as well as any known and/or potential

Geographic Information System (GIS) - A computer system capable of capturing, storing, analyzing, and displaying geographically referenced information; that is, data identified according to location.

threats. Discussion of the important natural resources that should be prioritized for long-term protection and recommendations for improving conservation and protection measures for the identified resources are also provided. An accompanying Map Set is presented in the report appendices.

DISCLAIMER:

The data presented in this inventory came from a variety of sources and were obtained using a variety of different analytical and/or estimated methods. Much of the data utilized in this NRI represent stock data sets obtained from the NH GRANIT database as maintained by the Complex Systems Research Center (CSRC) at the University of New Hampshire. NH GRANIT and CSRC maintain a continuing program to identify and correct errors in these data but make no claims as to the validity or reliability or to any implied uses of these data. As a result, the data should be used for planning purposes only. If greater data precision is required, this inventory should be supplemented with field surveys or other on-the-ground methods of data collection.

There may also be minor data discrepancies throughout this document due to the variety of source materials and mapping standards used. The reader is encouraged to refer to the original referenced sources if specific data inconsistencies need to be resolved.

2. Natural Resources

Located in Strafford County in south-eastern New Hampshire, the Town of New Durham covers 43 square miles (28,054 acres). The town lies to the southeast of Lake Winnepesaukee and is bound by Wolfeboro to the north, Alton to the west, Farmington to the south and Brookfield and Middleton to the east.

New Durham is served by the east–west state highway Route 11, providing the community with gateway access to the seacoast of New Hampshire thereby making it commutable to Rochester, Dover and Portsmouth. The population was 2,220 at the 2000 census. The 2009 population was estimated to be 2,586.

New Durham is fortunate to have within its boundaries a large number of water bodies and other natural resources. The largest waterbody is Merrymeeting Lake, famed for its pristine waters, and home to the New Hampshire Fish and Game Department’s Powder Mill Fish Hatchery. New Durham is drained by the Ela River, Merrymeeting River and the Cochecho River. Much of the town’s land area is still open and provides many recreational opportunities such as snowmobiling, boating, hiking, mountain bike riding. The natural beauty of New Durham’s mountains and lakes attracts many visitors and seasonal residents.

New Durham's highest point is 1,752 feet above sea level, on the western slope of Copples Mountain, along the town's eastern border. The mountain's 1,868-foot summit is in the neighboring town of Brookfield. The community also has panoramic views of Mount Washington, Mount Chocora, Mount Bet, Mount Jessie, Mount Rattlesnake, Mount Rand, Mount Caverley and Prospect Mountain. The following sections describe these resources in more detail.

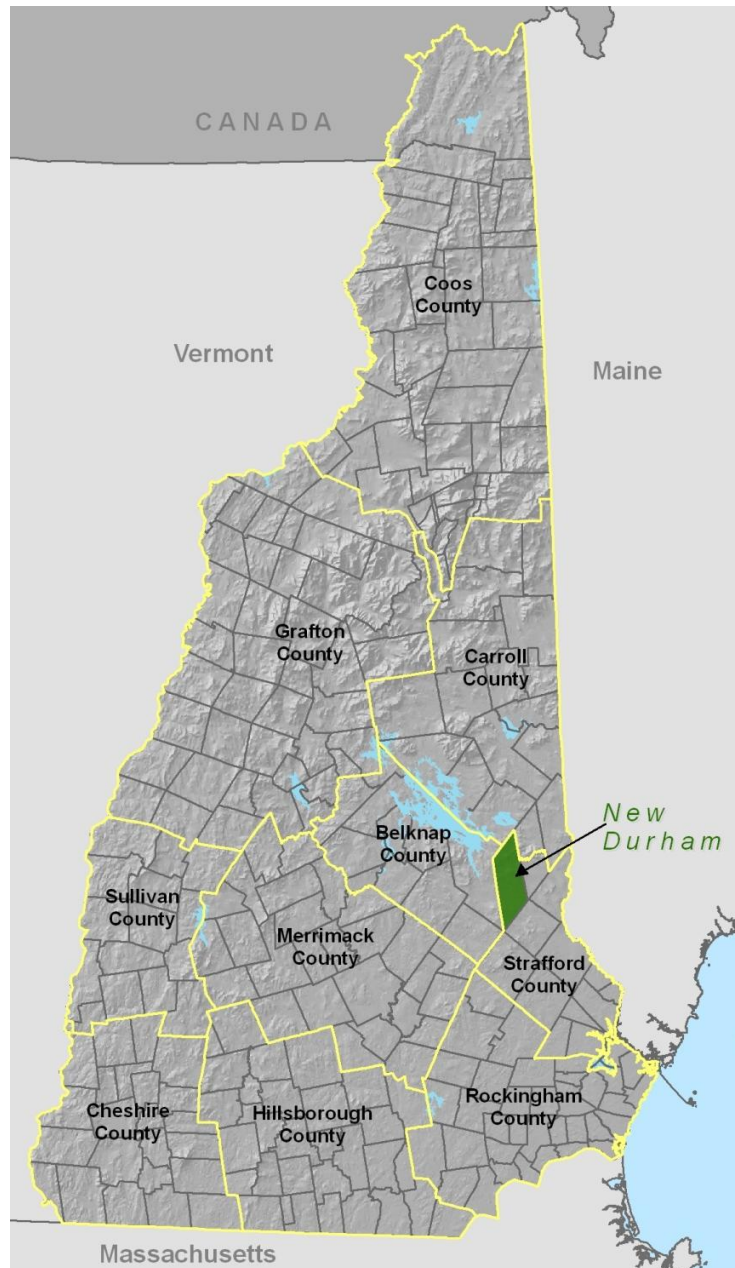


Figure 1: New Durham locator map.

2.1 Topography

Identifying the physical structure and composition of a community's natural landscape is an important starting point and context for evaluating its specific natural resource suites. Topography provides the basic conditions for understanding how a landscape evolves into areas valuable for specific natural functions such as agriculture, forestry, hydrology, and wildlife habitat, or cultural functions such as scenic vistas.

*Topography-
Features on the
surface of the land,
also called terrain.*

Topography is also an important factor in the assessment of suitability of development or resource protection. Higher points on the landscape are a visual asset and as such, are vulnerable to potentially unsightly development.

As illustrated on Map 3 (Topography) New Durham's highest elevations are located in the northern half of the town, in the area surrounding Merrymeeting Lake. The highest point in the town is 1,752 feet above sea level, on the western slope of Copple Crown Mountain, along the town's eastern border. The southern half of the town has generally flat to moderately sloping landscapes, dominated by low hills and the floodplains of the Cochecho River, Hayes Brook, Ela River and their tributaries, as well as numerous lakes and ponds. The highest point in the southern half of the town is New Durham Ridge at 1,007 feet. The highest elevations in town include¹:

Copple Crown Mountain (1,752 feet)

Rand Mountain (1,580 feet)

Caverly Mountain (1,433 feet)

Mount Molly (1,250 feet)

Birch Ridge (1,260 feet)

Mount Jesse (1,400 feet)

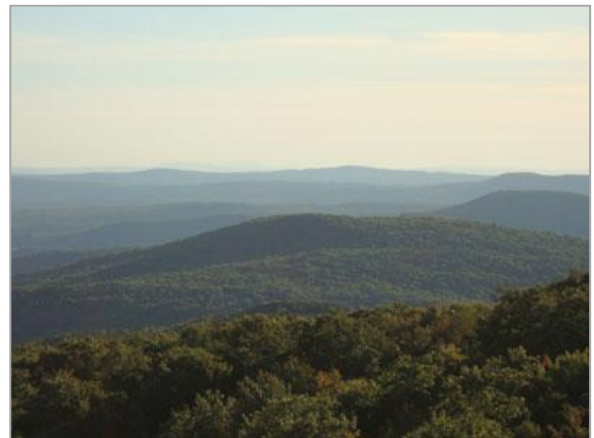
Mount Bet (1,400 feet)

Devil's Den Mountain (1,100 feet)

Mount Eleanor (1,120 feet)

New Durham Ridge (1,007 feet)

Rattlesnake Mountain (1,000 feet)



Caverly Mountain as seen from Copple Crown Mountain. (Source: www.franklinsites.com)

¹ Based on topographic maps and an analysis of digital topographic data conducted by NDCC in 2000 (NDCC, 2002).

Visual Resources

The New Durham community has panoramic views of Mount Washington, Mount Chocora, Mount Bett, Mount Jessie, Mount Rattlesnake, Mount Rand, Mount Caverley and Prospect Mountain. Many hillsides, ridgelines and other open spaces provide aesthetic value, important for the preservation of an area’s natural beauty, historical context, and character. Development and site disturbances in these areas can cause permanent adverse impacts on scenic value, especially on hillsides and ridgelines that are visible from public roads and facilities. NH DES, in its *Innovative Land Use Planning Techniques: a Handbook for Sustainable Development* (2008) recommends conducting an inventory of visual resources and developing land use overlays for protection of important viewsheds to minimize impacts on these resources.

Steep Slopes & South-Facing Slopes



Figure 2: New Durham steep and south-facing slopes.

Steep slopes and solar aspect are important terrain considerations in conservation planning. Slopes in excess of 25% gradient are considered unbuildable due to site grading and erosion issues (PLTA, 2011). Generally, as slope increases, service and development costs increase. Therefore, the steeper the slope, the more unsuitable development becomes.

During construction, removal of the soil humus layer, or addition of impervious surfaces can cause excess surface runoff on moderate or steep slopes, thereby leading to erosion and stream pollution through increased sedimentation. Thus, slopes over 25 percent should remain naturally vegetated as part of an open space system. Where construction occurs on moderate slopes, proper erosion and sediment controls should be required.

Steep rocky slopes offer den sites and sunning areas, important to bobcat and porcupine, especially where the land cover on south-facing slopes is hardwood forest. South-facing slopes on are also valuable wildlife sunning areas and with conifer tree canopy and often host deer wintering areas. These areas are generally sunny and warm and thus preferred by wildlife (such as wild turkey and white-tailed deer), especially in the winter. South facing slopes on the

map at left include any south or southwest facing slopes with a gradient over 10%.

Steep slopes tend to be found along the sides of the hills and mountains surrounding Merrymeeting Lake, and amount to about 143 acres town-wide; they are currently only 2% protected. South-facing slopes (with a gradient of 10% or more), are found throughout New Durham, but are most dominant in the northern portion of the town.

2.2 Geology

Bedrock Geology

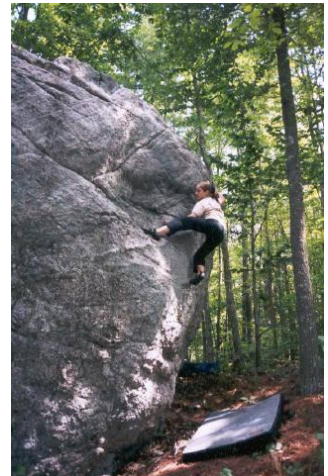
About 10,000 to 15,000 years ago, the land area of New Hampshire emerged from the glacial age. The melting ice revealed dramatic changes in the landscape. Mountains were rounded off. Chunks of bedrock were picked up and dragged for miles, then left behind as the large glacial boulders now called erratics.

The pattern of a general southwest to northeast direction of the receding glaciers of over 12,000 years ago can be seen today in New Durham as well as in most of New England (Marland, 1980). This process formed the rivers and lakes that we see today. The soil variations found throughout the Town of New Durham 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, waterbodies, and vegetation occurring above them.

Ledge and rock outcrops are very common in New Durham, particularly in the northern half of the town, such as Owl's Head on the northern shoreline of Merrymeeting Lake. There are also several sheer drops on Rand Mountain, Devil's Den, Mount Molly as well as numerous other unnamed ledge drops. Most of these vertical ledges were formed by a type of glacial erosion called 'plucking'. During this process, as a glacier flowed down hill, rock was torn loose from the downstream side and carried away in ice. These formations provide very unique wildlife and plant habitats such as bear and bobcat den sites.

Another type of rock formation, glacial erratic boulders, can be found next to Club Pond, off of Old Bay Road in New Durham. A glacial erratic is a piece of rock carried by glacial ice some distance from the original rock outcrop from which it came. There are three basic rock types: igneous, sedimentary and metamorphic. The Town of New Durham is divided into two general bedrock types. In the northern half of town the bedrock consists primarily of igneous rocks, which are formed through the cooling and solidification of magma or lava. The rocks in this area are primarily granite, with small areas of other rock types interspersed. Map 3 (Bedrock Geology) in Appendix 3, and Figure 3 on the following page, show two areas of this general bedrock type in New Durham: the area

Bedrock Geology-
Solid unweathered rock lying beneath surface deposits of soil.



The glacial erratic boulders at Club Pond in New Durham are a popular spot for rock climbers. (Source: rockclimbing.com)

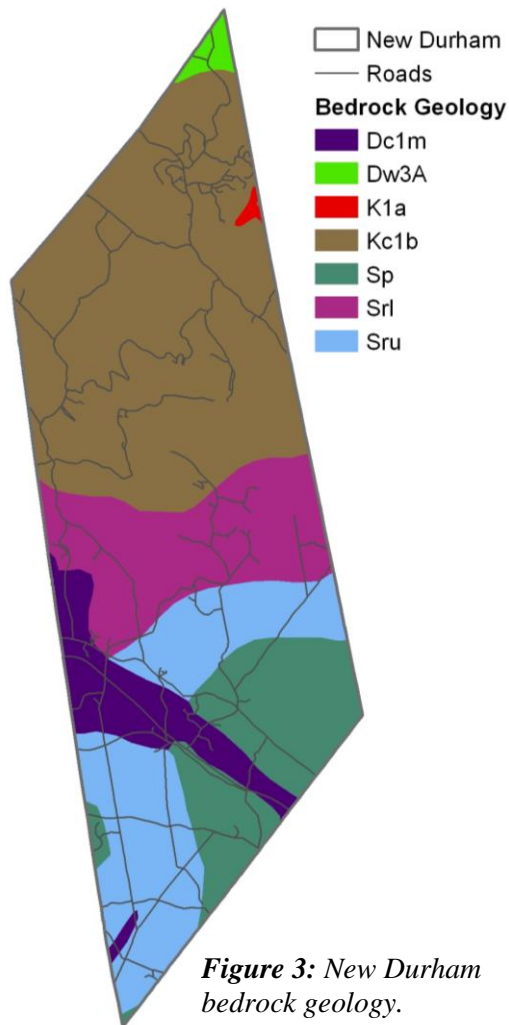


Figure 3: New Durham bedrock geology.

color-coded brown in the northern half of town (Concord granite - Kc1b), and the strip of purple running diagonally through the southern half of town (Mesoperthitic biotite granite - Dc1m). These areas correspond to the location of Merrymeeting Lake and its surrounding mountains (Kc1b), and the wetlands that serve as the headwaters of the Ela River (Dc1m). Today, the dark purple area on the map is also the location of downtown New Durham and the Route 11 corridor.

The second general bedrock type found in New Durham consists of metamorphic rocks. Metamorphic rocks are sedimentary or igneous rocks that have "morphed" into another kind of rock, through underground heat and pressure. A close look at metamorphic rocks, such as schist and quartzite, will reveal much more flattened grains than in an igneous rock such as granite. The three areas of this rock type are shown in Figure 3. The pink and blue areas are the lower part of the Rangely Formation (Srl) and the upper part of the Rangely Formation (Sru), respectively. The green area in the southeast corner of the town is known as the Perry Mountain Formation (Sp). These areas correspond to the lowest and wettest in town, including the headwaters of the Cocheco River (Marland, 1980).

The varied and unique bedrock formations in New Durham support conditions for a variety of plant communities and habitat for animal species.

Surficial Geology

Surficial geology describes the rocks and unconsolidated materials that lie between bedrock and the surface of the land. When the glaciers receded, the rock and debris frozen within the ice were left behind in various formations depending upon how fast or slow the glacier receded. These formations contain various sized particles and are classified by the shape of formation, the thickness, and the type and size of particles found. Surficial geology is important because the characteristics of materials below the earth’s surface influence the feasibility of constructing buildings and roads (Goldthwaite et al., 1951).

*Surficial Geology-
Unconsolidated geologic
materials, such as sand,
gravel or clay, lying on
top of bedrock.*

Materials deposited by running water typically consist of sand and gravel carried into low-lying areas. These deposits formed the stratified drift aquifers (layered sand and gravel) now used for large water withdrawals and productive domestic wells. Stratified drift aquifers have been surveyed statewide by the USGS using drilling and data extrapolation methods (Mack and Lawlor, 1992). The largest aquifer in New Durham is located along the Route 11 corridor in the area shown in purple on Figure 3 above.

In addition to aquifers, surficial deposits commonly determine soil composition and therefore may affect agricultural viability. Mapped data showing the surficial geology of New Durham was not available to incorporate into this 2011 NRI report. However sections 2.2 (Soils) and 2.5 (Water Resources) provide more details on some of the natural resources in New Durham that are influenced by the area's surficial geology. Further details about NH geology are available through the State Geologist – www.des.nh.state.us/geology/ and www.nhgeology.org.

2.3 Soils of Special Importance

Soil is the unconsolidated mineral and organic matter on the immediate surface of the earth that serves as a natural medium for the growth of plants. Understanding the nature and properties of soils is critical to managing and conserving natural resources. Different soil types developed from the interaction of several natural phenomena, including vegetation, topography, erosion, climate, and surficial geology.

The US Department of Agriculture's Natural Resources Conservation Service (NRCS) studies and inventories soil resources across the country. Soil surveys contain detailed soils maps, data tables, and text narratives that assist in determining appropriate uses for the land. Soil surveys also contain predictions of soil behavior for selected land uses and highlight limitations and hazards inherent in the soil and the impact of selected land uses on the environment. The most recently published edition of the Strafford County Soil Survey dates back to 1973. The smallest soil area that can be shown on the county soil survey is three acres in extent. The data and soils map for this inventory were derived from the 1973 survey.

The NRCS groups soils based on their capability to produce commonly cultivated crops and pasture plants without deteriorating over a long period of time. These classifications are based on numerous criteria that include, but are not limited to, the soil's salinity, parent material, capacity to hold moisture, potential for erosion, depth, and texture and structure, as well as local climatic limitations (e.g. temperature and rainfall). These units are further sorted based on land capability such as farmland, wetland, and forest soils. Soil classifications are designed to guide choices in land use and soil management. Map 5 (Soils) in Appendix 3 illustrates the type and extent of New Durham's soil types.

Forest Soils

The terrain features, topography, and soils that provide the foundation for today's forests can be traced to the action of glacial ice or melt water as the last glacier retreated northward. As a result, there is

considerable variability in soil types across the town. Most variability in tree species and forest composition is due to differences in underlying soil type, available nutrients, and moisture (Thorne and Sundquist, 2001).

Soils mapped by the NRCS for each county soil survey have been grouped into six “Important Forest Soils Groups” based on the inter-relationship between soil characteristics including texture and moisture or wetness; inherent limitations of the soil for forest management (e.g. steep slopes, shallowness, boulders, rock outcrops); and typical forest successional trends on certain soil types (Thorne and Sundquist, 2001). The three most important forest soil groups in New Durham are described below.

- **Group 1A** forest soils include deeper, loamy soils, moderately- to well-drained, and are considered prime northern hardwood forest soils. Certain soil series in the group are also good for hemlock growth. In New Durham, these soils account for approximately 3,510 acres or about 13% of the town’s total area.
- **Group 1B** consists of sandy or loamy soils that are moderately- to well-drained. These soils are good for growing paper birch, beech, and oak (northern mixed hardwood forest type). This is the predominant forest soil group in New Durham with over 13,978 acres or 50% of the town’s total area.
- **Group 1C** soils consist of outwash sands & gravels, and support the growth of white pine. These soils constitute about 1,259 acres or 4% of the town’s total area.

As shown in Figure 4, Group 1B (prime oak-beech) soils are found throughout New Durham. Group 1A (prime northern hardwood) soils are located primarily in the southwest corner of the town. The largest area of Group 1C (prime white pine) soils is located in the Route 11 corridor, with a few smaller sections of this forest soil type in the northern half of the town. Currently, only 3% of New Durham’s productive forest soils are protected.

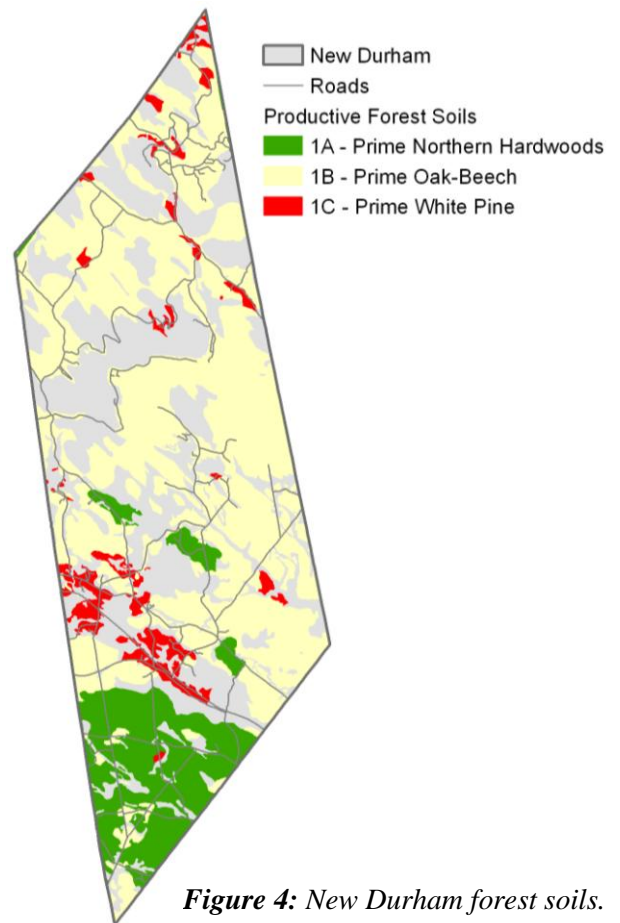


Figure 4: New Durham forest soils.

Table 1: Acreage of New Durham’s important forest soil types.

Forest Soil Group	Acres	% Total Town Area
1A	3,510	13%
1B	13,978	50%
1C	1,259	4%
Total Town Area	28,054	67%

Source: NRCS Strafford County Soil Survey, 1973

As illustrated on Map 1 (Base Map) and Map 5 (Land Cover – Land Use), New Durham is mostly forested, with forested land covering nearly three-quarters of the town’s total area. Therefore, forests and woodlands constitute a very important natural resource in New Durham. A detailed breakdown of New Durham’s important forest soils is included in Table 1A in Appendix 1.

Agricultural Soils

The Farmland Protection Policy Act of 1981 was established to assure that Federal programs are administered in a manner that will be compatible with state and local governments and private programs and policies to protect farmland. The NRCS uses the following three farmland soil classifications in New Hampshire for the purpose of carrying out the provisions of this Act (USDA, 1981):

- **Prime Agricultural Soils:** Prime agricultural soils have sufficient available water capacity to produce the commonly grown cultivated crops adapted to New Hampshire. They have high nutrient availability, generally low slope and low landscape position, are not frequently flooded, and contain less than 10% rock fragments in the top six inches. The land may currently be in crops, pasture, or woodland; but not urbanized, built-up land or water areas. It must either be used for producing food or fiber, or be available for these uses. In New Durham, these soils account for approximately 271 acres or about 1% of the town’s total area.
- **Soils of Local Importance:** Soils of local importance include soils that are not prime or of statewide importance, but that have local significance for the production of food, feed, fiber, forage and oilseed crops. These lands are designated by local agencies with the concurrence of the NRCS State Conservationist, and may include tracts of land that have been

Table 2: Acreage of New Durham’s important agricultural soils.

Agricultural Soil Group	Acres	% Total Town Area
Prime farmland	271	1%
Farmland of local importance	893	3%
Farmland of statewide importance	271	1%
Total Town Area	28,054	5%

Source: NRCS Strafford County Soil Survey, 1973

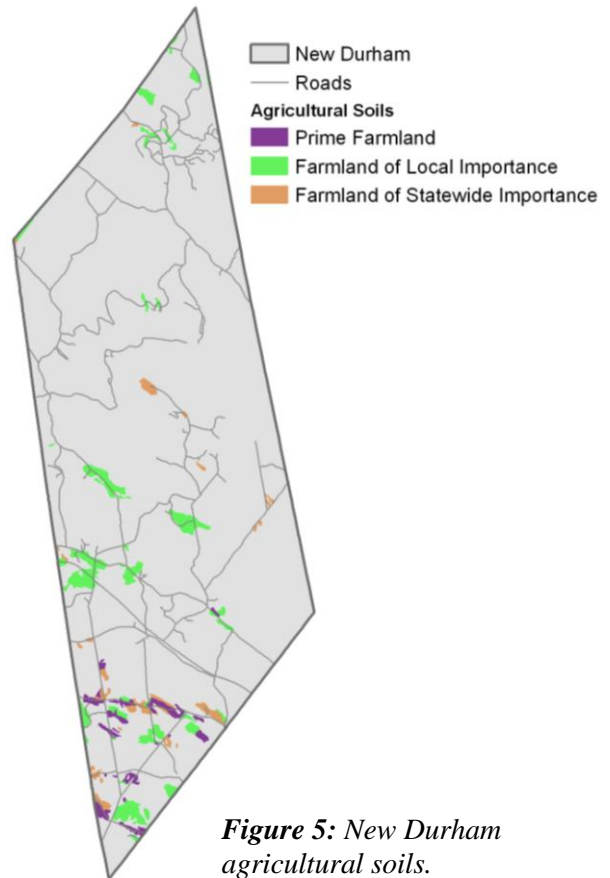


Figure 5: New Durham agricultural soils.

designated for agriculture uses by local ordinance. This is the predominant agricultural soil group in New Durham with over 893 acres or 3% of the town's total area.

- **Soils of Statewide Importance:** Farmland of statewide importance is land, in addition to prime and other unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The state government designates farmland of statewide importance with the concurrence of the NRCS State Conservationist. Generally, these farmlands include those areas that are nearly prime farmland and that can economically produce high yields of crops when treated and managed according to acceptable farming methods. These soils constitute about 271 acres or 1% of the town's total area.

Agricultural soils are distributed across New Durham, with the highest concentrations found in the southern half of the town. New Durham's best agricultural soils, or prime agricultural soils, are located only in the southwest corner of the town. These soils tend to be clustered on the broad ridge tops similar to and in conjunction with the most productive forest soils discussed above.

Figure 5 shows the distribution of prime agricultural and statewide importance soils in the town. It is important to note that these critical food and fiber growing soils are in very short supply. Even though 4% of New Durham's soils meet this criteria, only 46 acres (<1%) are currently protected. Most importantly, none of the town's prime agricultural soils are currently protected. A detailed breakdown of New Durham's important forest soils is included in Table 2A in Appendix 1.

Poorly Drained Soils

Soil drainage characteristics are based on a soil's permeability - the ability of air and water to move through it. Permeability is influenced by the size, shape, and continuity of pore spaces, which is dependent on soil density, structure, and texture. Texture is one of the most important characteristics since it influences many other properties of soil such as irrigation needs, erosion potential, and fertility. Soil texture describes the proportionate distribution of different sizes of mineral particles in a soil, excluding organic matter.

Generally, sandy soils tend to be low in organic matter content and fertility; low in ability to retain moisture and nutrients; and well-drained and therefore well suited for road foundations and building sites. Fine-textured soils are generally more fertile; contain more organic matter; and are better able to retain moisture and nutrients. When soils are

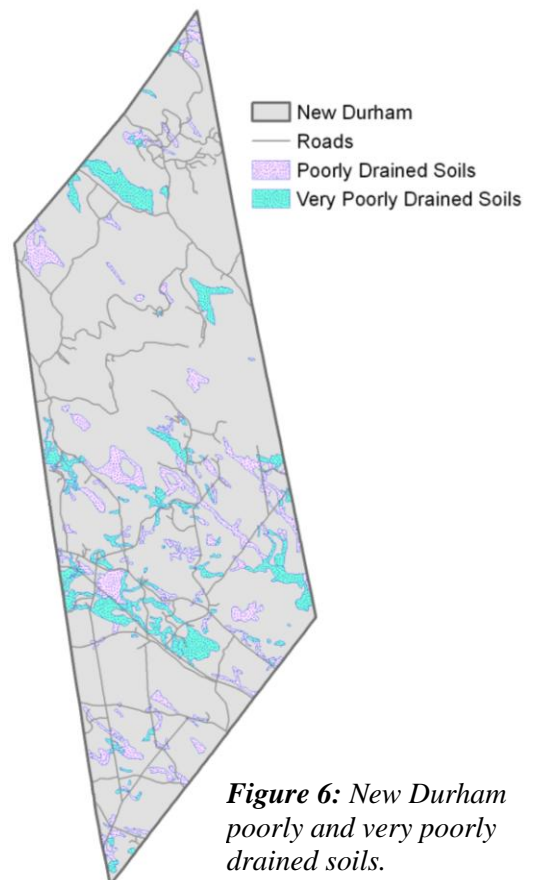


Figure 6: New Durham poorly and very poorly drained soils.

as fine-textured as to be classified as clay they are somewhat difficult to manage for cultivation, and have characteristics that adversely affect their suitability at building sites (particularly septic systems and basements) and for road construction. NRCS classifies such soils as “hydric soils”. These soils are frequently ponded or flooded for extended periods during the growing season, and are generally not well drained. Figure 6 (previous page) shows the extent of the poorly drained and very poorly drained soils in New Durham. While these soils are located in lowland areas and depressions throughout the entire town, the highest concentration of these soils is in the southern half of the town. This part of New Durham has the lowest elevations, and numerous wetlands.

In total there are 1,819 acres of very poorly drained soils in New Durham and 1,858 acres of poorly drained soils, covering 6% and 7% of the town, respectively.

2.4 Land Cover – Land Use

Land cover can be thought of as the mantle of surface features that lie on the physical landscape. Land cover types can be divided into naturally occurring vegetation or other features such as rock outcrops, human land uses such as farming, residential uses, commercial areas, and associated developed or cleared land.

As illustrated on the aerial photograph Map 1 (Base Map), and on Map 2 (Land Cover - Land Use) in Appendix 3, the majority of New Durham is forested – about 76% or over 21,400 acres – with 41% of the forest cover being hardwood dominated and about 35% in pure mixed forest/conifer forest types. About 1% of the land base is in agricultural land use or open grasslands, 18% is represented by open surface waters (lakes, ponds, rivers, open wetlands), 12% in forested and non-forested wetlands, and about 11% in various types of developed land uses, including residential, commercial and transportation, and other cleared lands.

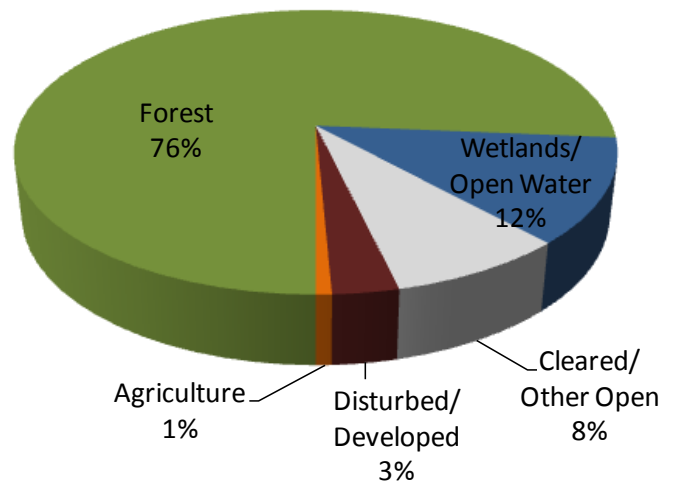


Figure 7: New Durham land uses.

Rural residential development is characteristic of New Durham, with exceptions of more dense development around Merrymeeting Lake and in the downtown area, and cluster developments such as Copple Crown Village off of Mountain Drive. New Durham is connected primarily by local roads, and the state Route 11 runs through town. Many roads are unpaved and many are Class VI (public ways that the town has no duty to maintain).

Table 3 provides a detailed listing of the land cover types in New Durham. These figures are derived from the state’s land cover mapping issued in 2001, which is generated from satellite imagery with a resolution of 30-meters per grid cell (UNH, 2001). Because these land cover types were developed using satellite imagery, there are limitations to the accuracy of these estimates. For example, a single house on a lawn surrounded by forest may be classified as forest, rather than developed land. Herein lies the distinction between land cover and land use – though the land may be used as residential, it remains generally under forest cover. Therefore, while the accuracy of the data is quite high statewide, it should be regarded as a coarse approximation of resource distribution at a community scale.

Table 3: Acreage of New Durham’s land cover types.

Land Cover Type	Acres	% Total Town Area
Mixed forest	8,577	31%
Beech/oak	7,296	26%
Other hardwoods	4,087	15%
Cleared/other open tundra	2,266	8%
Open water wetlands	2,231	8%
White/red pine	1,376	5%
Non-forested wetlands	672	2%
Transportation	652	2%
Forested wetland	429	2%
Hay/rotation/pasture	180	1%
Disturbed	119	0.4%
Residential, commercial, industrial	70	0.2%
Hemlock	63	0.2%
Row crops	19	0.1%
Spruce/fir	17	0.1%
Total Acres	28,054	100%

Source: NH GRANIT, New Hampshire Land Cover Assessment, 2001

Impervious Surfaces

Impervious surfaces are structures or surfaces, such as parking lots, roads, sidewalks and roofs, and compacted urban soils that prevent rainwater from penetrating into the ground. When it rains or when snow melts, water runs off impervious surfaces with greater quantity and velocity than would occur naturally. This results in erosion and flooding. Furthermore, pollutants like heavy metals, toxics, trash, pathogens, sediment, hydrocarbons, fertilizers, and pesticides are washed quickly into surface waters where they damage aquatic systems and lower water quality.

Generally, the more impervious surfaces (from increased development) present in an area, the lower the water quality of local streams and rivers (Stanfield and Kilgore, 2006).

***Impervious Surfaces-**
Landscape surfaces (e.g. roads, sidewalks, driveways, parking lots, and rooftops) that no longer absorb rain and may direct large volumes of stormwater runoff into a stream or other waterbody.*

The proximity of discharges from stormwater management structures or from overland flow, combined with the vegetative condition of the riparian area (the land area directly next to a waterbody) can have a significant effect on pollutant loading in waterbodies. UNH’s Complex Systems Research Center estimated changes in impervious surface coverage in towns throughout the NH coastal region from 1990 to 2005, as shown in Table 4.

The most recent estimate of impervious surfaces in New Durham is 2.8% (Figure 8). This percentage is fairly low and indicates that surface water quality should not be negatively impacted as a result of impervious surfaces. However, impervious surfaces in New Durham increased by 37% between 1990 and 2000, and by 16% between 2000 and 2005 (Table 4). These increases coincided with population increases of 15% between 1990 and 2000, and again between 2000 and 2010.

Not surprisingly, the highest concentrations of impervious surfaces are located in the southern half of the state, particularly along the Route 11 and Old Bay Road. These areas therefore, may contribute to localized water quality impacts. At higher levels of IC, studies have documented that waterbodies become degraded and are unable to support sensitive species of fish and aquatic macroinvertebrates. Typically, sensitive species of fish decline in watersheds with 4-6% IC or less (Wenger, 2008). For example, Wenger (2008) found significant decreases in sensitive fish species in streams at levels of development equivalent to about 2 to 4% directly connected impervious area. A 2005 report on the effects of urbanization on stream water quality in the seacoast region of New Hampshire found that sites having between 8 and 14 % impervious

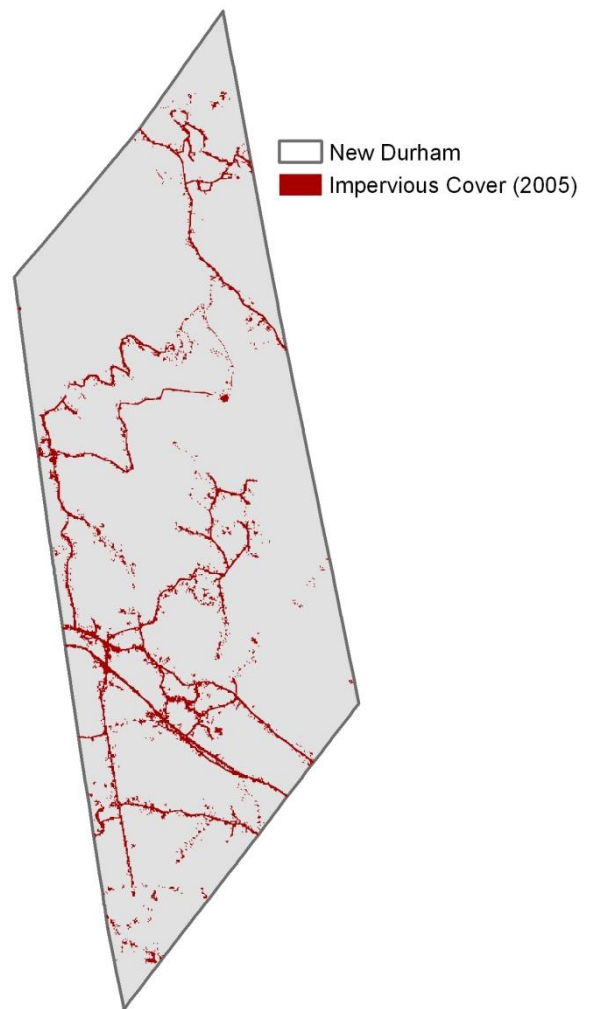


Figure 8: New Durham impervious surface area (2005).

Table 4: Impervious surface and population in New Durham (1990-2010).

	1990	2000	2005
Impervious Surface (acres)	458	628	727
% Total Town Area	1.7	2.4	2.8
% Increase	-	37%	16%
	1990	2000	2010
Population	1,948	2,236	2,570
% Increase	-	15%	15%

Sources: *Impervious Surface Mapping in Coastal New Hampshire* (2006), Complex Systems Research Center at the University of New Hampshire; and Economic & Labor Market Information Bureau, *NH Employment Security*, 2010

surface showed changes in stream quality as measured by reductions in the combined water quality, habitat condition and biological condition score for those sites (Deacon et al., 2005).

2.5 Water Resources

Water resources including both surface waters and groundwater resources are some of a community’s most valuable assets. Most drinking water sources – whether public or private – depend on subsurface water in sand and gravel aquifers, or in bedrock. Surface waters offer many recreational possibilities, and are key elements in the value of scenic resources. Floodplains provide fertile farming soils, and are also valuable in attenuating damaging floods. Wetlands are well-known for diverse wildlife habitat values, flood storage, and water filtering values. These aspects of New Durham’s water resources are discussed below. Appendix 3 contains a detailed map of the town’s water resources (Map 6).

Major Watersheds

A watershed is the area of land where all of the water that is on, over or under it drains into a given stream, river, lake or other water body. A watershed acts as a funnel, collecting all water within a drainage area and channeling it into groundwater, a stream, river or lake, and ultimately into the ocean. Watersheds are land features that can be identified by tracing a line along the highest elevations between two areas on a map, often along a ridgeline. Every piece of land is part of a watershed; therefore, everything that occurs on the land eventually has an effect on the water flowing through that watershed. Table 5 lists the acreage of each of New Durham’s three major basins, and Figure 9 (next page) illustrates the spatial extent of these watersheds.

Watershed-
An area of land where all water that is under it or drains off of it drains into a given stream, river, lake or other water body.

The northern half of New Durham drains to Lake Winnepesaukee to the northwest, while the lower half of the town drains to the Cocheco River to the southeast. New Durham’s major watersheds include portions of the Wolfeboro Bay and Alton Bay watersheds (sub-watersheds of the larger Lake Winnepesaukee watershed), and the Cocheco Rivers Headwaters watershed (part of the Cocheco River drainage area). Each of these is made up of smaller sub-watersheds.

Table 5: Acreage of New Durham’s major watersheds.

Watershed Hydrologic Unit Code 10	Sub-Watershed Hydrology Unit Code 12	Total Watershed Area (acres)	Total Area within Town (acres)	% Total Town Area
Lake Winnepesaukee Watershed (0107000202)	Alton Bay Watershed (010700020102)	32,253	8,944	32%
	Wolfeboro Bay Watershed (010700020101)	36,921	5,299	19%
Cocheco River Watershed (0106000310)	Cocheco Headwaters Watershed (010600030601)	27,475	13,275	47%

High Quality Stream Watersheds:

In addition to showing the extent of the three major watersheds in New Durham, Figure 9 also shows the locations of high-quality stream watersheds in New Durham. These watersheds were identified in the *Land Conservation Plan for New Hampshire’s Coastal Watersheds* as areas with potentially high water-quality streams (The Nature Conservancy, 2006). These include the Coldrain Pond watershed and a sub-basin of the Cocheco Rivers Headwaters watershed. The plan ranks these watersheds by tiers representing small watersheds with the highest landscape integrity and water quality. Tiers are stratified by breaks in population density, developed land cover, and agricultural land cover. New Durham’s high quality stream watersheds are classified as Tier 2 and Tier 3, which are defined as follows:

- **Tier 2:** Population density is <36 persons per sq. miles, <2% of the area is developed, and <5% of the landuse is agriculture.
- **Tier 3:** Population Density is <64 persons per sq. mile, <3% of the area is developed, and <5% of the landuse is agriculture.

More information about *The Land Conservation Plan for New Hampshire's Coastal Watersheds* is provided in Section 2.7 of this report.

Lakes and Ponds

Lakes, ponds, and reservoirs are key elements of aquatic ecosystems, and provide valuable habitat for fish, wildlife, and plants, as well as important recreational opportunities including swimming, boating, and fishing. Natural lakes and artificially impounded reservoirs are also sources of drinking water for some local and regional users.

New Durham is home to numerous lakes and ponds. Table 6 lists the state-designated public water (waterbodies over 10 acres) lakes and ponds located in town, including the largest waterbody in New

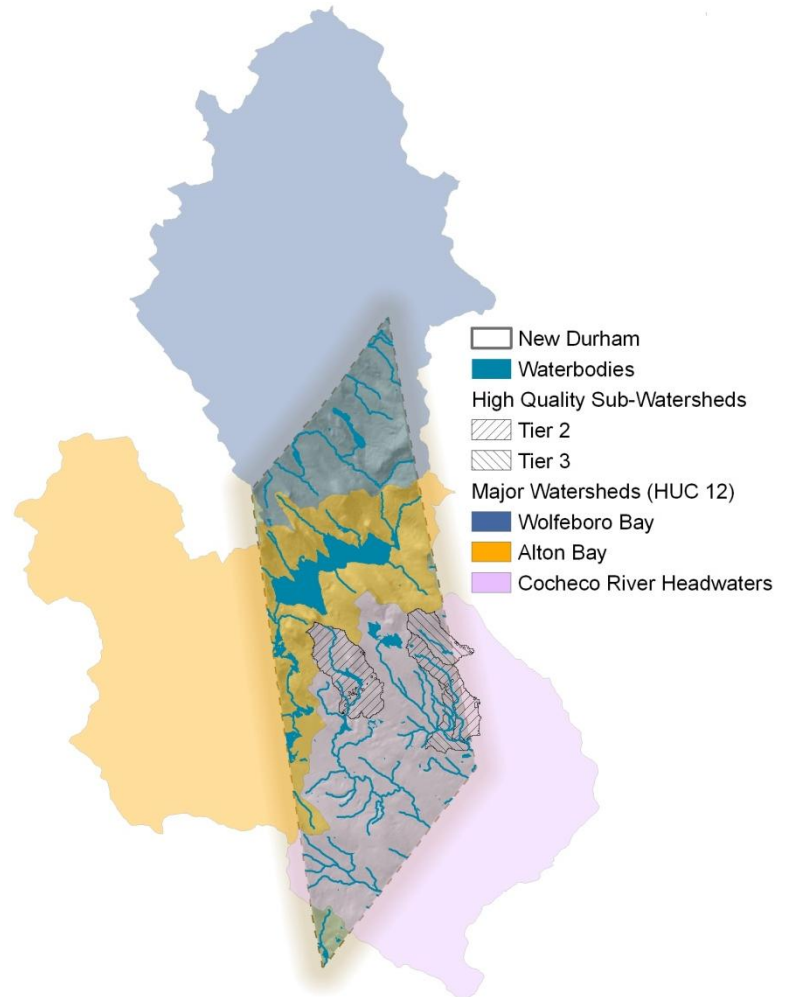


Figure 9: Major watersheds in New Durham.

Durham, Merrymeeting Lake. Collectively these lakes and ponds amount to 1,637 acres or approximately 6% of the town's area.

Lakes follow a natural aging process whereby they become nutrient enriched and gradually fill in. Under natural conditions, this aging process takes place over centuries. However, this process can be greatly accelerated by human activities. Increases in nutrients, especially nitrogen and phosphorus tend to increase plant growth, which in turn impacts overall lake water quality. Lakes are classified into three trophic classes based on measurements of chlorophyll pigments, total phosphorus and water clarity. These trophic classes provide an estimate of the lake's biological productivity, or the amount of living material supported within them, primarily in the form of algae.

Oligotrophic lakes are the most pristine and are characterized by high water clarities, low nutrient concentrations, low algae concentrations, minimal levels of aquatic plant weed growth, and high dissolved oxygen concentrations near the lake bottom. Eutrophic lakes have low water transparencies, high nutrient concentrations, high algae concentrations, large stands of aquatic plants, and very low dissolved oxygen concentrations near the lake bottom. Mesotrophic lakes have qualities between those of oligotrophic and eutrophic lakes. Figure 10 and Table 6 present the trophic status of New Durham's lakes and ponds. Marchs Pond and Merrymeeting Lake are classified oligotrophic (NHDES, 2010). These lakes have low algal production, and consequently, often have very clear waters, with high water quality. Coldrain Pond, Club Pond and Marsh Pond are classified as eutrophic (NHDES, 2010). These waterbodies have high productivity and nutrients and are subject to algal blooms, which results in poor water quality. It is important to note, however, that shallow waterbodies with forested watersheds with extensive wetlands, such as Coldrain Pond, may be considered naturally eutrophic.

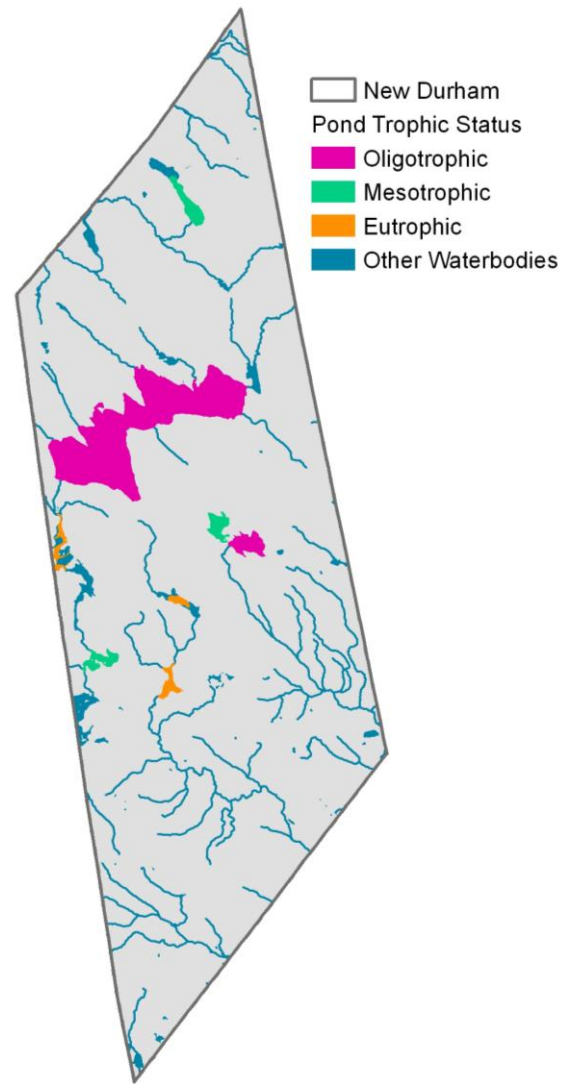


Figure 10: New Durham waterbodies, with lake trophic status indicated.

Trophic Status-
A simplified index of biological productivity in lakes.

Table 6: Official list of public waters in New Durham.

Waterbody Name	Waterbody Type	Area (acres)	Trophic Status
Merrymeeting Lake	Great Pond, with impoundment at western end	1,233	Oligotrophic
Marchs Pond	Great Pond w/ artificial impoundment	74	Oligotrophic
Shaw's Pond	Great Pond	68	Mesotrophic
Jones Pond Dam	Great Pond w/ artificial impoundment, on Merrymeeting River	57	Mesotrophic
Downing Pond	Great Pond w/ artificial impoundment, on Merrymeeting River	54	Mesotrophic
Chalk Pond	Great Pond, connected to Marchs Pond by culvert	53	Mesotrophic
Club Pond	Great Pond w/ artificial impoundment	40	Eutrophic
Marsh Pond	Great Pond w/ artificial impoundment, on Merrymeeting River	40	Eutrophic
Coldrain Pond	Great Pond	18	Eutrophic
Total Acres		1,637	

Source: New Hampshire DES, Official List of Public Waters, 2008; New Hampshire Watersheds, <http://nhwatersheds.unh.edu/index.html>

Rivers and Streams

New Durham is home to the headwaters of three rivers - Ela River, Merrymeeting River and Cocheco River – as well as numerous named and unnamed streams. There are 84 miles of rivers and streams in the town. Some intermittent streams, which carry water for only a portion of the year, are too small to be mapped and are not included in the above estimate. The water courses and their adjacent riparian corridors are important habitat and travel corridors for New Durham’s terrestrial wildlife. In addition, many bird species are attracted by the water and the food sources that are located nearby. Table 7 lists only the named streams and rivers in New Durham. There are numerous miles of additional unnamed streams in the town.

Table 7: List of named streams and rivers in New Durham.

Stream Name	Length within Town (miles)
Merrymeeting River	5.1
Ela River	4.6
Beaver Brook	4.4
Cocheco River	3.4
Hayes Brook	3.4
Perry Brook	1
Total Miles	22

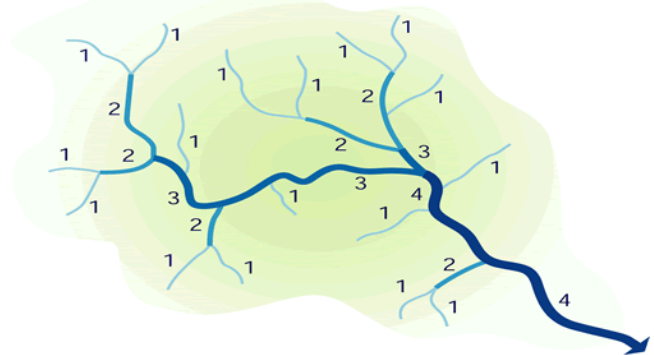
Source: USGS National Hydrography Dataset

The State of New Hampshire uses a stream order system to classify rivers and streams. Stream order is a method for classifying the relative location of a stream reach within the larger river system. Streams that have no branches are designated as first-order streams. When two first order streams come together, they form a larger, second-order stream. When two second-order streams come together, they form a larger, third-order stream, and so on, as illustrated in Figure 11.

Fourth order and higher streams are protected under the NH Comprehensive Shoreland Protection Act, discussed in Section 3. Headwater Streams (first-order streams) that have a watershed area less than one square mile are considered “primary” headwater streams. The health of larger streams, rivers, and other surface waters downstream in a watershed depend in part upon an intact primary headwater stream network. Headwater streams are particularly important for maintaining water quality due to the sheer number of miles they represent in most watershed drainage systems. In New Durham, headwater streams account for 67% of total stream miles (Table 8 and Figure 12). These areas contain especially important natural resources and provide important habitat, which are vulnerable to degradation by improper forestry practices and land use changes.

The collective health and functioning of primary headwater streams have profound influences on the quality and value of larger streams, rivers and lakes. The importance and benefits provided by primary headwater streams include reduction of sediment delivery downstream, reduction in nutrient loading (nitrogen and phosphorus), flood storage and control, and aquatic habitat. Primary headwater streams and their adjacent vegetation provide areas for wildlife habitat and add protection for fish and other animals living in the primary headwater streams and the larger streams into which they feed (Ohio EPA, 2003).

Figure 11: Illustration of the stream order system used in New Hampshire.



Source: State University of New York College of Environmental Science and Forestry, *Fluvial Geomorphology Training Module, Section 4.viii*, http://www.fgeomorph.com/fq_4_8.php

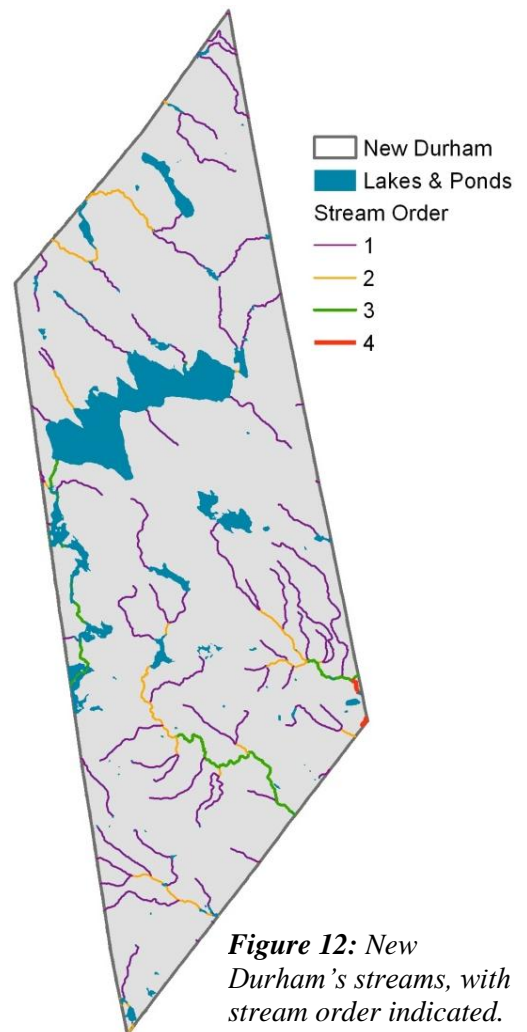


Figure 12: New Durham’s streams, with stream order indicated.

Table 8: Miles of various stream orders in New Durham.

Stream Order/Type	Miles	% Total Stream Miles
1 st Order (headwaters)	56	67%
2 nd Order	12	14%
3 rd Order	15	18%
4 th Order	0.5	1%
Total Miles	84	100%

Source: USGS National Hydrography Dataset

Disruption of the hydrologic and biological processes of primary headwater streams takes a cumulative toll on the health of the whole river system. Proper functioning of primary headwater streams can help maintain base flow in larger streams in times of drought. They are a key determinant in the overall condition of the river system (Ohio EPA, 2003).

The Cocheco River

The Cocheco River is part of the Piscataqua River drainage basin flowing near the boundary between Maine and New Hampshire. The river begins in New Durham and flows approximately 35 miles in a southeastern direction, through the cities of Rochester and Dover, before becoming tidal and joining with the Salmon Falls River to form the Piscataqua River. The Cocheco River corridor contains several areas of the highest quality habitat in New Hampshire throughout the entire length of the corridor according to the NH Fish and Game Department. More information about this habitat can be found in Section 2.2 of this report (Areas of Ecological Significance).

The Cocheco River has been designated by the NH State Legislature as a protected river under RSA 483 - New Hampshire Rivers Management and Protection Program. This designation grants the Cocheco River special consideration as a valuable natural resource in local development decisions within one-quarter mile of the river corridor. The Cocheco River is one of only sixteen rivers in the state currently protected in this manner. This designation also places the entire Cocheco River within the NH Comprehensive Shoreland Protection Act (CSPA) limiting land use, alteration, and development within 250 of the river edge.

Wetlands

Wetlands are an integral part of New Durham’s natural resources. They are important for removing excess nutrients and sediment from the water, slowing and storing floodwaters, promoting groundwater infiltration, and providing habitat for a variety of vegetation and animal life. In addition, wetlands provide recreational, educational and research opportunities. They add to the visual resources of the town as well.

Wetlands-
Areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

There are a diversity of wetland types in New Durham, including areas of open water with emergent vegetation such as cattails, forested wetlands, and scrub-shrub wetlands. The principal types of wetlands with standing water in the spring have been mapped from aerial photos by the National Wetlands Inventory (NWI) of the U.S. Fish and Wildlife Service, which serves as the primary data source for wetlands mapping. The NWI wetlands do not include all wetlands, particularly those that do not typically have standing water in the spring. Additionally, vernal pools² – seasonal depressional wetlands that typically fill during the spring or fall – are often small and under forest canopy and frequently are not detected by NWI maps. Therefore, it is likely an underestimate of the amount of wetlands in the town. While some minor inaccuracies are known to exist in NWI data, they continue to serve as the baseline reference in locating wetlands. General information about New Durham’s wetlands is provided below.

Figure 13 shows the extent of wetlands in New Durham. Note that NWI mapping includes ponds and lakes. New Durham contains approximately 3,623 acres of mapped wetlands, representing 13% of the town’s total area. Only 16% (589 acres) of New Durham’s mapped wetlands are currently protected (within the conservation lands listed in Table 16, page 38). The general wetland types in New Durham are listed in Table 9. For the purposes of this NRI, the wetlands were categorized by the dominant vegetation type.

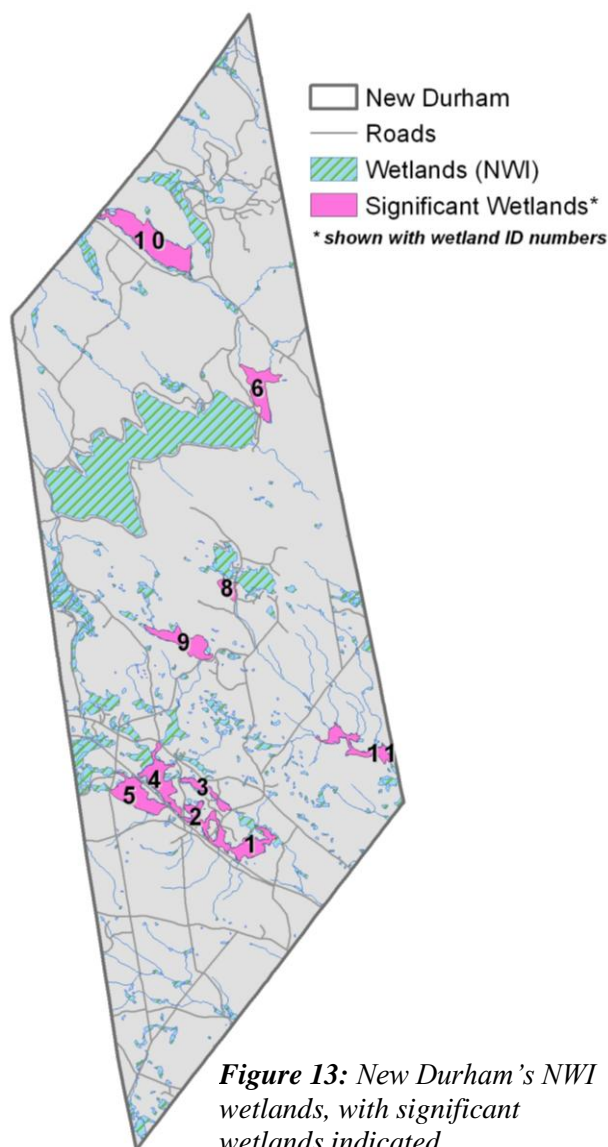


Table 9: Wetland types and acreage in New Durham.

Wetland Type	General Description	Area (acres)	% Total
Freshwater lake	Lake or reservoir basin	1,618	45%
Forested wetland	Forested swamp	1,140	31%
Palustrine scrub-shrub	Wetland shrub bog or wetland	509	14%
Palustrine emergent	Herbaceous marsh, fen, swale or wet meadow	245	7%
Freshwater pond	Pond	110	3%
Total Acres		3,622	97%

Source: USFWS, NWI Wetland Inventory

² In New Hampshire, vernal pools are identified using criteria outlined in *Identification and Documentation of Vernal Pools in New Hampshire*, available online via the NH Fish and Game Department: www.wildlife.state.nh.us/Wildlife/.../Vernal_pool_manual.pdf

Significant Wetlands

A study conducted by Moose Mountains Regional Greenways (MMRG) in 2004 identified significant wetlands in New Durham. Moose Mountains Regional Greenways was founded in 1999 by conservation commissioners and planning board members from the towns of Brookfield, Farmington, Middleton, Milton, New Durham, and Wakefield to help create a network of permanently protected conservation lands in the region. The goal of the study was to provide detailed information to these six towns about their significant wetlands and how to protect them (Blue Moon Environmental, 2004).

Table 10: Significant wetland selection criteria.

Significant Wetland Selection Criteria
1. Must be located in the Cochecho or Salmon Falls watershed
2. Must be greater than 5 acres (larger wetlands generally have a greater diversity of habitat and provide a wider suite of wetland functions)
3. Must contain very poorly drained soils over at least 50% of its area (one of NHDES criteria for prime wetlands)
4. Must be located over an aquifer
5. Must be located along a perennial stream
6. Must be located within the protective radius of drinking water sources (wellhead protection area) or in watersheds dedicated to surface water drinking supplies for communities
7. Must be located within or near the proposed MMRG greenway

Source: Use of GIS Data to assist in the Selection and Identification of Significant Wetlands in the Moose Mountains Regional Greenways: New Durham User's Guide. 2004

Selection criteria were applied to identify those wetlands in each town that exhibited the potential to provide exceptional function and value to their respective communities. Table 10 lists the seven selection criteria used. A series of community meetings were held to explain the study and to solicit local input, and all selected wetlands were field-evaluated. The ten significant wetlands identified in New Durham are described below and shown on Figure 13. Not all of New Durham's significant wetlands meet each of the criteria listed in Table 10. For example, wetlands 1 through 8 are located within the Cochecho River watershed (Criterion 1), but wetlands 6 and 10 are located within the Lake Winnepesaukee watershed. Only wetlands 6, 10 and 11 are located within or near the proposed MMRG greenway (Criterion 7); wetlands 8, 9 and 10 are not located over an aquifer (Criterion 4); and, wetlands 3 and 5 are not located along a perennial stream (Criterion 5).

- **Wetland 1: (94 acres)** Wetland 1 is located adjacent to Route 11, close to Davis Crossing Road, Old Bay Road and Mill Road.
- **Wetland 2: (50 acres)** Wetland 2 is located along Route 11, between Tash Road and Davis Crossing Road.
- **Wetland 3: (37 acres)** Wetland 3 is adjacent to Route 11 in an area that contains wetlands 1, 2, 4 and 5.
- **Wetland 4: (101 acres)** Wetland 4 is located along the northeast side of Route 11, in close proximity to wetlands 1, 2, 3 and 5.

- **Wetland 5: (562 acres)** Wetland 5 is located to the southwest of Route 11, close to Ridge Road and Valley Road.
- **Wetland 6: (99 acres)** Wetland 6 is connected to the eastern shore of Merrymeeting Lake by a perennial stream.
- **Wetland 7:** *The survey report and maps do not identify Wetland 7. Therefore, there are a total of 10 significant wetlands identified.*
- **Wetland 8: (27 acres)** Wetland 8 is located along the southwestern shorelines of Chalk Pond and Marchs Pond.
- **Wetland 9: (92 acres)** Wetland 9 is located at the headwaters of the Ela River and includes the 27-acre Coldrain Pond.
- **Wetland 10: (224 acres)** Wetland 10 is located in the northern portion of New Durham, just north of Caverly Road and southwest of Shaw’s Pond.
- **Wetland 11: (76 acres)** Wetland 11 is located at the southeastern tip of New Durham between Middleton Road, Old Bay Road, and the New Durham town line.

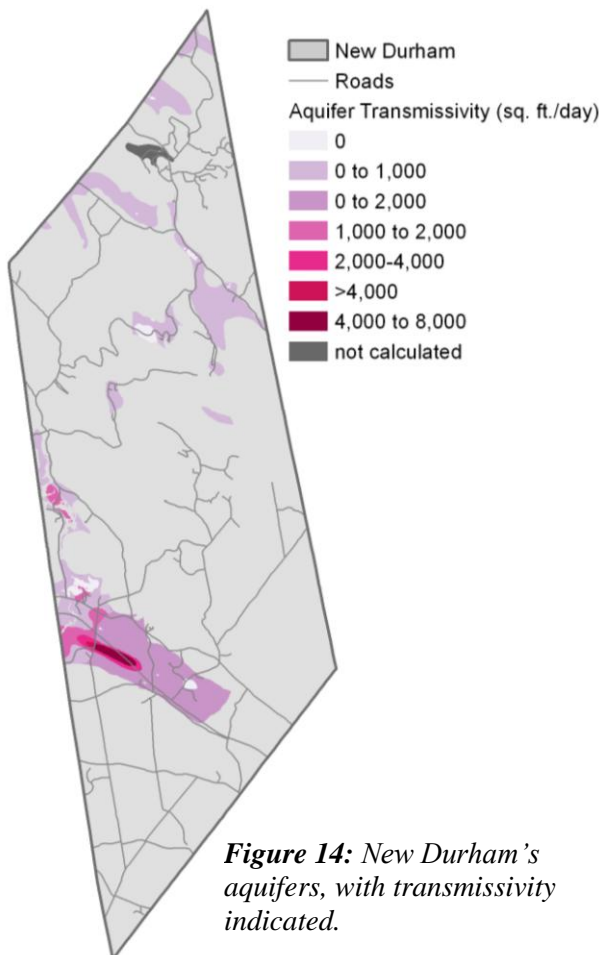


Figure 14: *New Durham’s aquifers, with transmissivity indicated.*

More information about each of these wetlands can be found in *Use of GIS Data to Assist in the Selection and Identification of Significant Wetlands in the Moose Mountains Regional Greenways: New Durham User’s Guide* (Blue Moon Environmental, 2004). Based on information in the report, the New Durham Conservation Commission has been discussing proposing Prime Wetland designation via the annual town ballot. The town has also been reviewing the study data to support local conservation initiatives.

Aquifers

Based on GIS data, New Durham has approximately 3,384 acres of aquifers – primarily stratified drift aquifers with a few small pockets of till aquifers. A stratified drift aquifer, typically a layered deposit of gravel, sand and silt

*Aquifer-
An underground bed or layer of permeable rock, sediment, or soil that yields water.*

in river valleys, is the only ground formation sufficiently productive to meet large volume water needs such as public water supply

wells. Whereas wells drilled in bedrock are usually limited by the inability of bedrock fractures to transmit much water, a stratified drift aquifer does not have this limitation; there is more storage space between the gravel particles and water can travel towards the well relatively easily (HVCEO).

The size, location and transmissivity of stratified drift aquifers have been surveyed statewide by the USGS (Mack and Lawlor, 1992). The transmissivity of an aquifer is a measure of the quantity of water that the aquifer can transmit horizontally. Transmissivity is typically used to determine the water that an aquifer can deliver to a well, and can be calculated from the aquifer's horizontal permeability and thickness.

Most of New Durham's aquifers have transmissivity of less than 2,000 square feet per day. The largest and most productive aquifer in the town is located in the Ela River valley, along Route 11 in western New Durham (Figure 14). This large aquifer covers 1,495 acres, 56 acres of which have a transmissivity of greater than 4,000 square feet per day, and up to 8,000 square feet per day. In total, 28% (944 acres) of the aquifers in New Durham are located on conservation land (Table 16, page 38) or within wellhead protection areas (WHPAs).

Wellhead Protection Areas

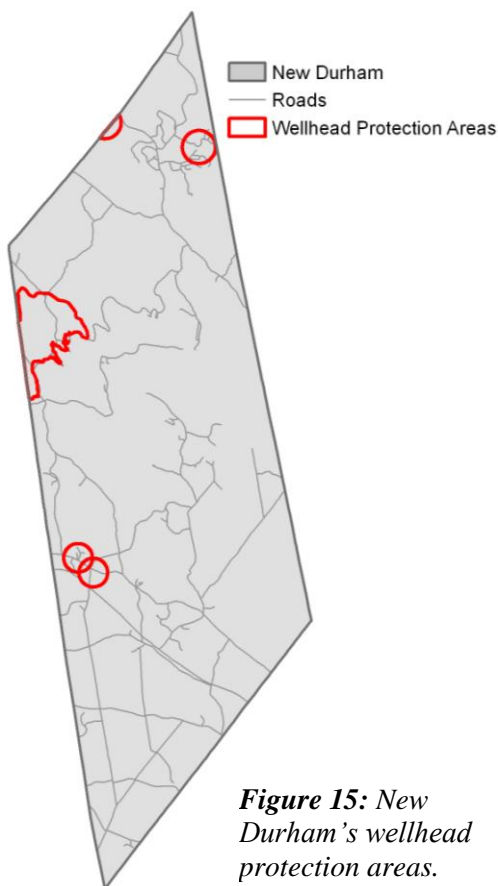


Figure 15: New Durham's wellhead protection areas.

According to New Hampshire's State Drinking Water Regulations (Part Env-Ws 386), any community water supplier or municipality siting

Wellhead Protection Area (WHPA)-
A protected surface and subsurface zone surrounding a well or well field supplying a public water system to keep contaminants from reaching the well water.

a new community well must develop a wellhead protection program for the well. The purpose of a wellhead protection program is to prevent well contamination. Once a well becomes contaminated, it is very costly and sometimes impossible to correct. Preventing contamination is important because most communities, including New Durham, depend upon groundwater sources. A wellhead protection program identifies the land area that provides water to the well (wellhead protection area) and establishes a management program consisting of local health and land use regulations designed to prevent groundwater contamination. For bedrock wells, the WHPA is a circle whose radius depends on the

maximum daily amount of water withdrawn from the well. For till and gravel wells, the WHPA has been calculated based on existing hydrogeologic information.

There are five WHPAs in New Durham (Figure 15). Three of these areas fall completely within the town boundaries. Two of the WHPAs, Sherwood Forest and Chamberlain Springs, are shared with adjacent towns (Wolfeboro and Alton, respectively). Wellhead protection areas in New Durham cover 1,126 acres, or 4% of the total area (Table 11).

As part of a wellhead protection program, water suppliers and municipalities must look carefully at activities and businesses within the WHPA, identify any threats to water quality and develop strategies to address them. For more information on WHPAs, contact the State of New Hampshire Department of Environmental Services Wellhead Protection Program at (603) 271-1168 [<http://des.nh.gov/organization/divisions/water/dwgb/dwspp/protection.htm>].

Table 11: Wellhead protection areas and acreage in New Durham.

Name	Address	Population	Area within Town (acres)
Chamberlain Springs	118 Old Wolfeboro Rd.	0	676
Copple Crown Village District	Middleton Rd., Rte. 128	80	162
Manitoos Shores	Butternut Rd.	57	122
New Durham Elementary School	7 Old Bay Rd.	259	122
Sherwood Forest	Friar Tuck Rd., off Middleton Rd.	55	43
		Total Acres	1,126

Source: NH DES

2.6 Areas of Ecological Significance

Unfragmented Lands

Undeveloped land becomes fragmented over time as new roads and intensive human land use convert the natural landscape. Preserving unfragmented blocks of forest and open space is critical for sustaining wildlife populations. Development of the natural landscape results in the direct fragmentation and loss of habitat. Fragmentation reduces the quality of habitat by altering its size, shape, and distribution creating less interior space for wildlife to exist undisturbed by human activity (Forest Society, 2005).

Unfragmented Forest Blocks- Large pieces of land which are not bisected by a maintained road; typically there are few or no houses, businesses or other human habitation.

A 500-acre block is big enough to support significant wildlife habitat, protect water quality, and allow some economic forest management. Large forest blocks also enable landowners to conduct timber harvests that are economically viable; and minimize conflicts that can arise when managed forests and farms are surrounded and interspersed with development. Unfragmented lands also offer opportunities for remote recreation including hunting, hiking, biking, snowshoeing, and snowmobiling, where landowners allow (Forest Society, 2005).

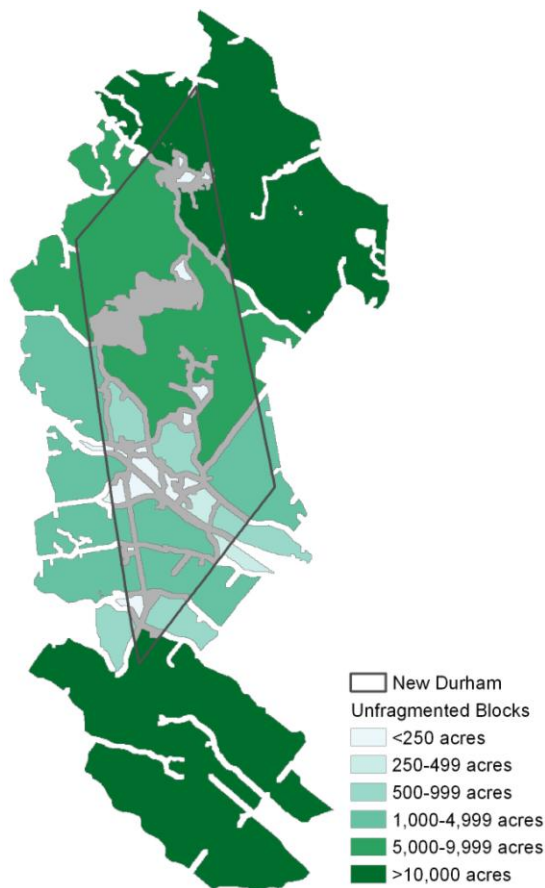


Figure 16: *New Durham unfragmented lands (unfragmented blocks).*

and 5,000 acres, and two large blocks between 5,000 and 10,000 acres, and two large blocks greater than 10,000 acres also fall within the town’s boundaries. These larger-sized blocks are considered regionally significant (The Nature Conservancy, 2006).

The largest blocks include an over 16,000 acre land area that extends from the southern tip of New Durham into Farmington and Strafford; a 17,150 acre block that extends from the northeast corner of New Durham into Wolfeboro and Brookfield, and; a 7,684 acre block that extends from the north west corner of New Durham into Alton. These large blocks could serve as points through which neighboring towns could collaborate on conservation projects. The unfragmented block south of Merrymeeting Lake is the largest unfragmented block almost entirely within New Durham. The block covers 6,912 acres, of which only 63 acres are currently protected. Its location, wetland complexes and unprotected status warrant its consideration as a conservation project area as well.

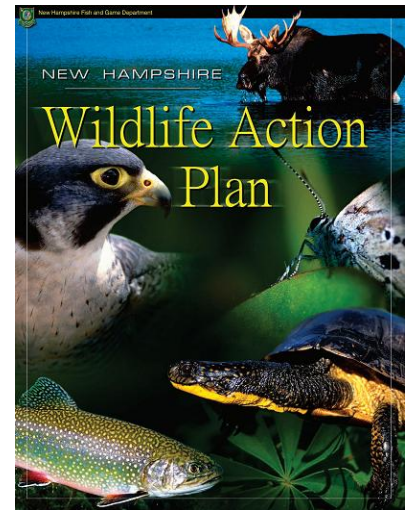
New Hampshire’s Wildlife Action Plan

The New Hampshire Fish and Game Department collaborated with partners in the conservation community to create the state's first Wildlife Action Plan (WAP). The plan, which was mandated and funded by the federal government through the State Wildlife Grants program, provides New Hampshire decision-makers with important tools for restoring and maintaining critical habitats and

These blocks provide important habitat to a variety of species ranging from large mammals like bear, moose, and bobcat to forest interior birds such as certain thrushes and warblers. Large undisturbed expanses of land also play a role in maintaining the hydrologic cycle by maintaining water quality (through natural filtering processes) and water quantity (by recharging underlying aquifers). These are important considerations for maintaining existing municipal water supplies or locating future ones.

As illustrated in Figure 16, the most fragmented areas in New Durham are located in the southern half of the town. There are fourteen blocks less than 250 acres in size, two blocks between 250 and 500 acres, and five unfragmented blocks between 500 and 1,000 acres. Smaller unfragmented blocks such as these areas are considered locally significant and may provide habitat for some interior forest species in addition to being important for recreational opportunities, neighborhood green space, or localized ground-water protection (The Nature Conservancy, 2006). Seven large blocks between 1,000

populations of the state's species of conservation and management concern. The plan is a comprehensive wildlife conservation strategy that examines the health of wildlife and prescribes specific actions to conserve wildlife and vital habitat before they become rarer and more costly to protect. The WAP is the most comprehensive wildlife assessment ever completed in New Hampshire.



This section describes the components of the WAP that are of use to the New Durham NRI. It is important to note that the habitat features developed by the WAP and used in this study are predictive, and may not reflect actual on-the-ground features. The reason for this is that the modeling processes used in the WAP draw on many natural resource factors – soils, slope, solar aspect, vegetation, etc. – to identify those areas with high potential to harbor the types of habitats mapped. In most cases, the natural communities indicative of the habitats will actually be found in those locations; however, the exact extent and distribution of patches may not match existing field conditions. Only careful field reconnaissance can determine the actual location and extent of natural communities and habitat features.

New Durham’s Natural Habitat Communities

New Durham’s natural habitat communities, as reported in the Wildlife Action Plan and in Table 12 below, are listed below (NH Fish & Game, 2006). The general locations of each habitat are shown in Figure 17. Note that in several cases, some features co-exist or overlap on top of other features. For a detailed map of the communities, see Map 8 (Wildlife Action Plan) in Appendix 3.

- Hemlock-Hardwood-Pine:** Hemlock hardwood pine forests are a transitional forest regions or “tension zones” in New Hampshire. In latitude and elevation, they occur between hardwood conifer forests to the north (mostly above 1,400 ft) and oak pine (Appalachian or central hardwood) forests to the south (mostly below 900 ft). Hemlock hardwood pine forest is the most widely distributed forest type in New Hampshire, covering nearly 50% of the state’s land area. Similarly, this is the dominant habitat type in New Durham, covering 25,574 acres, or 91% of the total town area.

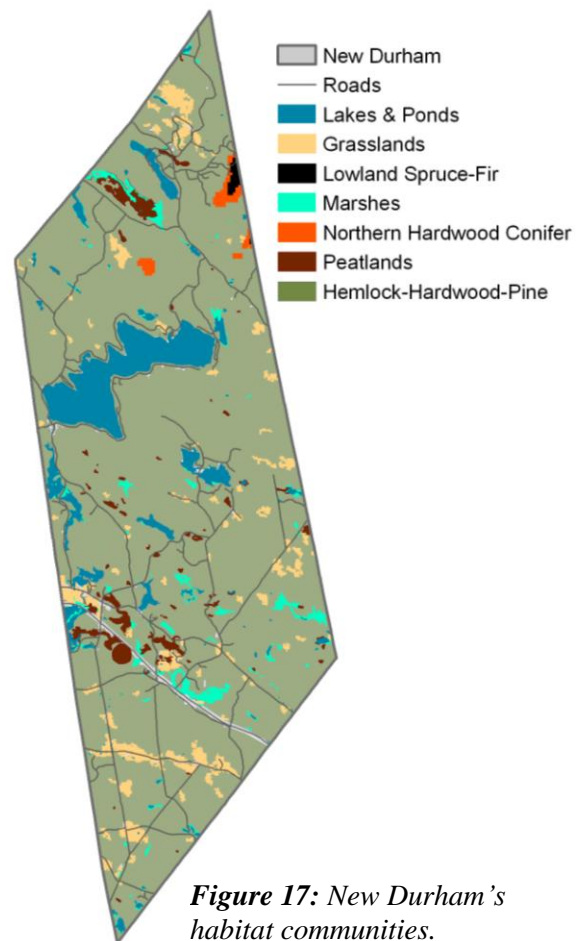


Figure 17: *New Durham’s habitat communities.*

- **Grasslands:** Extensive grasslands are defined as areas that are dominated by grasses, wildflowers, and sedges with little shrub or tree cover. Some examples include hayfields, pastures, and cropland (cornfields and other row crops). Grasslands in New Hampshire must be mowed to prevent them from becoming shrub lands or forests. In New Hampshire, grasslands serve as primary breeding and nesting grounds for several avian species of conservation concern including the state endangered northern harrier (*Circus cyaneus*), state endangered upland sandpiper (*Bartramia longicauda*), state threatened grasshopper sparrow (*Ammodramus savannarum*), eastern meadowlark (*Sturnella magna*), horned lark (*Eremophila alpestris*), and vesper sparrow (*Pooecetes gramineus*). Large (>10 ha) grasslands are important because many grassland birds require large areas. In New Durham, approximately 1,099 acres or 4% of the town's total area are classified as grasslands. This system occurs across the town, with the most extensive areas in the northeast and southwest areas of the town.
- **Marshes:** Marshland systems have a broad range of flood regimes, often controlled by the presence or departure of beavers. These systems, which provide an important food source for many species, are often grouped into three broad habitat categories: wet meadows, emergent marshes, and scrub-shrub wetlands. Marshes and wetlands filter pollutants, preventing them from getting into local streams, and help store water to reduce flooding. Marshland systems cover 944 acres, or 3% of New Durham's total area. This complex is most common in the lowland areas north of Route 11.
- **Peatlands:** Peatlands have water with low nutrient content and higher acidity caused by limited groundwater input and surface runoff. Conservation of the 11 different natural communities that comprise peatlands is vital to the continued existence of many rare plant and wildlife species in New Hampshire. The most challenging issues facing peatlands habitat are development; altered hydrology (amount and flow of water); non-point source pollutants such as road salt, lawn fertilizers, and pesticides; and unsustainable forestry practices. Peatlands cover 558 acres, or 2% of New Durham's land total area. This complex is most common in the lowland areas north of Route 11.
- **Northern Hardwood Conifer:** New Hampshire's northern hardwood forests are characterized by American beech, sugar maple, and yellow birch. Northern hardwood forests are generally found between 1,400 and 2,500 ft. in elevation in New Hampshire. Statewide, threatened and endangered wildlife species occurring in this forest type include osprey, Cooper's hawk, Peregrine falcon, and Bald eagle. This habitat type covers 149 acres, or 1% of the total town area. This complex can be found in the highest elevations of New Durham, in the northeast corner of town.
- **Lowland Spruce-Fir:** This system is a mosaic of lowland spruce - fir forest and red spruce swamp communities that occur on mineral soils. In New Hampshire, these range from well or moderately well-drained upland forests to poorly or very poorly drained swamps. Statewide,

threatened and endangered wildlife species occurring in this forest type include Canadian Lynx, eastern small-footed bat, marten, osprey, peregrine falcon, bald eagle, and three-toed woodpecker. Extensive heavy cutting in recent decades has substantially reduced the distribution of mature spruce-fir forest in New Hampshire. The lowland spruce-fir accounts for 52 acres, less than 1% of New Durham’s total area. A small area of this complex may be found in the northeast corner of New Durham.

Table 12: *Habitat communities and acreage in New Durham.*

Habitat Type	Acres	% Town Area
Hemlock-Hardwood-Pine	25,574	91%
Grasslands	1,099	4%
Marshes	944	3%
Peatlands	558	2%
Northern Hardwood Conifer	149	1%
Lowland Spruce-Fir	52	0.2%

Source: NH Fish and Game, NH Wildlife Action Plan, 2006

Habitat Protection Priority

The WAP also evaluated habitat resources and condition at the landscape scale to develop a statewide and regional ranking, and to identify the highest condition habitat relative to all instances of a given habitat type in the state. The results of this analysis provide regional and local conservation planners a means to identify the most critical wildlife habitat locations. Tiers of habitat quality were assigned based on an intensive statewide analysis, as follows:

- **Tier 1** rating was given to areas that contain the highest condition habitat in the state.
- **Tier 2** areas contain the highest condition rank in the biological region (defined by eco-region for terrestrial habitats, and watershed for wetland and aquatic habitats). New Durham is in the Sebago-Ossipee Hills and Plains biological region.
- **Tier 3** includes supporting landscapes such as watersheds containing top-ranked stream networks and lakes, large forest blocks, or specific animal, plant and natural community occurrences of special note.

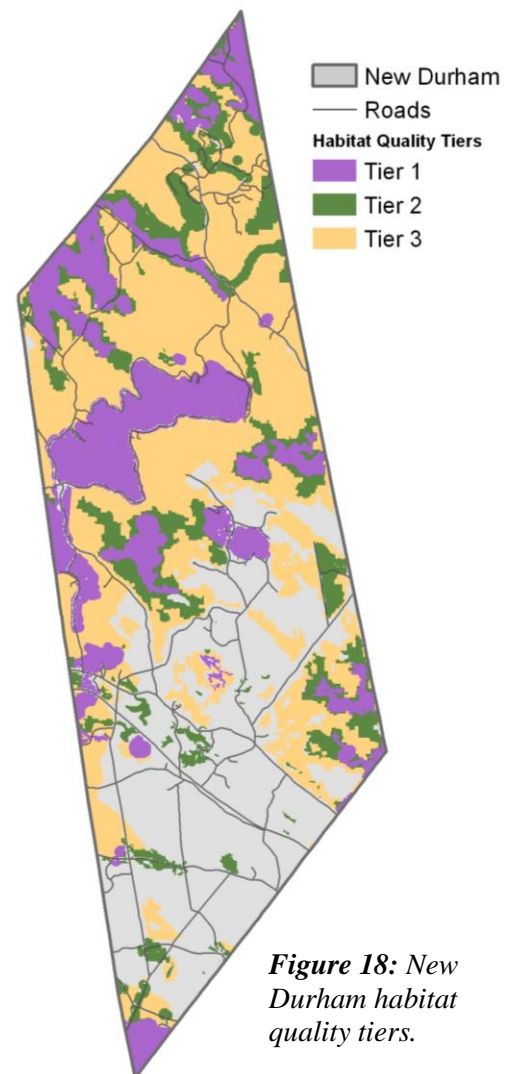


Figure 18: *New Durham habitat quality tiers.*

As illustrated in Figure 18, areas with the highest priority rank according to the WAP are predominantly found in the northern half of New Durham. Some of the Tier 1 areas in New Durham include Merrymeeting Lake, Merrymeeting River, Chalk Pond, Marchs Pond, and the riparian areas along Beaver Brook. Shaws Pond and Coldrain Pond are among the Tier 2 areas in New Durham. The largest areas of supporting landscapes correspond with the large, intact forest blocks mentioned in the section on unfragmented lands above.

All three WAP habitat tiers total 18,819 acres in town, or about 67% of the town land area. Tier 1 habitats total about 5,039 acres, Tier 2 about 3,391 acres, and Tier 3 supporting landscapes are the majority at 10,389 acres. About 30% of this total acreage is currently protected. Tier 2 habitats are better protected than the other two tiers at 13%; Tier 1 habitats are about 11% protected, and Tier 3, while containing the most acreage, is only 6% protected.

Table 13: *Habitat quality tiers and acreage in New Durham.*

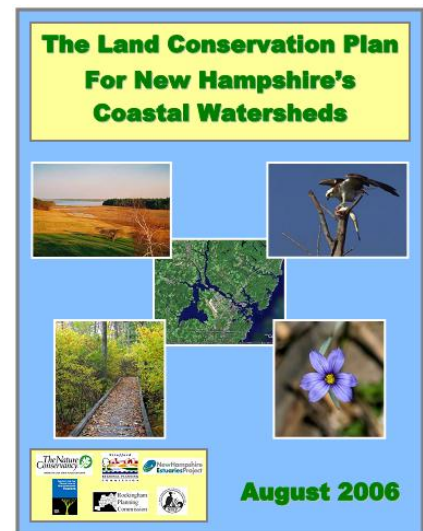
Habitat Quality Tier	Acres	% Town Area
Tier 1	5,039	18%
Tier 2	3,391	12%
Tier 3	10,389	37%
Total Area	18,819	67%

Source: NH Fish and Game, NH Wildlife Action Plan, 2006

Land Conservation Plan for New Hampshire’s Coastal Watersheds

New Hampshire’s coastal watersheds contain exceptional natural, cultural, recreational, and scenic resources. To advance the long-term protection of these resources, The Nature Conservancy, The Society for the Protection of New Hampshire Forests, Rockingham Planning Commission, and Strafford Regional Planning Commission partnered to develop a comprehensive, science-based land conservation plan for the state’s coastal watersheds. The project was funded through the New Hampshire Coastal Program, the New Hampshire Estuaries Project, and the New Hampshire Charitable Foundation.

The overarching goal of this land conservation plan is to focus conservation attention on those lands and waters that are most important for conserving water quality and living resources - native plants, animals, and natural communities in coastal watersheds. The plan prioritizes coastal watershed areas for conservation and offers regional strategies for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and outstanding recreational opportunities into the future.



The highest priority areas for conservation are based on consideration of the following resources: 1) large, unfragmented forest blocks; 2) intact floodplains and riparian zones; 3) high quality stream networks and small watersheds; 4) irreplaceable coastal and estuarine features; 5) significant fish and wildlife habitats; 6) critical habitat supporting rare species and exemplary natural communities; and 7) important connectivity zones. (Section 2.5 of this report highlights the high quality stream watersheds from the plan, while unfragmented lands are discussed at the beginning of Section 2.6.)

The plan identifies Land Conservation Focus Areas, considered to be of exceptional significance for the protection of living resources and water quality in the coastal watersheds. Each Conservation Focus Area is comprised of a Core Area that contains the essential natural resources for which the focus area was identified, with the boundary fitted to the real world of roads, forest edges, rivers, and wetlands. The associated Supporting Landscapes are lands adjacent to Core Areas that provide valuable support functions to them.

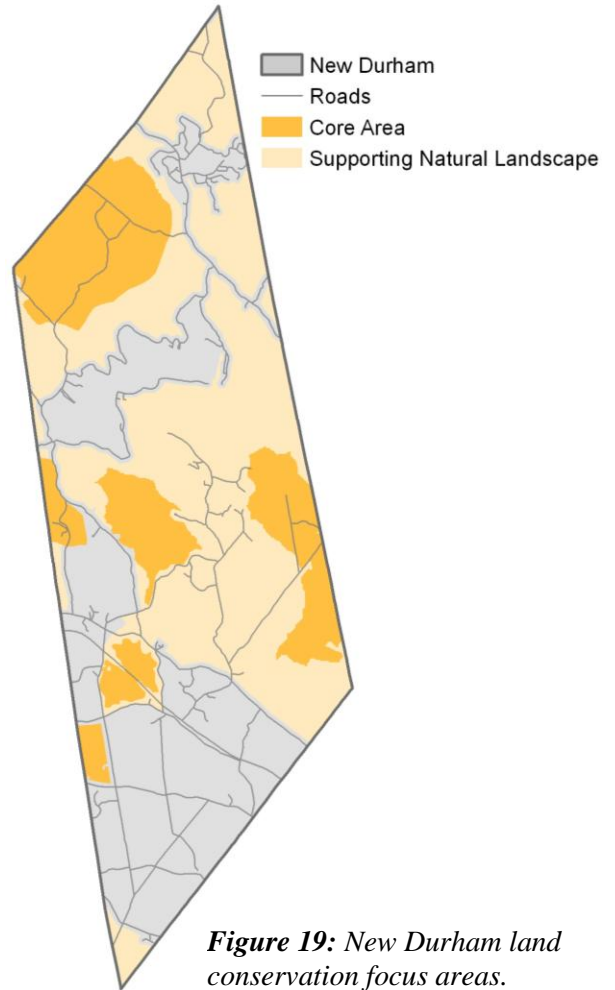


Figure 19: *New Durham land conservation focus areas.*

Figure 19 shows the general locations of the core and supporting areas in New Durham; for a more detailed map, see Appendix 3, Map 9 (Conservation Focus Areas).

As shown in Table 14, eleven Core Focus Areas and Supporting Landscape Areas are identified, either partially or wholly located in New Durham. Together, the portions of these areas located within the town boundaries comprise over 63% of the town's total area. It should be noted that many of these identified areas extend into neighboring towns, making their protection an issue of regional as well as municipal importance.

The largest single Focus Area is at Beaver Brook where the Core and Supporting Landscape amounts to over 4,309 acres or 16% of the town's total area. The Core and Supporting Landscape for the Cocheco Headwater, Coldrain Pond and Cooper Cedar Woods in the eastern portion of the town amount to 10,589 acres, or 38% of the total town area. All of the eight Focus Areas are parts of larger unfragmented forest blocks, and contain important headwater (first order) streams. Several areas contain high quality watersheds, wellhead protection areas, and important farmland soils.

Table 14: Type and acreage of conservation focus areas in New Durham.

Conservation Focus Area	Type	Acres	% Town Area
Beaver Brook	Core Area	2,469	9%
Cocheco Headwaters	Core Area	1,424	5%
Coldrain Pond	Core Area	911	3%
Cooper Cedar Woods	Core Area	380	1%
Marsh Pond	Core Area	324	1%
Prospect Mountain	Core Area	205	1%
Cocheco Headwaters, Coldrain Pond and Cooper Cedar Woods	Supporting Natural Landscape	7,874	28%
Moose Mountains	Supporting Natural Landscape	1,954	7%
Beaver Brook	Supporting Natural Landscape	1,840	7%
Blue Hills	Supporting Natural Landscape	228	1%
Marsh Pond	Supporting Natural Landscape	100	0%
Total Area		17,709	63%

Source: TNC et al., *The Land Conservation Plan for New Hampshire's Coastal Watersheds*, 2006

3. Existing Protections for Natural Resources

There are several ways to conserve and protect valuable natural resources and ecosystems. The primary mechanisms for conserving land are through zoning regulation, tax methods, direct acquisition, or the assignment of protective conservation easements on parcels. In the case of conservation easements, governments, land trusts, non-profit preservation groups, and landowners work cooperatively to develop parcel-specific conservation easements that provide ongoing benefit to the landowner while specifically limiting certain activities and mandating oversight and monitoring, to ensure that the parcel is protected in perpetuity.

At the municipal level, master plans can guide policy goals and implementation strategies related to natural resources. Conservation zoning can be used to encourage the preservation of open spaces while allowing appropriate development to occur in suitable locations. Current use property assessments are another key method of conserving lands. The current use program encourages landowners to keep larger parcels intact and productive for agriculture and forestry, or left unused as wild land, by lowering their property tax burden for as long as the land remains under its traditional use. This section describes some of the natural resource protection measures currently in place in New Durham.

Master Plan

The New Durham Master Plan describes the current status and future goals for the town. It is periodically updated to reflect changes in development and community attitudes; the most recent master plan update was adopted in 2008. The Master Plan provides the legal basis for zoning and other land use regulations in New Durham.

The Natural Resources section of the New Durham Master Plan includes policy goals, principles, standards, and implementation strategies related to protection, conservation and/or use of natural resources including aquifers, wildlife, forests, riparian environments, views, wetlands, night sky protection and other land, water and air resources (Town of New Durham, 2008). The New Durham Master Plan outlines the following natural resources policy goal and general implementation strategies:

Natural Resources Policy Goal:

The Town's natural resources and rural landscape, that include prime agricultural soils, forests, wildlife habitat, water and air quality will be preserved for the sustainable health, safety and welfare of current and future generations.

Natural Resources General Implementation Strategies:

The following implementation strategies are of general importance and are applicable to the protection, conservation and/or use of various natural resource categories:

1. Provide for the ready dissemination of natural resource and environmental information for the town by publishing and regularly updating relevant maps and associated data on the town's website.
2. When the development of an environmentally sensitive area is considered, retain an environmental consultant who will represent the interests of the town when subdivisions or commercial site plans are being reviewed. Such consultant's review will be at the Planning Board's discretion and will be paid by the applicant.
3. Support the Conservation Commission's efforts to complete the Natural Resource Inventory, which, when completed, should be adopted as a supplement to the Master Plan.

The New Durham Master Plan also contains specific policy goals and implementation goals for the following natural resource types: open space, wildlife habitat, water quality/non-point source pollution, scenic views, agricultural resources, night sky protection (i.e. light pollution), and forestry.

The New Durham Master Plan can be viewed online at:

http://www.newdurhamnh.us/Pages/NewDurhamNH_Planning/Planning/ND%20MasterPlan.2008.1.0.pdf

Zoning Ordinances

One of the most effective methods to protect natural resources is through local zoning ordinances and land use regulations. The Town of New Durham has a zoning approach that supports protection of a variety of natural resources. The town is divided into two base zoning districts – Residential/Recreational/Agricultural and the Town Center Mixed Use. All lands within the municipal boundaries of the town are located within one of these two districts as identified on the official Zoning Map.

In addition to the base districts, there are a series of overlay zoning districts superimposed over the conventional zoning map of the town. These overlay districts may or may not occur within all parts of the town. They are intended to regulate the use of specific features or characteristics of the community. These districts are:

- The **Riparian Buffer Zone**, part of the Water Quality Protection Ordinance, ensures areas of restricted development and limited land use adjacent to surface waters and wetlands in New Durham.
- The **Shorefront District** extends to a line 300 feet inland from the normal high water level, on all lakes and ponds over ten (10) acres. In this area, restrictions are designed to protect and enhance water quality, prevent overcrowding of the shore land in the interest of public health and safety, and to preserve the natural beauty and wildlife habitat of the water front areas in New Durham.

- The **Aquifer Protection Overlay** protects water supply sources and encourages wise development in areas associated with known aquifers.
- The **Wetland Conservation Overlay** restricts construction in environmentally sensitive wetland areas and disallows very poorly drained soils from being considered toward meeting the requirements of minimum lot sizes in new subdivisions.
- The **Conservation Focus Area District** identifies lands that have exceptional significance for the protection of living resources and water quality.
- The **Steep Slope Conservation District** comprises all lands in the Town of New Durham with a slope of 15% or greater. The purpose of this ordinance is to regulate the use of steeply sloping lands in order to limit soil loss, erosion, excessive storm water runoff, the degradation of surface waters, and to maintain the natural topography and drainage patterns of land.

The New Durham Zoning Ordinance also contains an Open Space Conservation Subdivision Ordinance that encourages the preservation of open space by promoting greater flexibility in the design of residential subdivisions than would otherwise be possible under conventional subdivision practice.

The New Durham Zoning Ordinance can be viewed online at:

http://www.newdurhamnh.us/pages/newdurhamnh_planning/regs/zoning2010.pdf

Current Use

Current use property assessments are another key method of conserving lands. The current use program encourages landowners to keep larger parcels intact and productive for agriculture and forestry, or left unused as wild land, by lowering their property tax burden for as long as the land remains under its traditional use. Some towns set aside a percentage of revenues from current use tax assessments to acquire lands outright or to provide matching funds or administrative support for conservation easement activities. RSA 79A (Current Use Taxation) authorizes this program, through which parcels of field, farm, forest, wetland, natural preserves, and recreation land receive reduced tax assessments.

The most recent report on land in current use was compiled for 2009 by the New Hampshire Department of Revenue. In New Durham, 62% of New Durham's total land area was designated as current use (Table 15). The majority of the land in current use is in forest, while only 481 acres or about 3% is currently in agriculture use.

Table 15: New Durham's current use program, 2009.

Current Use Designation	Area (acres)	% of Current Use Lands	% Total Town Area
Farmland	481	3%	2%
Forest land without Documented Stewardship	9,452	54%	34%
Forest Land with Documented Stewardship (e.g. tree farm or forest management plan)	6,090	35%	22%
Unproductive Land	629	4%	2%
Wetland	706	4%	3%
Total Acres	17,358	100%	62%

New Hampshire Department of Revenue, 2010 [http://www.nh.gov/revenue/munc_prop/curpts.htm]

Conservation Lands

Conservation lands are undeveloped lands that are protected from future development by governmental ownership or conservation easement. Depending on the type of protection, these lands may or may not be protected in perpetuity. Certain parcels of public land are designated as state or national forests, state parks, wildlife refuges or management areas, or receive other special designation whereby the land will be protected from development. Other public lands as well as private land may be protected by a conservation easement, a deed restriction where the development rights have been removed. Publicly owned land without a conservation easement or other deed restriction retains its development rights, which provides no permanent protection. The three primary protection types applicable for conservations lands in New Durham are as follows:

- **Conservation Easement*** – A voluntary agreement that allows a landowner to limit the type or amount of development on their property while retaining private ownership of the land.

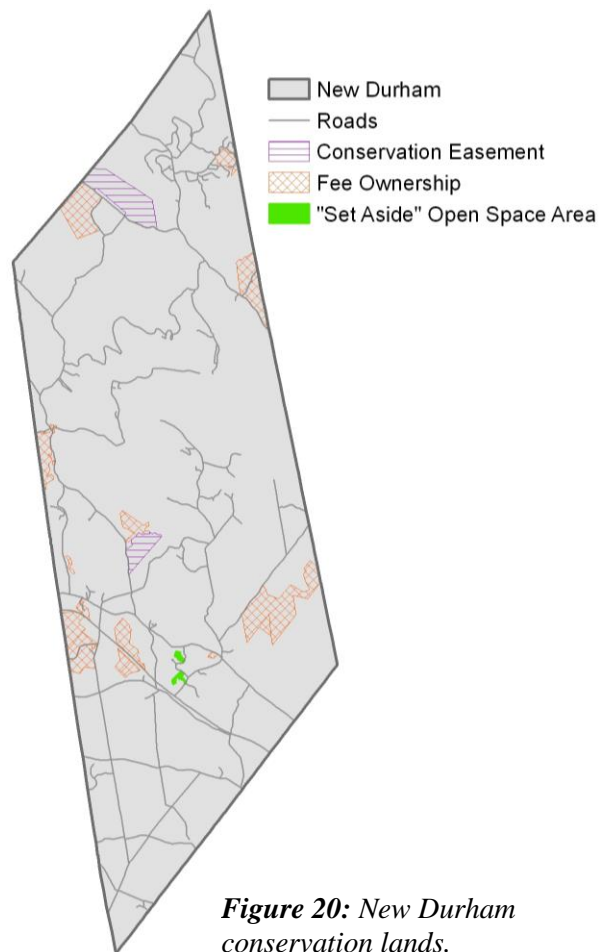


Figure 20: New Durham conservation lands.

- **Fee Ownership** – The absolute ownership of property. Public ownership means the land is owned in fee by some government authority such as a Town, City, County or a federal entity. Fee ownership could include land as parks, athletic fields, town halls, libraries, courthouses, some highways, beaches, civic centers, schools, etc.
- **“Set Aside” Open Space*** – Land set aside as "open space" as part of a development project. This land is not permanently protected and may be developed in the future.

*Land protected by these methods is typically private property and is not open for public access. Terms of these conservation restrictions vary considerably; consult deeds for specifics.

There are currently 27 parcels with some level of conservation protection in New Durham. Determining the exact number of acres of conservation land in New Durham is difficult because some of these lands have not been surveyed. Based on the NH GRANIT Conservation/Public Lands data layer, the approximate total area of conservation lands in New Durham is 1,683 acres or 7% of the town, as detailed in Table 16 below.

Table 16: Acreage and other information about New Durham’s conservation lands.

Name	Protection Type	Primary Protecting Agency	Protecting Agency Type	Acreage in New Durham	% Total Town Area
Jennings Forest	Fee Ownership	Society for the Protection of NH Forests	Private	389	1%
Beaver Brook CE	Conservation Easement	NH Fish & Game	State	314	1%
Beaver Brook WMA	Fee Ownership	NH Fish & Game	State	226	1%
Jones Brook WMA	Fee Ownership	NH Fish & Game	State	183	1%
New Durham Town Forest	Fee Ownership	New Durham	Municipal	138	0.49%
Cooper Cedar Woods	Fee Ownership	Society for the Protection of NH Forests	Private	134	0.5%
Woodward Easement	Conservation Easement	Society for the Protection of NH Forests	Private	111	0.4%
Merrymeeting Marsh WMA	Fee Ownership	NH Fish & Game	State	102	0.4%
Powdermill Fish Hatchery	Fee Ownership	NH Fish & Game	State	100	0.4%
Coldrain Pond Remote Access Facility	Fee Ownership	NH Fish & Game	State	63	0.2%
Copple Crown Village District Land	Fee Ownership	Copple Crown Village District	Other Public/Quasi-Public Entity	51	0.2%
New Durham Ballfield	Fee Ownership	New Durham	Municipal	20	0.07%
Drew Road Housing Development Open Space	"Set Aside" Open Space	New Durham	Municipal	20	0.07%
Meetinghouse Park	Fee Ownership	New Durham	Municipal	6	0.02%
Merrymeeting Lake Dam	Fee Ownership	NH Fish & Game	State	2	0.01%
Marsh Pond Access	Fee Ownership	New Durham	Municipal	2	0.01%
Abbotts Grant - Farmington Town Forest	Fee Ownership	Farmington	Municipal	2	0.01%
Town Beach	Fee Ownership	New Durham	Municipal	1	0.004%
Total Acres				1,863	7%

Source: NH Granit conservation lands data layer

The largest conserved area in town is Jennings Forest comprising 389 acres or approximately 1% of the town's total area, owned by The Society for the Protection of New Hampshire Forests (SPNHF). The Jennings Forest is a tree farm, managed to produce forest products and provide wildlife habitat and watershed protection. Woods roads lead through the forest to a beaver meadow and a forested wetland along a brook (NH.com). SPNHF also owns the nearby Cooper Cedar Woods property, which features an interpretive trail through a bog with a valuable stand of Atlantic white cedar and another of black spruce. The property provides habitat for deer and other wildlife, including numerous waterfowl (NH.com). Both properties are located on Route 11. Additionally, SPNHF holds an easement on the 111-acre Woodward parcel on Brackett Road.

The second-largest conserved area in New Durham is the 314-acre Beaver Brook easement on Caverly Road, held by the New Hampshire Fish and Game Department (NH Fish & Game). NH Fish & Game also owns the adjacent 226-acres Beaver Brook Wildlife Management area, which includes 70 acres of wetlands habitat and open water and vegetation types that include shrub-scrub, forested bog, emergent habitat, tall grasses, sedges, red maple, sphagnum moss, and balsam fir. The nearby Jones Brook Wildlife management Area is also owned by NH Fish & Game. The 183-acre property abuts Kings Highway along the Middleton/New Durham town line, and is comprised of upland forest, with mixed stands and various age classes of hardwoods, hemlock and white pine. It has important deer wintering areas, several ponds and streams, and a network of wetlands for waterfowl (NH Fish & Game).

The Town of New Durham owns 187 acres of conservation lands in town, the largest of which is the 138-acre New Durham Town Forest on Berry Road. Additional town-owned conservation lands include the New Durham Ballfield, the Drew Road Housing Development Open Space, Meetinghouse Park, the Marsh Pond Access area, and the Town Beach.

4. Summary and Recommendations

It is clear from the results of this NRI that New Durham possesses abundant and diverse natural resources that contribute significantly to both the ecological richness and health of the town, as well as socially to its quality of life the community. This NRI is not and should not be viewed as a conservation plan of action. Rather, it is an encyclopedia of information based on the best currently available data, with a measure of interpretation and some initial recommendations about what is important to conserve. The NRI is a baseline characterization, and a beginning in what should be an ongoing process of updates and refinements.

Current zoning ordinances and land use regulations provide some protections. However, the town can take several additional approaches to maintain and protect its rural character, and its special resources for the benefit of current residents, visitors, wildlife, and future generations. Below are some

recommendations for future additions to this NRI report, and next steps toward transforming the NRI information and interpretation into a strategic conservation plan for the town.

Recommendations for Further Work

This study is a comprehensive look at the natural resources of New Durham. Virtually all available data appropriate to the study were utilized. However, there are additional data which could be developed, and addendums to the study which could be completed. The New Durham NRI is a living document that should be updated periodically to reflect the latest available data.

The creation of an updated soils map would be particularly helpful to planning in New Durham. Since the current maps and zoning ordinances are largely based on 1973 soils mapping, updated soils mapping data should be incorporated when it becomes available. Updated digital soils data would be particularly useful for reassessing zoning districts and delineating wetlands, as well as evaluating agricultural and forestry potential. The Natural Resource Conservation Service has completed updated field mapping for Strafford County soils, however, digitization has not yet been completed. When completed, the updated soil survey data will be available from NH GRANIT.

Additionally, one of the stated objectives of this NRI is to help identify high priority areas for conservation that can be targeted for protection. While some general recommendations to this end are provided below, the completion of a natural resources co-occurrence map would help to identify the specific parcels where various high-value natural resources overlap. A co-occurrence map shows the impact of having numerous resources in the same geographic area. Conceptually, each of the natural resource features is located on a separate, transparent map. These maps are then overlaid so that the locations with more co-located occurrences of the separate factors appear darker than those locations with fewer occurrences. A resource co-occurrence model assigns a weighted importance value to each data factor or layer. New Durham's co-occurrence map could build on the existing conservation focus areas map developed by the Nature Conservancy (Figure 19), which uses the same type of methodology. But, the town could incorporate other town-specific conservation priorities into the map.

Recommended Next Steps

The completion of this report reflects one step in the process of developing a conservation plan for the Town of New Durham. A commitment should be made to transforming the NRI information and interpretation into a policy-related, strategic conservation plan for the town. This work would include, but not be limited to:

- Broaden the stakeholder group beyond the New Durham Conservation Commission to include representatives from other boards in town, as well as professionals and persons with additional knowledge and information to bring into the discussion.

- Generate a “shared vision” of the town’s conservation plan by using a facilitated consensus-building process to assign relative importance values to key factors. This information can be incorporated into the recommended natural resources co-occurrence mapping described above.
- Craft a public information plan to keep New Durham residents apprised of the planning process, opportunities to become involved or learn more about the plan, and most important to interpret and build voter support for the strategies within the plan.
- Continue to pursue Prime Wetland designation for the significant wetlands identified on page 24 of this report and in the *Use of GIS Data to Assist in the Selection and Identification of Significant Wetlands in the Moose Mountains Regional Greenways: New Durham User’s Guide* (Blue Moon Environmental, 2004). Prime Wetland designation is a way for towns to provide additional protection to wetlands which are particularly unique, fragile and/or unspoiled. More information about the designation process can be found on the NHDES website [http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm].
- Investigate opportunities to enhance connectivity among key natural areas (particularly Conservation Focus Areas outlined in Section 2.6) and along riparian and shoreland corridors. Contiguous tracts of conserved land help protect and improve the natural landscape, water quality, and habitat quality.

A few of the key areas to consider for conservation include:

- 1. North of Merrymeeting Lake, near Devil’s Den Road.** This area contains important forest habitat and soils (Map 4), is part of the important Beaver Brook Focus Area (Map 9) and is included in one of the largest blocks of unfragmented habitat in New Durham (Map 7). One of the town’s significant wetlands is also located nearby (Map 6). Opportunities for conserving areas adjacent to the existing Beaver Brook conservation lands should be investigated.
- 2. Coldrain Pond area, near Brackett Road.** This area is part of the Coldrain Pond Focus Area (Map 9), is included in the high quality Coldrain Pond watershed (Map 6), and is part of one of the largest blocks of unfragmented habitat in New Durham (Map 7). One of the town’s significant wetlands is also located nearby (Map 6). Opportunities for conserving areas adjacent to the existing Coldrain Pond remote access facility conserved area should be investigated.
- 3. Cocheco River headwaters area, near Middleton Road.** This area is a key high quality stream watershed (Map 6) and is partially included in one of the largest blocks of unfragmented habitat in New Durham (Map 7). The Cocheco River headwaters are also one of the important Core Focus Areas in New Durham (Map 9). Opportunities for conserving areas adjacent to the existing Jennings Forest conservation lands should be investigated.
- 4. Ela River headwaters, along Route 11.** This area contains the Cooper Cedar Woods Focus Area (Map 9), as well as highest transmissivity aquifer in New Durham (Map 6), contiguous

significant wetlands (Map 6), and important peatland/wetland habitat (Map 8). Opportunities for conserving areas adjacent to the existing Cooper Cedar Woods conservation lands should be investigated.

- 5. Important agricultural and forest soils in the southwest corner of town, near Ridge Road.** Currently, less than 1% of New Durham's mapped agricultural soils, and none of the highest value (prime) agricultural soils are protected. Similarly, only 3% of the town's important forest soils are protected. New Durham's most valuable agricultural and forest soils (prime northern hardwood soils) are located in the southwest corner of the town (Map 4). Opportunities for protecting some of the larger areas of these soils, particularly the prime agricultural soils along Ridge Road, should be investigated.

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Appendix 1: Natural Resource Data Tables not included in Section 2

Table 1A: New Durham productive forest soil details.

Map Unit Symbol	Map Unit Name	Forest Soil Class	Map Unit Acres
166C	Canterbury fine sandy loam, 8 to 15 percent slopes	Group IA	0.03
167B	Canterbury fine sandy loam, 3 to 8 percent slopes, very stony	Group IA	0.43
167C	Canterbury fine sandy loam, 8 to 15 percent slopes, very stony	Group IA	4.12
167D	Canterbury fine sandy loam, 15 to 25 percent slopes, very stony	Group IA	0.14
459B	Metacomet fine sandy loam, 3 to 8 percent slopes, very stony	Group IA	0.19
459C	Metacomet fine sandy loam, 8 to 15 percent slopes, very stony	Group IA	0.00
47B	Henniker fine sandy loam, 3 to 8 percent slopes, very stony	Group IA	5.93
47C	Henniker fine sandy loam, 8 to 15 percent slopes, very stony	Group IA	8.34
47D	Henniker fine sandy loam, 15 to 25 percent slopes, very stony	Group IA	13.58
559B	Skerry fine sandy loam, 3 to 8 percent slopes, very stony	Group IA	0.04
559C	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	Group IA	1.66
56C	Becket fine sandy loam, 8 to 15 percent slopes	Group IA	2.94
57B	Becket fine sandy loam, 3 to 8 percent slopes, very stony	Group IA	0.26
57C	Becket fine sandy loam, 8 to 15 percent slopes, very stony	Group IA	13.34
CfB	Charlton fine sandy loam, 3 to 8 percent slopes	Group IA	1.66
CfC	Charlton fine sandy loam, 8 to 15 percent slopes	Group IA	13.75
CsB	Charlton very stony fine sandy loam, 3 to 8 percent slopes	Group IA	56.57
CsC	Charlton very stony fine sandy loam, 8 to 15 percent slopes	Group IA	587.78
CsD	Charlton very stony fine sandy loam, 15 to 25 percent slopes	Group IA	44.47
PbB	Paxton fine sandy loam, 0 to 8 percent slopes	Group IA	209.96
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	Group IA	169.96
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	Group IA	31.45
PdB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Group IA	444.26
PdC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	Group IA	1,181.48
PdD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	Group IA	130.05
SnB	Sutton fine sandy loam, 0 to 8 percent slopes	Group IA	2.35
SuB	Sutton very stony fine sandy loam, 0 to 8 percent slopes	Group IA	12.15
WgB	Woodbridge fine sandy loam, 0 to 8 percent slopes	Group IA	57.35
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	Group IA	311.06
WsC	Woodbridge very stony fine sandy loam, 8 to 15 percent slopes	Group IA	204.48
Group 1A Soils: <i>Deeper, loamy soils, moderately well-drained (northern hardwood forest type).</i>		Group IA Total	3,509.77

Source: NRCS Stafford County Soil Survey, 1973

Table 1A: New Durham productive forest soil details, continued.

Map Unit Symbol	Map Unit Name	Forest Soil Class	Map Unit Acres
143D	Monadnock sandy loam, 15 to 25 percent slopes, very stony	Group IB	4.26
380D	Tunbridge-Lyman-Becket complex, 15 to 25 percent slopes, very stony	Group IB	2.10
443C	Chichester sandy loam, 8 to 15 percent slopes, very stony	Group IB	2.43
443D	Chichester sandy loam, 15 to 25 percent slopes, very stony	Group IB	2.63
463E	Woodstock-Bice fine sandy loams, 25 to 35 percent slopes, very stony	Group IB	10.19
480B	Millsite-Woodstock-Henniker complex, 3 to 8 percent slopes, very stony	Group IB	0.16
480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	Group IB	0.04
480D	Millsite-Woodstock-Henniker complex, 15 to 25 percent slopes, very stony	Group IB	2.64
977B	Acton fine sandy loam, cool, 0 to 8 percent slopes, very stony	Group IB	0.02
980C	Henniker-Gloucester fine sandy loams, cool, 8 to 15 percent slopes, very stony	Group IB	0.37
AcB	Acton fine sandy loam, 0 to 8 percent slopes	Group IB	13.32
AdB	Acton very stony fine sandy loam, 0 to 8 percent slopes	Group IB	594.14
AdC	Acton very stony fine sandy loam, 8 to 15 percent slopes	Group IB	241.85
GlB	Gloucester fine sandy loam, 3 to 8 percent slopes	Group IB	70.48
GlC	Gloucester fine sandy loam, 8 to 15 percent slopes	Group IB	56.50
GsB	Gloucester very stony fine sandy loam, 3 to 8 percent slopes	Group IB	939.19
GsC	Gloucester very stony fine sandy loam, 8 to 15 percent slopes	Group IB	4,401.07
GsD	Gloucester very stony fine sandy loam, 15 to 25 percent slopes	Group IB	1,005.63
GtD	Gloucester extremely stony fine sandy loam, 8 to 25 percent slopes	Group IB	6,005.56
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	Group IB	9.61
HfB	Hollis-Gloucester fine sandy loams, 3 to 8 percent slopes	Group IB	4.92
HfC	Hollis-Gloucester fine sandy loams, 8 to 15 percent slopes	Group IB	42.38
HgB	Hollis-Gloucester very rocky fine sandy loams, 3 to 8 percent slopes	Group IB	72.59
HgC	Hollis-Gloucester very rocky fine sandy loams, 8 to 15 percent slopes	Group IB	397.76
HgD	Hollis-Gloucester very rocky fine sandy loams, 15 to 25 percent slopes	Group IB	98.39
Group 1B Soils: Sandy or loamy soils, moderately to well-drained (mixed hardwood forest type).		Group IB Total	13,978.22

Map Unit Symbol	Map Unit Name	Forest Soil Class
35B	Champlain loamy fine sand, 3 to 8 percent slopes	Group IC
613A	Croghan fine sandy loam, 0 to 5 percent slopes	Group IC
DeA	Deerfield loamy sand, 0 to 3 percent slopes	Group IC
DeB	Deerfield loamy sand, 3 to 8 percent slopes	Group IC
HaA	Hinckley loamy sand, 0 to 3 percent slopes	Group IC
HaB	Hinckley loamy sand, 3 to 8 percent slopes	Group IC
HaC	Hinckley loamy sand, 8 to 15 percent slopes	Group IC
WdA	Windsor loamy sand, 0 to 3 percent slopes	Group IC
WdB	Windsor loamy sand, 3 to 8 percent slopes	Group IC
WdC	Windsor loamy sand, 8 to 15 percent slopes	Group IC
Group 1C Soils: Outwash sands and gravels (pine forest type).		Group IC Total
		Grand Total

Source: NRCS Strafford County Soil Survey, 1973

Table 2A: New Durham productive agricultural soil details.

Map Unit Symbol	Map Unit Name	Farmland Soil Class	Map Unit Acres
CfB	Charlton fine sandy loam, 3 to 8 percent slopes	Prime farmland	1.66
PbB	Paxton fine sandy loam, 0 to 8 percent slopes	Prime farmland	209.96
SnB	Sutton fine sandy loam, 0 to 8 percent slopes	Prime farmland	2.35
WgB	Woodbridge fine sandy loam, 0 to 8 percent slopes	Prime farmland	57.35
		Total Prime Farmland Acres	271.31
143D	Monadnock sandy loam, 15 to 25 percent slopes, very stony	Farmland of local importance	4.26
167B	Canterbury fine sandy loam, 3 to 8 percent slopes, very stony	Farmland of local importance	0.43
167C	Canterbury fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	4.12
167D	Canterbury fine sandy loam, 15 to 25 percent slopes, very stony	Farmland of local importance	0.14
35B	Champlain loamy fine sand, 3 to 8 percent slopes	Farmland of local importance	0.27
380D	Tunbridge-Lyman-Becket complex, 15 to 25 percent slopes, very stony	Farmland of local importance	2.10
443C	Chichester sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	2.43
443D	Chichester sandy loam, 15 to 25 percent slopes, very stony	Farmland of local importance	2.63
459B	Metacomet fine sandy loam, 3 to 8 percent slopes, very stony	Farmland of local importance	0.19
459C	Metacomet fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	0.00
47B	Henniker fine sandy loam, 3 to 8 percent slopes, very stony	Farmland of local importance	5.93
47C	Henniker fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	8.34
480B	Millsite-Woodstock-Henniker complex, 3 to 8 percent slopes, very stony	Farmland of local importance	0.16
480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	Farmland of local importance	0.04
559B	Skerry fine sandy loam, 3 to 8 percent slopes, very stony	Farmland of local importance	0.04
559C	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	1.66
57B	Becket fine sandy loam, 3 to 8 percent slopes, very stony	Farmland of local importance	0.26
57C	Becket fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of local importance	13.34
977B	Acton fine sandy loam, cool, 0 to 8 percent slopes, very stony	Farmland of local importance	0.02
978A	Leicester-Moosilauke fine sandy loams, cool, 0 to 3 percent slopes, very stony	Farmland of local importance	0.21
CsB	Charlton very stony fine sandy loam, 3 to 8 percent slopes	Farmland of local importance	56.57
DeA	Deerfield loamy sand, 0 to 3 percent slopes	Farmland of local importance	56.73
DeB	Deerfield loamy sand, 3 to 8 percent slopes	Farmland of local importance	39.19
PdB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	Farmland of local importance	444.26
RgA	Ridgebury fine sandy loam, 0 to 3 percent slopes	Farmland of local importance	6.77
WdA	Windsor loamy sand, 0 to 3 percent slopes	Farmland of local importance	176.49
WdB	Windsor loamy sand, 3 to 8 percent slopes	Farmland of local importance	66.15
		Total Farmland of Local Importance Acres	892.71
166C	Canterbury fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	0.03
56C	Becket fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	2.94
613A	Croghan fine sandy loam, 0 to 5 percent slopes	Farmland of statewide importance	0.00
980C	Henniker-Gloucester fine sandy loams, cool, 8 to 15 percent slopes, very stony	Farmland of statewide importance	0.37
AcB	Acton fine sandy loam, 0 to 8 percent slopes	Farmland of statewide importance	13.32
CfC	Charlton fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	13.75
GIB	Gloucester fine sandy loam, 3 to 8 percent slopes	Farmland of statewide importance	70.48
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	169.96
		Total Farmland of Statewide Importance Acres	270.86
		Grand Total	1,434.88

Source: NRCS Strafford County Soil Survey, 1973

Appendix 2: Map Set Definitions

Conservation Focus Areas - Conservation Focus Areas were delineated for the Land Conservation Plan for New Hampshire's Coastal Watersheds in August 2006. A Conservation Focus Area is considered to be of exceptional significance for the protection of living resources and water quality in the coastal watersheds. In general, focus areas occur in places where multiple important natural resource features co-occur to an extent that is significant from a whole-watershed perspective. Each Conservation Focus Area is comprised of a Core Area that contains the essential natural resources for which the focus area was identified, with the boundary fitted to the real world of roads, forest edges, rivers and wetlands. Some Conservation Focus Areas also include a Supporting Natural Landscape, which is comprised of natural lands that buffer and sometimes link core areas and help to maintain habitat and ecological processes.

Conservation Lands Protection Types –

- ***Conservation Easement**** – A voluntary agreement that allows a landowner to limit the type or amount of development on their property while retaining private ownership of the land.
- ***Fee Ownership*** – The absolute ownership of property. Public ownership means the land is owned in fee by some government authority such as a Town, City, County or a federal entity. Fee ownership could include land as parks, athletic fields, town halls, libraries, courthouses, some highways, beaches, civic centers, schools, etc.
- ***“Set Aside” Open Space**** – Land set aside as "open space" as part of a development project. This land is not permanently protected and may be developed in the future.

*Land protected by these methods is typically private property and is not open for public access. Terms of these conservation restrictions vary considerably; consult deeds for specifics.

Drinking Water Source Protection Areas - Drinking Water Source Protection Areas identify the surface and subsurface area surrounding a groundwater source of drinking water supplying a public water system through which contaminants are likely to move toward and reach such groundwater source. This information is utilized by New Hampshire Department of Environmental Services for setting priorities for drinking water protection activities.

Forest Ecosystems Co-Occurrence Model - This model is designed to assist in identifying optimal areas to conserve and restore functional core forest conditions in New Hampshire's coastal watersheds. The model utilizes three data layers: (1) unfragmented forest blocks, (2) aggregated forest blocks, and (3) high-quality stream watersheds.

A comprehensive description of the Forest Ecosystems Co-occurrence Model may be found in Section III of the Land Conservation Plan for New Hampshire's Coastal Watersheds.

High Quality Stream Watersheds - The High-quality Stream Watersheds dataset was created to define areas within the New Hampshire Coastal Watersheds with potentially high water-quality streams. Watershed boundaries are based on the USGS SPARROW water quality model.

The definition for each tier is as listed below:

Tier 2: Population Density <36 persons per sq. miles, <2% of the area is developed, and < 5% of the landuse is agriculture.

Tier 3: Population Density is <64 persons per sq. mile, <3% of the area is developed, and <5% of the landuse is agriculture.

A complete description of the dataset may be found in The Land Conservation Plan for New Hampshire's Coastal Watersheds (Section III).

High-value Forest Ecosystem Zones - High-value Forest Ecosystem Zones were delineated for the Land Conservation Plan for New Hampshire's Coastal Watersheds in August 2006. These zones identify large areas of unfragmented forest.

Hydrologic Areas of Concern - A Hydrologic Area of Concern is a land area surrounding a water source, which is intended to include the portion of the watershed in which land uses are likely to have the greatest impact on water quality at the water supply intake.

Impervious Cover - Impervious cover is defined as landscape surfaces (e.g. roads, sidewalks, driveways, parking lots, and rooftops) that no longer absorb rain and may direct large volumes of stormwater runoff into a waterbody.

Land Conservation Plan for NH's Coastal Watersheds (2006) - The Land Conservation Plan for New Hampshire's Coastal Watersheds prioritizes coastal watershed areas and offers regional strategies for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and outstanding recreational opportunities into the future. It was created with public input from a range of stakeholders including citizens, scientists, conservation organizations, and natural resource agencies. The hope is that the plan will serve as a valuable guide, tool, and information resource for landowners, communities, land trusts, and public agencies that are interested in land conservation.

Special Flood Hazard Areas - Land areas that are at high risk for flooding are called Special Flood Hazard Areas (SFHAs), or floodplains. These areas are indicated on Flood Insurance Rate Maps. The SFHA is the area where the National Flood Insurance Program floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Stratified Drift Aquifer- An aquifer is a geologic formation or deposit, typically a layered deposit of gravel, sand and silt in valleys, which is capable of yielding usable quantities of groundwater.

Unfragmented Lands (Unfragmented Blocks) - Unfragmented blocks of habitat are large pieces of land which are not bisected by a maintained road; typically there are few or no houses, businesses or

other human habitation. These areas can include forests, meadows, open water, wetlands, and agricultural fields. Unfragmented blocks of land sustain diverse communities of plant and animal species, provide recreational opportunities for the community and often provide or protect important scenic resources.

Wellhead Protection Areas - Wellhead Protection Areas are surface and subsurface land areas regulated to prevent contamination of a well or well-field supplying a public water system. This program, established under the national Safe Drinking Water Act, is implemented through state governments.

Wildlife Action Plan (2005) - The New Hampshire Fish and Game Department has 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 New Hampshire decision-makers with important tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern. It is a pro-active effort to define and implement a strategy that will help keep species off of rare species lists, in the process saving taxpayers millions of dollars.

Appendix 3: Map Set

Due to large file sizes, the map set documents must be downloaded separately from this report.

Map 1: Base Map

Map 2: Topography

Map 3: Bedrock Geology

Map 4: Soils of Special Importance

Map 5: Land Cover – Land Use

Map 6: Water Resources

Map 7: Unfragmented Lands

Map 8: Wildlife Action Plan

Map 9: Conservation Focus Areas