Conservation Commission

Town of Alton

Natural Resource Inventory

Alton Conservation Commission

May 2002

Conservation Commission

TOWN OF ALTON

NATURAL RESOURCE INVENTORY

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PREPARED FOR AND IN CONSULTATION WITH:
TOWN OF ALTON
ALTON PLANNING BOARD
ALTON CONSERVATION COMMISSION

MAY 2002

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Natural Resource Inventory

Purpose: To conduct a comprehensive study of Alton's natural resources to determine their distribution and composition and to serve as a guide for the future planning and development of the town.

Goals:

Water Resources/Water Quality

-Surface Water Features: lakes/ponds, streams/rivers.

-Groundwater Resources: stratified drift aquifers, etc…

-Wetlands: wetland distribution/types, hydric soils, prime wetlands.

-Forests: role vegetated buffers and forested landscapes play in preserving water quality and quantity.

-Biodiversity: diversity of surface waters and wetlands and diversity of species utilizing those resources in a local and regional context.

-Wildlife Habitat: value of surface waters, wetlands and riparian areas as wildlife habitat.

Open Space/Unfragmented Lands

-Large Contiguous Areas of Undeveloped Land (500 acres +)

-Conservation Land

-Agricultural Land/Farms: remaining farms in town and productive agricultural soils.

-Forest Resources: forest types, productive forest soils, large unfragmented blocks of forest etc...

-Biodiversity: habitat and species diversity of open space tracts in a local and regional context.

-Wildlife Habitat: value of unfragmented tracts as wildlife habitat and significant wildlife habitat.

Methodology: Natural resources were inventoried primarily utilizing Geographic Information Systems (GIS) maps produced from GRANIT data layers developed at the Complex System Research Center, University of New Hampshire and GIS analysis of the data layers in conjunction with field observations, site visits, review of relevant publications and local knowledge.

Natural Resource Inventory Participants: Natural Resource Specialist Charles Hersey prepared the inventory in consultation with the Alton Conservation Commission, Alton Planning Board, Alton Land Use and Property Records Department and the public. The Society for the Protection of New Hampshire Forests produced the following large-scale maps (1:24,000 scale) of Alton's natural resources: Unfragmented Lands, Water Resources, Land Cover, Wetland and Riparian Zones, and Resource Co-Occurrence.

Introduction

Alton is one of the largest communities in New Hampshire, in terms of area, and it contains a remarkable diversity of natural resources and habitats within its borders. The town comprises 83 square miles of lakes, ponds, rivers, wetlands, mountains, forests, aquifers, endangered species habitat, agricultural land, floodplains, and large tracts of undeveloped land.[1] These essential natural resources are not spread evenly throughout the town, but rather they are distributed mainly according to topography, glacial activity, climate, and past and present land use. Approximately 14,000 years ago, a sheet of ice up to a mile thick that had covered Alton and the rest of New Hampshire began to recede. As the glaciers retreated to the north their sheer weight and melt water changed the topography and geology of Alton. Sand and gravel carried by the glaciers' melt water collected in river bottoms and glacial lakes thereby creating Alton's most productive aquifers and providing the raw material for the town's largest wetland complexes. The glaciers also deposited till, unsorted sediments ranging in size from clay to boulders, on much of the town's uplands and hills.[2]

Alton's natural resources are in many ways a legacy of the most recent period of glaciation. However, over the last two hundred years human use of Alton's landscape has had a strong influence on the composition, structure, health and distribution of its natural resources as well. Alton was not settled until the late 1700's and for most of the 1800's Alton was a farming community.[3] Population of Alton during the 1800's peaked in 1820 at 2,058, remained steady for a few decades and then declined rapidly till 1950 when only 1,189 people called Alton home.[4] Prior to European settlement, around 90% of Alton's landscape was forested.[5] Farmers cleared thousands of acres of forests in Alton for pasture, tillage fields, homes and roads. They also cut thousands of acres of forests to supply their fuel and lumber needs.

The large scale clearing of the forests had many interrelated ecological affects to numerous to mention, but some of the most obvious were: a decrease in forest area and habitat for species that relied on forests, elimination of old-growth or virgin forests, and a change in climate and water regime. The farmers replaced the forested landscape with an agrarian landscape where much of the agricultural production left Alton to supply growing urban and manufacturing markets to the south. The rush of land clearing and settlement faded as quickly as it came due to the promise and competition of more productive farmland land in the Midwest. During the late 1800's and early 1900's the forests reclaimed many abandoned fields and pastures as the farmers left town.[6] The predominantly forested landscape Alton enjoys today is a direct legacy of the land use patterns of the 1800's as well as ecological conditions.

The land use patterns of the 1900's and today differ greatly from that of the 1800's. From the late 1800's to the present, Alton has experienced a transformation from a predominantly agricultural community to a seasonal resort community dominated by Lake Winnipesaukee. Most development during the last century in Alton has been centered around Lake Winnipesaukee and other smaller water bodies such as Halfmoon

and Sunset Lake and Hills Pond. In contrast to the 1800's, when Alton exported large quantities of agricultural commodities and most of life's necessities came from within the town's borders, today almost all food consumed within the town is imported from places thousands of miles away. There are only four farms remaining in town.[7] One result of development patterns in Alton is that most frontage on the town's major lakes and ponds has been developed. Undeveloped shoreline has become a rare and endangered habitat. Seasonal homes and tourism are the town's major industry and provide much of the town's tax base.

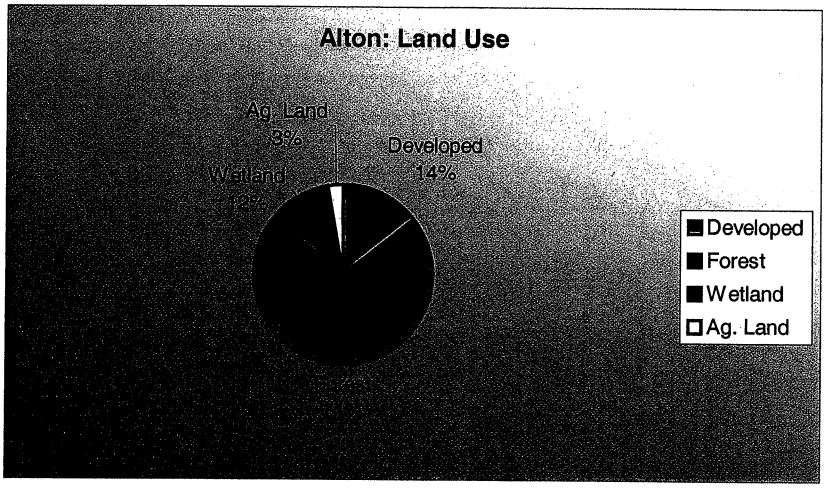
A new land use trend is emerging as Alton enters the twenty-first century: large, residential subdivisions of twenty homes or more throughout the town, especially in south Alton, due to its proximity to urban centers. New development is no longer concentrated on and near the lakes, as most of this land has already been developed. Rural and environmentally sensitive areas of Alton are beginning to be subdivided and developed as growth pressures continue to emanate from southern New Hampshire and eastern Massachusetts. What this new development pattern means for the future of Alton remains to be seen. It is a distinct possibility, however, that Alton will begin to resemble a suburb of Boston much more than a rural lake community in the coming decades.

Approximately **5,844 acres** or **14.3%** of Alton's land base is developed (e.g. homes, businesses, seasonal homes, roads etc...). This leaves over **34,000 acres** or **85.7%** Alton's land base as undeveloped land. This undeveloped or open land is composed of a number of different natural resources, which include approximately 4,685 acres of wetlands, 1,102 acres of agricultural land, 28,991 acres of forestland and thousands of acres of steep slopes and aquifers. This is all in addition to the over **12,000 acres** of surface water in town.[8]

While it is convenient and often necessary to separate natural resources into different categories it must be kept in mind that in nature nothing is separate, all is inter-related. There are many biological and physical factors that connect the ridge tops to the floodplains and habitats within Alton to other communities, the most notable being water and wildlife species. The connections and interdependencies between natural resources and ecosystems must guide all natural resource planning and protection efforts.

Land Use

Chart 1: Alton Land Use



Based on figures in Table 1: Developed Land in Alton; and Table 2: Undeveloped Land in Alton.

Area of Alton (approximate values)

Total: 83 square miles or 53,230 acres

Land: 64.1 square miles or 40,622 acres

Water: 19 square miles or 12,608 acres

Developed Land (% based on land area, not total area)

Table 1: Developed Land in Alton[9]

Category	Acres	Percent of Land Base
Residential (Year Round and Seasonal)	**3,522**	**8.6**
Commercial	**989**	**2.4**
Roads	**923**	**2.3**
Summer Camps	**302**	**0.7**
Industrial	**108**	**0.25**
Total Developed Land	**5,844**	**14.3**

**Note: Computed residential development by multiplying number of housing units in 2000 of 3,522 by one acre to derive 3,522 acres of residential developed land in Alton. One acre was selected because it takes into account the average footprint of a home, impervious surfaces, lawns and other disturbances associated with human dwellings. Housing unit figures came from Lakes Region 2000 Census Interim Report: Population Age and Housing December, 2001 produced by the Lakes Region Planning Commission. Commercial and industrial acres were taken directly from Alton Master Plan Update: Chapter III Land Use 1999 without any interpretation.

Open Space/Undeveloped Land

Table 2: Undeveloped Land in Alton

Category	Acres	Percent of Land Base
Forestland	**28,991**	**71.3**
Wetlands[10]	**4,685**	**11.5**
Agricultural Land[11]	**1,102**	**2.7**
Total Undeveloped Land	**34,778**	**85.6**

**Note: Forestland was computed by subtracting wetland acreage, agricultural land acreage, and developed land acreage from the land area of Alton. This assumes that the rest of the land in town is forestland, which is a safe assumption even though some of the land classified as forestland may not be forest, it most likely was once and will be again.

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[1] Locke, Andrew and Matt Walsh. Master Plan Update: Chapter III Land Use. Alton, New Hampshire. October, 1999. Pg. 1.

[2] Medalie, Laura and Richard Moore. Ground-Water Resources in New Hampshire: Stratified Drift Aquifers. 1995. United States Geological Survey. Water Resources Investigation Report: 95-4100. Pg. 6-7.

[3] Griffin, Barton McLain. The History of Alton, New Hampshire. 1965. New Hampshire Publishing Company: Somersworth, NH.

[4] Lakes Region Planning Commission. 1985 Alton Master Plan: Chapter III Population. 1985. Pg. 3-5.

[5] Ober, Richard. At What Cost? Shaping the Land We Call New Hampshire. 1992. Concord, NH: Imperial Printing. Pg. 74-76.

[6] Ober, Richard. At What Cost? Shaping the Land We Call New Hampshire. 1992. Concord, NH: Imperial Printing. Pg. 40-44.

[7] Walsh, Matt. Master Plan Update Chapter 3: Conservation and Preservation of Natural Resources. (Draft) 1998. Town of Alton.

[8] Lakes Region Planning Commission. Lakes Region 2000 Census Interim Report: Population, Age, and Housing. December, 2001. Pg. 9; Locke, Andrew and Matt Walsh. Master Plan Update: Chapter III Land Use. Alton, New Hampshire. October, 1999. Pg. 6.

[9] Locke, Andrew and Matt Walsh. Master Plan Update: Chapter III Land Use. Alton, New Hampshire.

October, 1999.

[10] Rendall, Nancy B. Alton's Wetlands A User's Manual: Inventory and Classification. October, 1984. Alton Conservation Commission.

[11] Town of Alton. 2000 Annual Report. 2000. "Summary of Current Use Classifications." Pg. 62.

Water Resources

Introduction

Water is a vital natural resource for any community. Given the number and extent of surface water features, wetlands, and aquifers in Alton, in addition to the town's water dependant economy, water is indeed a very important resource for the town. Alton's largest surface water feature is Lake Winnipesaukee.[1] The majority of the town's land area is apart of the Winnipesaukee watershed.[2] Thus many activities and land use decisions can affect the Lake even it does not occur directly on its shores. One of the Lake's main tributaries, and in many respects one of Alton's most important natural resources, is the Merrymeeting River. The river meanders for several miles through Alton before emptying into Alton Bay. In addition to the large quantity of surface water encompassed by the river, many other important hydrological features are associated with it, including hundreds of acres of wetlands and the town's largest and most productive stratified drift aquifer.[3] The uplands and wetlands surrounding the river help to maintain its water quality and thus the water quality of Lake Winnipesaukee.

Although Lake Winnipesaukee, the Merrymeeting River and associated environs are the most significant hydrological features in town, there are many other important water resources. In addition to Lake Winnipesaukee, six great ponds can be found in Alton. A great pond is defined as a natural water body 10 acres or more in size. Some of these ponds and lakes are highly developed, whereas some retain significant percentages of natural shoreline. Hundreds of miles of perennial and intermittent streams drain Alton's landscape. Thousands of acres of various wetland types exist in Alton, thereby helping to maintain the water quality of connected surface waters. Several stratified drift aquifers can be found along brooks and near Lake Winnipesaukee. Some of Alton's water resources are of regional and state importance due to their size, productivity and diversity.[4]

Water is a precious natural resource that most easily demonstrates the concept of ecosystem connectivity. It is necessary to maintain the water quality of the town's surface water and groundwater to protect human health, the region's water dependent economy and to provide a hospitable environment for a variety of aquatic and terrestrial species. Water is also important for the recreational opportunities it affords residents and visitors and for its contribution to the town's aesthetic beauty and "rural character."

Methodology

Water resources were inventoried primarily utilizing relevant GRANIT data layers and publications. Undeveloped shoreline was determined through GIS analysis of USGS Digtal Raster Graphics, road and hydrography data layers, and local knowledge.

Alton Water Resources

Legend

- Road/Trail
- Town Boundary
- Watershed Boundary
- Brook/River
- NWI/Wetland
- Aquifer
- Lake/Pond
- Active Dam

Data Sources:
Aquifer data obtained from US Geological Survey, last revised February 2000. Original Scale 1:24,000.

Dam data obtained from NHDES, last revised December, 2000. Original Scale 1:24,000

Hydrography data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

NWI/Wetland data obtained from USF&WS, last revised October 1998. Original Scale 1:24,000.

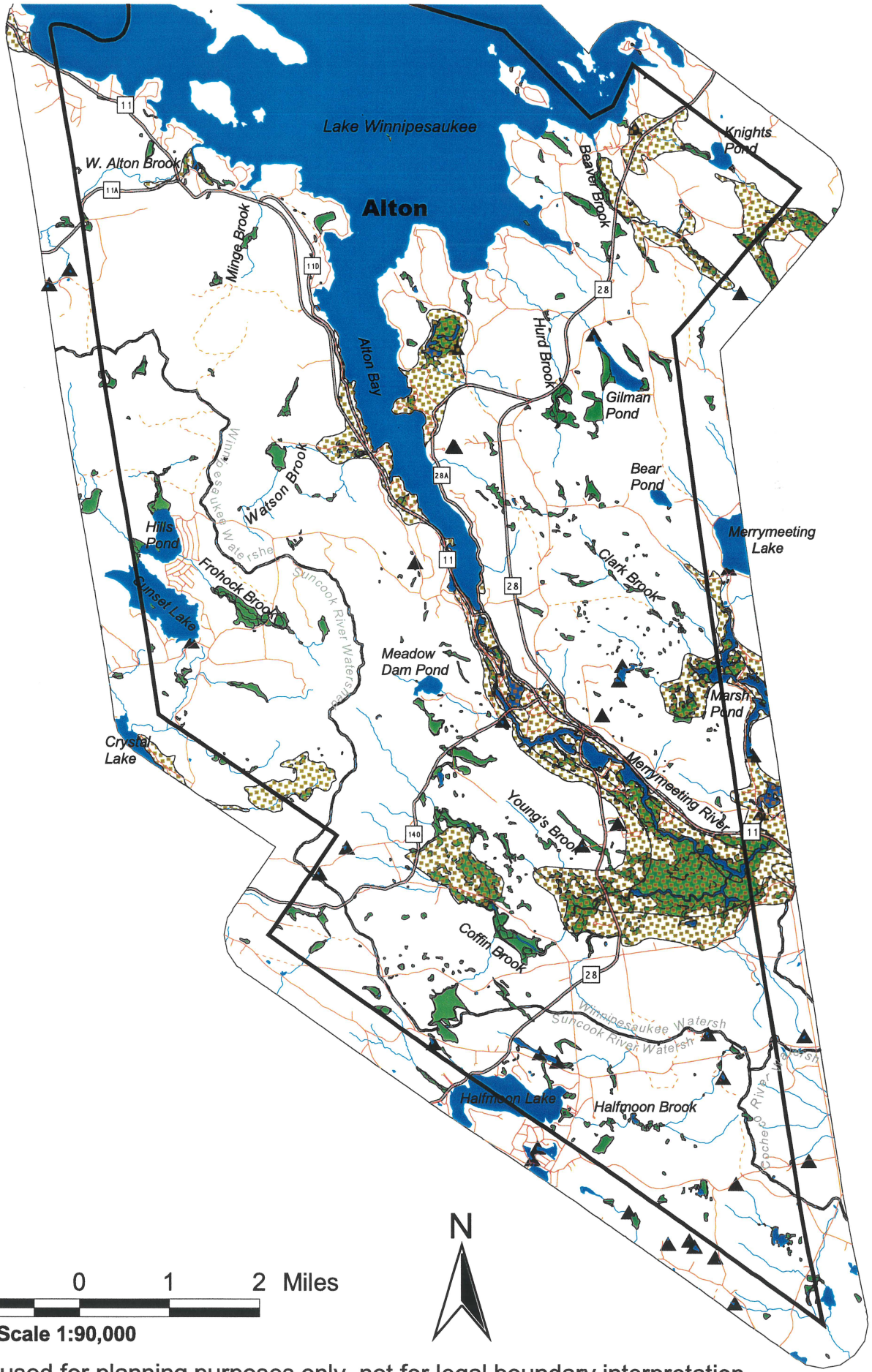
Roads data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

Watershed data obtained from NHDES, last revised February, 1994. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
December 10, 2001

GRANIT

TOWN OF ALTON, NEW HAMPSHIRE
INC. JUNE 16, 1796



1 0 1 2 Miles

Scale 1:90,000

N

This map is to be used for planning purposes only, not for legal boundary interpretation.

Wetlands were inventoried utilizing the National Wetland Inventory GRANIT data layer and two studies of Alton's wetlands conducted by Nancy Rendall in the 1980's: Alton's Wetlands A User's Manual: Inventory and Classification; Alton's Wetlands Phase II: Evaluation and Designation of Prime Wetlands.

Surface Water Features: Lakes and Ponds

Lake Winnipesaukee

Approximately 12,000 acres of the 44,586-acre lake are in Alton. This includes Alton Bay, part of the "Broads" and some islands. Alton contains approximately 35 miles of shoreline along Lake Winnipesaukee. Winnipesaukee is generally classified as an oligotrophic water body having relatively low nutrient levels and high visibility.[5] The Lake contains both warm water fish species such as largemouth and smallmouth bass, pickerel and perch and coldwater fish species such as lake trout, salmon and brook trout.[6] The Lake is the economic lifeblood and epicenter of the community. Much of Alton's development has been directly influenced by the Lake. The Lake provides recreational pursuits and aesthetic beauty that has drawn thousands of people to build along its shores. Most of Alton's frontage on the Lake has already been developed, providing the town with a large tax base due to the high value and seasonal use of homes along the lake. Less than one mile of noncontiguous natural shoreline, approximately 3 percent of the total 35-mile shoreline, remains on the Lake in Alton.[7] Natural Winnipesaukee shoreline is a rare and endangered habitat. The majority of the remaining natural shoreline is experiencing intense development pressure and will most likely be developed over the next decade. Camp Kabeyun is the only summer camp with significant natural shoreline remaining that is partially protected through a reverter clause.

Like many beautiful and popular natural resources elsewhere, the potential exists to love the lake to death. Development provides excess nutrients and sediment that is speeding up the natural aging process of the lake (cultural eutrophication). Development along the lake provides the most conspicuous form of degradation, but development in the watershed can also decrease the lake's ecological integrity. Approximately 16.8% of the Lake's watershed is located in Alton, the second largest percentage of any community in the watershed.[8] Given its low topographical location, Lake Winnipesaukee is the recipient of nutrients and sediments from upland areas. Most of Alton is in the Lake Winnipesaukee watershed, which means that most land use and development activities have the potential to influence the lake.

The boat launch at Alton Bay is open free of charge to the public, and there are other boat launches that charge a fee. There are a few small public beaches on Alton Bay, and a very small swimming area on Roberts Cove in East Alton.

NH Lakes Lay Monitoring Program: Alton Bay 2000

The year 2000 marked the eighteenth year the NH Lay Lakes Monitoring Program has monitored the water quality of Alton Bay. The NH Lay Lakes Monitoring Program is administered by the Freshwater Biology Group at UNH and water samples are collected by volunteers. Five water quality monitoring sites are located on Lake Winnipesaukee in Alton. Two of the sites are in Alton Bay, and the other three sites are located in more open water near the islands. The results of the 2000 season are basically the same as they have been for the last eighteen years: Alton Bay is best classified as oligotrophic or an

unproductive, pristine lake. A number of variables were measured in order to determine the water quality of Alton Bay including: water clarity, microscopic plant abundance "greenness," background (dissolved) water color, total phosphorus, alkalinity (resistance against acid precipitation), acidity (pH), dissolved salts, temperature and dissolved oxygen profiles. The average of these variables for the 2000 season in Alton Bay fell within the range of oligotrophic or pristine. Alton Bay had higher average water clarity values than other water quality monitoring sites on Lake Winnipesaukee. Despite the present relatively high water quality of Alton Bay, the amount of development along Alton Bay and in its watershed increases the potential for the water quality of Alton Bay to be degraded in the future. The Freshwater Biology Group at UNH recommends maintaining vegetative riparian buffers because the vegetation will assimilate nutrients and physically filter out sediment before it reaches the water. They also recommend reducing applications of fertilizers and performing timely septic system maintenance to help decrease the nutrient load that enters surface waters thereby maintaining water quality. A sixth water quality monitoring site was established in August 2001 at the Rt. 11 bridge where the Merrymeeting River enters Alton Bay. This site will help determine the water quality of the river and its influence on Alton Bay. For more information on the NH Lakes Lay Monitoring Program contact Coordinator Jeff Schloss (603) 862-3848 or Assistant Coordinator Bob Craycraft at (603) 862-3546.[9]

Halfmoon Lake

This 280-acre natural lake is situated in part of the Suncook watershed in Alton and Barnstead and has approximately 180 acres in Alton. The spring fed lake is located in South Alton and its level is raised by a small dam. Halfmoon has an average depth of 20 feet, and the bottom is primarily sand and rock. The lake is classified as an oligotrophic water body with mainly warm water species present: largemouth and smallmouth bass, pickerel, yellow perch and sunfish.[10] Nutrient enrichment may become more of a problem due to the highly developed nature of the shoreline and increasing development in the lake's watershed. The only substantial portion of undeveloped shoreline on the lake is approximately 0.4 miles owned by Camp Mi-Te-Na, which is 10% of the lake's four-mile shoreline.[11] The boat launch off of Route 28 is open to the public with parking to accommodate light use.

Sunset Lake

This 206-acre lake is situated in the headwaters of the Suncook watershed in Alton and Gilmanton. The natural level of the pond is raised by a dam located in West Alton near the Gilmanton town line. The lake is classified as oligotrophic, and there is very little emergent and floating vegetation in the lake. The bottom and structure of the lake mimics that of the surrounding land. Sunset is the second deepest lake in Alton (max depth sounded: 62 feet) and is characterized by sharp drop offs and rocky bottom. The lake contains primarily warm water fish species such as smallmouth bass, pickerel, and yellow perch.[12] The east side of the pond is heavily settled and is part of Alton Shores. The west side of the pond, however, is only moderately developed. Nearly one-mile of the lake's shoreline is permanently protected from development, due to the B.S.A Hidden

Valley conservation easement which encompasses 27 percent of the lake's 3.7 mile shoreline.[13] There is public access at the dam for swimming or canoe launching.

Hills Pond

Located in the headwaters of the Suncook watershed, this 85-acre natural pond is situated entirely in Alton, just north of Sunset Lake. Hills Pond is a mesotrophic water body whose bottom consists of a mixture of sand, rock, muck and gravel. The pond provides habitat primarily for warmwater species such as smallmouth bass, pickerel, yellow perch, and sunfish.[14] The smallmouth fishery, formerly outstanding, has declined in recent years. This pond has one of the best pickerel fisheries in the area. Pickerel average two pounds, and there are many fish in the three to four pound range. The weedy outlet and inlet are the best places to catch monster "picks-picks." Unlike Sunset Lake, a short canoe ride downstream, Hills Pond does have emergent and floating vegetation, especially near the inlet and outlets where sediment has collected. The pond has steep drop offs, similar to Sunset, although the maximum depth is around 40 feet. The east and south shores of the pond are part of Alton Shores and hence, are heavily developed. The west and north shores are completely undeveloped. Including the two islands, Hills Pond contains approximately 1.2 miles of contiguous undeveloped shoreline, 57 percent of the pond's 2.1 mile shoreline.[15] Hills Pond has quite an extensive wetland associated with its inlet that has been suggested for designation as prime for the various values it possesses and functions it performs.[16] The pond has no public access.

Gilman Pond

This 32-acre natural pond is located in East Alton in the Winnipesaukee watershed. A rarity among great ponds in New Hampshire, Gilman Pond's 1.85-mile shoreline is completely undeveloped. Better yet its shoreline is completely protected from development in perpetuity thanks to the foresight and hard work of the town's residents.[17] According to NH Fish and Game, the bottom is mucky and contains warmwater fish, such as largemouth bass, pickerel and yellow perch.[18] The pond also contains a moderate amount of coarse woody debris, which helps to add to its structural diversity. There are some wetlands, including a quaking bog, associated with the pond. There is public access via trails, canoe carry-in only.

Knights Pond

Knights Pond is a 31-acre natural pond located in northeastern Alton near the Wolfeboro town line in the Winnipesaukee watershed. Its one-mile shoreline is completely undeveloped and protected from development forever, similar to Gilman Pond.[19] The pond is classified as mesotrophic and has a sandy bottom with a thin layer of silt in many places. There are large amounts of coarse woody debris in the pond, which contributes greatly to providing diverse habitats for warmwater species that include largemouth bass, yellow perch and horned pout.[20] A large wetland associated with the outlet of the pond has been recommended for designation as prime.[21] There is public access via trails, canoe carry in only.

Bear Pond

This 15-acre natural pond is situated in the Merrymeeting watershed near the New Durham line in East Alton. The pond has an average depth of 8 feet and possesses primarily warmwater species: largemouth bass, pickerel, horned pout and sunfish.[22] The shoreline is sparsely developed and is limited to only 5 camps on the southeast shore of the pond; Bear Pond contains 0.6 miles of undeveloped shoreline, which is 86 percent of its 0.7-mile shoreline.[23] There is limited public access via the road. The pond is unique because it has no perennial surface water inlet or outlet, and serves as both a groundwater recharge and discharge area. There are a few intermittent streams and seep areas that could be considered the pond's inlets, and one intermittent outlet stream/seep area.

Surface Water Features: Rivers and Brooks

Merrymeeting River

Located in the Winnipesaukee watershed, the Merrymeeting River is the largest watercourse in Alton in terms of water volume and watershed size.[24] The river meanders for approximately six miles from the New Durham town line near Rt. 11 to its mouth in Alton Bay. Even though the Big Lake is the economic heart of the community, the Merrymeeting River and its associated environs are in many ways the most important natural resources in town. Hundreds of acres of valuable wetlands are found along its banks. These wetlands possess numerous values and perform many functions that are essential to maintaining the ecological health of not only the Merrymeeting watershed, but also the greater Winnipesaukee watershed of which it is a part. The wetlands help to reduce flooding in times of high flow by absorbing excess water; and conversely slowly release water during low flow periods thereby helping to maintain a hospitable environment for aquatic species and adequate water levels. Wetlands also help to improve water quality by removing excess nutrients and sediment and they provide habitat for a myriad of species.[25] Beneath the river, its wetlands and adjacent uplands, lies the town's largest and most productive stratified drift aquifer.[26] The stratified drift aquifer along the river, a remnant of the last period of glaciation, is where the town's drinking water wells are located. The river is the largest surface water feature feeding Alton Bay.[27]

In juxtaposition to the high natural values of the river is the amount of development along and in close proximity to its shoreline in Alton. Route 11 runs near the river for much of its length, and there are many homes and businesses located near the river, especially in Alton Village. Development along the river and in the river's watershed has the potential to degrade the river's integrity, most notably water quality. There is little doubt that the water quality of the river has been affected by the amount of development in its watershed through the last few years.

The Merrymeeting has historically been an important spawning and rearing habitat for landlocked salmon.[28] Only about a mile of the river is accessible to salmon due to the dam. Both the quantity and quality of salmon habitat in the accessible portion of the river have been reduced and degraded throughout the years mainly attributable to human activity. Heavy infestations of milfoil are found in this section of the river, little vegetative buffer protects the river along Letter S road, and nutrient levels have fostered abundant attached algae growth. All of these human induced changes have degraded the river's value as salmon habitat.

Numerous public access points along the river allow for a high amount of recreational use from fishing to bird watching.

Major Perennial Streams

Beaver Brook: Located in the Winnipesaukee watershed, this brooks flows for approximately three miles through the northeastern part of town into Lake Winnipesaukee. It originates in New Durham from Shaw's Pond. Part of its frontage and watershed is protected by the Beaver Brook Wildlife Management Area owned by New Hampshire Fish and Game. It is a significant tributary to Lake Winnipesaukee. Approximately one-third (2,030 acres) of the brook's 6,160-acre watershed is located in Alton.[29] The brook supports both warmwater species (pickerel) and coldwater species (brook trout). NH Fish and Game stocks the brook with approximately 1,200 brook trout each year.[30] A wetland associated with the brook near the New Durham town line has been suggested as a candidate for prime.[31] A small aquifer is associated with the brook along much of its course through Alton.[32] Residents report that the salmon have historically utilized the brook.

Coffin Brook: Coffin Brook is one of the main tributaries of the Merrymeeting River. The brook starts on Rocky Mountain and flows for approximately seven miles before it empties into the Merrymeeting. The watershed encompasses 7,870 acres of which 7,358 acres are located within Alton.[33] Coffin Brook is an important natural resource in its own right, due to the relatively large size of its watershed and variety of associated wetlands; however, its hydrological connection to the Merrymeeting make it just as vital a resource as the river is to the town. Like the Merrymeeting, Coffin Brook has hundreds of acres of wetlands along its banks. The confluence of Coffin Brook with the river is one of the largest wetland complexes in the region and is of statewide importance.[34] Coffin Brook's watershed is less developed than the Merrymeeting's, although the rate of development in the watershed is increasing. The brook starts in the unspoiled wilderness of Rocky Mountain and flows south through an area of light density rural development with a few gravel excavation sites. Once the brook crosses Rt. 28, it enters an area of denser development due to the number of new homes built near Stockbridge Corner Rd. in recent years. The increasing rate of development in the lower Coffin Brook watershed is a concern not only for the ecological integrity of the brook, but for the Merrymeeting and ultimately Lake Winnipesaukee as well. The Coffin Brook watershed contains some of the most productive agricultural and forest soils (especially white pine) and developable land in Alton.[35] Coffin Brook provides habitat for both cold and warmwater fish species. NH Fish and Games stocks approximately 290 brook trout in Coffin Brook each year.[36]

Frohock Brook: The brook is located entirely within Alton. It originates on the west side of Rocky and Alton Mountains and empties into Hills Pond. The Brook serves as part of the headwaters of the Suncook River and its large associated wetland has been recommend for designation as prime due to its contribution to maintaining the water quality of downstream surface waters and value as wildlife habitat.[37] The Frohock Brook Conservation Area protects 17 acres of the brook and associated wetlands.

Halfmoon Brook: This brook in the Suncook watershed originates on the slopes Ragged and Prospect Mountains in South Alton and flows for approximately three miles before it empties into Halfmoon Lake. There are numerous wetlands along the brook. The

wetland at its mouth has been suggested for designation as prime for its value in maintaining the water quality of Halfmoon Lake and as wildlife habitat.[38] Most of the brook's course flows through forested, undeveloped land. A small section near Halfmoon Lake is near residences, but it is protected by a vegetated buffer.

Hurd Brook: All but a small portion of the brook's 3,205-acre watershed is located entirely within East Alton.[39] Hurd Brook flows for approximately three miles before it empties into Chestnut Cove on Lake Winnipesaukee. A large wetland along the brook that can be seen from Rt. 28 has been recommended for designation as prime. The wetland has been recommended for prime designation because of its ability to store floodwaters and due to the variety of vegetation types, size and location it has high wildlife habitat potential.[40] Each year NH Fish and Game stocks the brook with approximately 350 brook trout.[41]

Minge Brook: Located entirely in Alton, this small brook has a watershed of 913 acres. It drains Mt. Major and empties into Lake Winnipesaukee at Minge Cove.[42] Most of the brook's watershed is undeveloped. Due to the high recreational use of Mt. Major, the brook is also an important recreational asset.

Watson Brook: This brook originates from the north side of Alton Mountain and the Alton Town Forest and flows for approximately three miles before it empties into Loon Cove on Lake Winnipesaukee. Two large wetland complexes are associated with Watson Brook. The wetland near Loon Cove has been recommended as a candidate for designation as prime, due to its value as fisheries and wildlife habitat and its ability to trap sediments and retain nutrients.[43] There is also a small aquifer on either side of the brook near Rt. 11 and Lake Winnipesaukee.[44] Each year NH Fish and Game stocks the brook with approximately 105 brook trout.[45]

West Alton Brook (Post Office Brook): This brook originates in Gilford and flows east through northwest Alton for approximately two miles before emptying into Smalls Cove on Lake Winnipesaukee. The brook serves as a significant breeding and nursery area for landlocked salmon from Lake Winnipesaukee. Each fall large numbers of salmon ascend the brook to breed and the young remain there for several years before they enter the lake. There is a small aquifer associated with the brook near Lake Winnipesaukee.[46] Each year NH Fish and game stocks the brook with approximately 350 brook trout.[47]

Young's Brook: An important tributary of Coffin Brook, Young's Brook starts near Rt. 140 and empties into Coffin Brook near Rt. 28. Its watershed is lightly developed.

Dams

According to the New Hampshire Department of Environmental Services Water Division, Dam Bureau, there are 23 active dams in Alton.[48]

Hazard Classification of Active Dams in Alton[49]

Class AA: 18 class AA active dams in Alton. Class AA dams present no threat to life or property.

Class A: 3 class A dams in Alton. Class A dams have a low hazard potential, and present a minimal threat to life and property.

Class B: 1 class B dam in Alton. (Outlet of Sunset Lake). Class B dams have a significant hazard potential, and present a substantial threat to life and property.

Class C: 1 class C dam in Alton (Alton Power Dam AKA Wentworth Dam on the Merrymeeting River). Class C dams have a high hazard potential and present significant threat to life and property.

Wetlands

Wetlands are an important natural resource for any community. The fact that water drives the economic engine of Alton only increases the imperative to maintain healthy, functioning wetland ecosystems in town. Wetlands protect water quality, absorb excess water during high flows and release water during low flows, provide unique and critical habitat for a myriad of species thereby contributing to biodiversity, offer countless recreational and educational pursuits, and are some of the most productive (in terms of biomass) ecosystems on the planet.[50] Both the Federal and New Hampshire governments have passed laws protecting wetlands to varying degrees. Wetlands, like all natural resources, are not isolated, autonomous entities that can be managed without regard to the complex interactions between the physical and biological components of the environment. Water connects all ecosystems in a watershed from headwaters to river mouths.

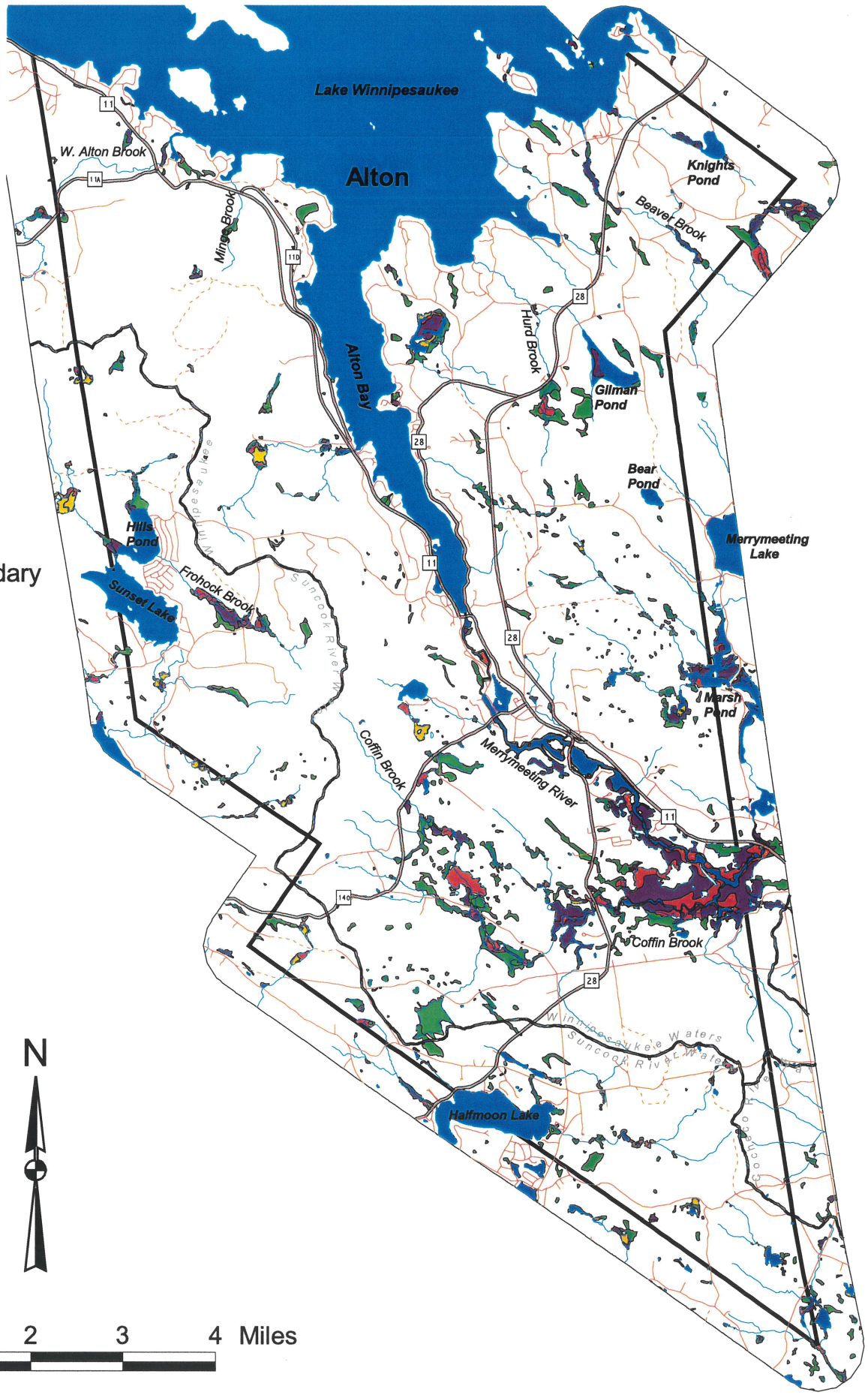
A 1984 survey of Alton's wetlands, Alton's Wetlands A User's Manual: Inventory and Classification by Nancy Rendall, found there to be 187 palustrine wetland areas in Alton encompassing approximately 4,685 acres or 11.5% of Alton's land base. Palustrine is a term used to describe the system of freshwater wetlands that are dominated by trees, shrubs, and emergent vegetation and also includes small, shallow, permanent or intermittent water bodies commonly known as ponds.[51] The wetland inventory conducted by Nancy Rendall classified 3,320 acres as consisting of very poorly drained soils and 1,297 acres as poorly drained.[52] This acreage is not distributed evenly throughout town. The largest concentrations of wetlands in Alton are found at the confluence of Coffin brook and the Merrymeeting River and in their respective watersheds. East Alton contains a moderate amount of wetlands; however, West Alton has very few wetland areas due to the steep terrain (except around Hills Pond and along Frohock and Watson Brooks). Alton is fortunate, not only to contain a large amount of wetlands, but also to possess a variety of wetland types. Forested, scrub-shrub, emergent, aquatic bed, and open water wetlands are all found in Alton to varying degrees and compositions.

Table 3: Wetland Types in Alton

Wetland Type	Number of Areas	Percent of Total
Forested Wetland	131	70.0%
Scrub-Shrub	18	9.6%
Forested/Scrub-shrub	14	7.5%
Emergent	8	4.3%
Aquatic Bed	5	2.7%
Forested/Emergent	3	1.6%
Scrub-Shrub/Emergent	5	2.7%
Open Water	3	1.6%

Source: Alton's Wetlands A User's Manual: Inventory and Classification. Nancy Rendall. October 1984. Pg. 14.

Alton Wetland Resources



Legend

Wetland Type (Palustrine)

- Forested (PFO)
- Scrub-Shrub (PSS)
- Emergent (PEM)
- Unconsolidated Bottom (PUB)

- Lake/Pond
- Brook/River
- State Highway
- Town Road
- Trail
- Watershed Boundary

Data Sources:

Hydrography data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

Road data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

Wetland data obtained from NWI USF&WS, last revised October 1998. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
January 10, 2002

GRANIT

TOWN OF ALTON, NEW HAMPSHIRE
INC. JUNE 16, 1796

N

1 0 1 2 3 4 Miles

Scale 1:65,000

This map is to be used for planning purposes only, not for legal boundary interpretation.

Table 4: Acreage of Wetland Types in Alton

Wetland Type	Acres	Percent of Total
Forested Wetland	2,458.8	52.5%
Scrub-Shrub/Emergent	742.7	15.9%
Scrub-Shrub	543.3	11.6%
Forested/Scrub-Shrub	458.7	9.8%
Emergent	244.4	5.2%
Forested/Emergent	179.2	3.8%
Aquatic Bed	48.0	1.0%
Open Water	7.3	0.15%
	4,682.4 acres	**100%**

Source: Alton's Wetlands A User's Manual: Inventory and Classification. Nancy Rendall. October 1984. Pg. 9-13.

Wetland Types in Alton

Forested Wetlands: Forested wetlands, commonly known as swamps, are by far the most numerous and extensive wetland type in Alton. A forested wetland, as the name suggests, are wetlands dominated by woody vegetation 20 feet or greater in height.[53] The soil surface is seasonally flooded with up to one foot of water. Several layers of vegetation are usually present, including trees, shrubs and herbaceous vegetation.[54] Due to the structural diversity of vegetation, forested wetlands probably support a greater diversity of songbirds than any other wetland type.[55] There are several different categories and subcategories of forested wetlands. Forested wetlands are commonly classified as either deciduous or coniferous and then further classified according to variations of dominant canopy species. In swamps and wet areas around Lake Winnipesaukee, especially near Woodlands Rd., rare black gum trees can be found. A few coniferous-forested wetlands can be found in Alton. Coniferous-forested wetlands are usually either dominated by spruce and fir, hemlock or white pine. Due to their relative rarity in Alton and unique values they possess, coniferous wetlands can be considered a unique natural community.

Scrub-Shrub Wetlands: Wetlands dominated by woody vegetation less than 20 feet tall are considered scrub-shrub wetlands. Scrub-shrub wetlands are the second most abundant and extensive wetland type found in Alton. As with forested wetlands, scrub-shrub wetlands are broken down into classes and subclasses depending upon dominant vegetation, hydrology and vegetation structure. Scrub-shrub wetlands occur in a variety of hydrological regimes, from permanently flooded to temporarily flooded or seasonally saturated.[56] Scrub-shrub wetlands occur throughout Alton, but the largest scrub-shrub wetlands can be found along the Merrymeeting River and Coffin Brook. Common scrub-shrub species in Alton include: buttonbush, sweet gale, leather leaf and red maple saplings.

Emergent Wetlands: Emergent wetlands, also referred to as marshes, occur in fewer numbers and cover less area than forested or scrub-shrub wetlands in Alton. Emergent wetlands are usually permanently flooded with a foot or more of water and dominated by herbaceous vegetation such as grasses, sedges, rushes, pickerelweed, and arrowheads.[57] Emergent wetlands provide valuable habitat for many species of waterfowl.[58] The most extensive emergent wetlands in Alton occur along the Merrymeeting River and Coffin Brook.

Aquatic Bed: Aquatic bed wetlands constitute only a minute portion of Alton's total wetland acreage. Aquatic bed wetlands are characterized by permanent standing water varying from 1 to 5 feet in depth and floating and submerged vegetation such as white water lily, yellow pond lily, water shield, pondweeds and duckweeds.[59] They are usually associated with large expanses of open water. The small amount of aquatic bed wetlands in Alton increases their value and contribution to maintaining the town's biodiversity.

Prime Wetlands

In 1985, Nancy Rendall and the Alton Conservation Commission recommended in Alton's Wetlands Phase II: Evaluation and Designation of Prime Wetlands that 35 wetlands be designated as "prime" in town due to the special functions they performed, thereby affording them special consideration when the Wetlands Bureau reviewed dredge and fill permits. The 35 wetlands identified as prime encompass 2,310 acres. The wetlands were evaluated using several assessment criteria. All wetlands designated for prime were at least 5 acres in size and had very poorly drained soils as required by the Wetlands Bureau regulations. Each wetland was examined for its opportunity and effectiveness in performing a number of important functions including: flood storage, shoreline anchoring, sediment trapping, nutrient retention (long term and short term), food chain contribution, wildlife habitat, fisheries habitat, uniqueness of vegetation, aesthetic value and recreational significance. Many of the candidates for prime wetlands designation are associated with the Merrymeeting River watershed; the others are scattered throughout East and South Alton; only a few are found in West Alton.[60]

Prime wetland numbers correspond with those found in the report: Alton's Wetlands Phase II: Evaluation and Designation of Prime Wetlands written by Nancy Rendall in 1985. Wetland numbers correspond with those found in the report, Alton's Wetlands A User's Manual: Inventory and Classification, written by Nancy Rendall in 1984 and with those found on the map, "Alton Wetlands Map," created by Nancy Rendall in 1984.

Prime Wetland 1 (Wetland 208)

Acres: 11.3
Location: Letter S Road, Alton Village
Watershed: Winnipesaukee
Associated Water Bodies: Merrymeeting River

Classification: Emergent Wetland (PEM1G)
Values and Functions: Flood storage, shoreline anchoring, sediment trapping and nutrient retention (water quality protection), and groundwater recharge.

Prime Wetland 2 (Wetland 209)

Acres: 9
Location: Rt. 11, mouth of Merrymeeting River
Watershed: Winnipesaukee
Associated Water Bodies: Merrymeeting River and Lake Winnipesaukee
Classification: Emergent Wetland (PEM1F)
Values and Functions: Sediment trapping and nutrient retention (water quality protection), shoreline anchoring, and recreation.

Prime Wetland 3 (Wetland 176)

Acres: 9
Location: Junction of Rt. 11 and Jesus Valley Rd.
Watershed: Winnipesaukee
Associated Water Bodies: Watson Brook and Lake Winnipesaukee
Classification: Scrub-Shrub/Emergent Wetland (PSS/EMHh)
Values and Function: Aesthetic, sediment trapping and nutrient retention (water quality protection), ground water discharge and fishery/wildlife habitat.

Prime Wetland 4 (Wetland 81)

Acres: 18.9
Location: North side of Prospect Mt. Rd., near Halfmoon Lake.
Watershed: Suncook River (Halfmoon Lake)
Associated Water Bodies: Halfmoon Lake
Classification: Scrub-Shrub/Emergent (PSS/EMGb)
Values and Functions: Flood storage, sediment trapping and nutrient retention (water quality protection), and groundwater recharge.

Prime Wetland 5 (Wetland 152)

Acres: 12
Location: Between Minge Cove and Smalls Cove, near Rt. 11.
Watershed: Winnipesaukee
Associated Water Bodies: Lake Winnipesaukee
Classification: Forested Wetland (PFO1H)
Values and Functions: Water quality protection, fishery/wildlife habitat, and recreation.

Prime Wetland 6 (Wetland 91, Gontarz Wetland Conservation Area)

Acres: 16.8

Location: Junction of Muchado Hill Rd. and Lockes Corner Rd.
Watershed: Suncook River
Associated Water Bodies: None
Classification: Forested Wetland (PFO5G)
Values and Functions: Trap and retain nutrients (water quality protection) and groundwater recharge.
Note: Majority of this area is now owned by the Town of Alton and is known as the Gontarz Wetland Conservation Area.

Prime Wetland 7 (Wetland 85)

Acres: 8.1
Location: Hollywood Beach Rd and Halfmoon Lake
Watershed: Suncook River and Halfmoon Lake
Associated Water Bodies: Halfmoon Lake
Classification: Forested Wetland (PFO1/4E)
Values and Functions: Trap sediments and retain nutrients (water quality protection), aesthetic and recreation.

Prime Wetland 8 (Wetland 122, Merrymeeting Marsh)

Acres: 678
Location: Along Merrymeeting River/Lower Coffin Brook between Rt. 11 and Rt. 28
Watershed: Winnipesaukee
Associated Water Bodies: Merrymeeting River and Coffin Brook
Classification: Scrub-Shrub/Emergent Wetland (PSS/EMGr)
Values and Functions: Fishery/wildlife habitat, recreation, trap sediments and retain nutrients (water quality protection) and flood storage.
Note: A significant percentage of these wetlands have been protected by the NH Fish and Game Merrymeeting Marsh Wildlife Management Area and conservation easements.

Prime Wetland 9 (Wetland 207)

Acres: 10.6
Location: Letter S Rd. just downstream from the dam in Alton Village
Watershed: Winnipesaukee
Associated Water Bodies: Merrymeeting River
Classification: Forested Wetland (PFO1F)
Values and Functions: Water quality protection, groundwater recharge and flood storage.

Prime Wetland 10 (Wetland 120)

Acres: 117
Location: West side of Rt. 28, just north of Stockbridge Corner Rd. along Coffin Brook.

Watershed: Winnipesaukee
Associated Water Bodies: Coffin Brook
Classification: Scrub-Shrub Wetland (PSS1F)
Values and Functions: Fishery/wildlife habitat, trap sediments and retain nutrients (water quality protection), and flood storage.

Prime Wetland 11 (Wetland 49, Marsh Pond and environs)
Acres: 155
Location: East of Rt. 11, along the New Durham town line and Merrymeeting River.
Watershed: Winnipesaukee
Associated Water Bodies: Marsh Pond and Merrymeeting River
Classification: Forested/Scrub-Shrub Wetland (PFO/SSG)
Values and Functions: Recreation, trap sediments and retain nutrients (water quality protection), flood storage, fishery/wildlife habitat.

Prime Wetland 12 (Wetland 123)

Acres: 115
Location: Along Merrymeeting River from the traffic circle to Rt. 140.
Watershed: Winnipesaukee
Associated Water Bodies: Merrymeeting River
Classification: Emergent Wetland (PEM1/2Hr)
Values and Functions: Water quality protection, shoreline anchoring, fishery/ wildlife habitat and recreation.

Prime Wetland 13 (Wetland 23)

Acres: 29.9
Location: Adjacent to Gilman Pond in East Alton.
Watershed: Winnipesaukee
Associated Water Bodies: Gilman Pond
Classification: Scrub-Shrub Wetland (PSS1/3F)
Values and Functions: Groundwater recharge, water quality protection, rare species habitat and fishery/wildlife habitat.

Prime Wetland 14 (Wetland 28, Trask Swamp)

Acres: 170
Location: Between Trask Side Rd. and Chestnut Cove Rd. near Lake Winnipesaukee.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Forested/Emergent Wetland (PFO/EMG)
Values and Functions: Wildlife habitat, aesthetics, and water quality protection.
Note: The vast majority of this wetland has been protected by the Lakes Region Conservation Trust Trask Swamp Conservation Area and the Town of Alton.

Prime Wetland 15 (Wetland 101)

Acres: 12.4
Location: Prospect Mountain off of Prospect Mt. Rd.
Watershed: Suncook River
Associated Water Bodies: Halfmoon Brook
Classification: Forested/Scrub-Shrub Wetland (PFO/SSG)
Values and Functions: Aesthetic, recreation, and headwaters of Halfmoon Brook.

Prime Wetland 16 (Wetland 114)

Acres: 205
Location: Coffin Brook Rd., along Coffin Brook
Watershed: Winnipesaukee
Associated Water Bodies: Coffin Brook
Classification: Scrub-Shrub Wetland (PSS1Gb)
Values and Functions: Trap sediments and retain nutrients (water quality protection) and wildlife habitat.

Prime Wetland 17 (Wetland 69)

Acres: 59.6
Location: Rt. 140, near Gilmanton town line.
Watershed: Suncook River
Associated Water Bodies: None
Classification: Forested Wetland (PFO1/4E)
Values and Functions: Trap sediments and retain nutrients (water quality protection), wildlife habitat and flood storage.

Prime Wetland 18 (Wetland 189)

Acres: 94.5
Location: Avery Hill Rd., near Sunset Lake and Hills Pond.
Watershed: Suncook River
Associated Water Bodies: Frohock Brook
Classification: Scrub-Shrub Wetland (PSS1E)
Values and Functions: Flood storage, trap sediments and retain nutrients (water quality protection) and unique natural community.
Note: A portion of this wetland is owned by the Town of Alton and is know as the Frohock Brook Conservation Area.

Prime Wetland 19 (Wetland 147)

Acres: 7.4
Location: West side of Rt. 11 in West Alton.
Watershed: Winnipesaukee

Associated Water Bodies: None
Classification: Scrub-Shrub Wetland (PSS1H)
Values and Functions: Groundwater discharge, flood storage, trap sediments and retain nutrients (water quality protection) and unique natural community.

Prime Wetland 20 (Wetland 97)

Acres: 12
Location: Extreme southern tip of Alton, along Cook Rd.
Watershed: Suncook River
Associated Water Bodies: None
Classification: Emergent Wetland (PEM1G)
Values and Functions: Groundwater recharge, down-stream food-chain support and fishery/wildlife habitat.

Prime Wetland 21 (Wetland 121)

Acres: 6.7
Location: East side of Rt. 28, just north of Coffin Brook.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Scrub-shrub Wetland (PSS1F)
Values and Functions: Trap sediments and retain nutrients (water quality protection).

Prime Wetland 22 (Wetland 31)

Acres: 63
Location: East side of Rt. 28 in East Alton.
Watershed: Winnipesaukee
Associated Water Bodies: Hurd Brook
Classification: Forested/Scrub-Shrub Wetland (PFO/SSG)
Values and Functions: Flood storage, water quality protection and wildlife habitat.

Prime Wetland 23 (Wetland 61)

Acres: 22.8
Location: South side of Rt. 140, near Youngtown Rd.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Emergent Wetland (PEM1F)
Values and Functions: Unique natural community and wildlife habitat.

Prime Wetland 24 (Wetland 8)

Acres: 13.6
Location: Along outlet of Knights Pond

Watershed: Winnipesaukee
Associated Water Bodies: Knights Pond
Classification: Forested/Scrub-Shrub Wetland (PFO/SSGb)
Values and Functions: Trap sediments and retain nutrients (water quality protection), wildlife habitat and recreation.

Prime Wetland 25 (Wetland 178)

Acres: 35.4
Location: Along inlet to Hills Pond
Watershed: Suncook River
Associated Water Bodies: Hills Pond
Classification: Forested Wetland (PFO1E)
Values and Functions: Trap sediments and retain nutrients (water quality protection), wildlife habitat and recreation.

Prime Wetland 26 (Wetland 14, Palmer Swamp)

Acres: 41.4
Location: South side of Rines Rd. near New Durham town line.
Watershed: Winnipesaukee
Associated Water Bodies: Beaver Brook
Classification: Forested Wetland (PFO1E)
Values and Functions: Flood storage, shoreline anchoring, support downstream food chains, and fishery/wildlife habitat.

Prime Wetland 27 (Wetland 47)

Acres: 16.8
Location: Near Range Rd.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Emergent Wetland (PEM2G)
Values and Functions: Groundwater recharge and wildlife habitat.

Prime Wetland 28 (Wetland 203, Meadow Dam Pond)

Acres: 16
Location: North of Rt. 140, near Alton Village.
Watershed: Winnipesaukee
Associated Water Bodies: Meadow Dam Pond
Classification: Aquatic Bed Wetland (PAB3Hr)
Values and Functions: Recreation, fishery/wildlife habitat and unique natural community.

Prime Wetland 29 (Wetland 126)

Acres: 6.9
Location: Adjacent to Meadow Dam Pond.
Watershed: Winnipesaukee
Associated Water Bodies: Meadow Dam Pond
Classification: Forested Wetland (PFO1F)
Values and Functions: Groundwater recharge and wildlife habitat.

Prime Wetland 30 (Wetland 64)

Acres: 33.6
Location: Along Coffin Brook, south of Rt. 140.
Watershed: Winnipesaukee
Associated Water Bodies: Coffin Brook
Classification: Emergent Wetland (PEM1G)
Values and Functions: Fishery/wildlife habitat and ground water recharge.

Prime Wetland 31 (Wetland 60)

Acres: 53.8
Location: Junction of Rt. 140 and Youngtown Rd.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Forested Wetland (PFO1E)
Values and Functions: Trap sediments and retain nutrients (water quality protection) and flood storage.

Prime Wetland 32 (Wetland 202)

Acres: 45.1
Location: North of Rt. 140, near Meadow Dam Pond.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Forested Wetland (PFO5Fb)
Values and Functions: Wildlife habitat and flood storage.

Prime Wetland 33 (Wetland 88)

Acres: 20.7
Location: East of Hollywood Beach Rd in extreme South Alton.
Watershed: Suncook River
Associated Water Bodies: None
Classification: Forested Wetland (PFO4E)
Values and Functions: Groundwater recharge and unique natural community (spruce-fir).

Prime Wetland 34 (Wetland 197)

Acres: 9.9
Location: East of Avery Hill Rd., along the Gilmanton town line.
Watershed: Suncook River
Associated Water Bodies: None
Classification: Forested Wetland (PFO5G)
Values and Functions: Groundwater recharge.

Prime Wetland 35 (Wetland 74)

Acres: 175
Location: Between Stockbridge Corner Rd. and Dudley Rd.
Watershed: Winnipesaukee
Associated Water Bodies: None
Classification: Forested Wetland (PFO1/4E)
Values and Functions: Wildlife habitat and groundwater recharge.

Groundwater Resources

Groundwater is another essential component of Alton's hydrological system. Water flows not only over ground and in rivers, but also through pores in the ground. The porosity of a soil, i.e. the space between soil particles, and permeability, i.e. the interconnectedness of pore spaces, are the main considerations in determining favorable areas for groundwater extraction, the idea being the greater the space between particles and connections among the pores, the greater the potential for a soil to store and transmit water.[61] The areas in New Hampshire that have the greatest potential to yield large volumes of groundwater are known as stratified drift aquifers. Stratified drift aquifers are composed of varying degrees of sand and gravel that can store and transmit large quantities of water. Stratified drift aquifers are usually found along rivers and near lakes where glacial activity deposited large amounts of sand and gravel.[62] Alton is fortunate to have several stratified drift aquifers located within its boundaries. According to the United States Geological Survey, 7.2 square miles (4,608 acres) or 12 percent of Alton is underlain by stratified drift aquifers.[63]

Stratified Drift Aquifers

High Yield:

-Only one aquifer in Alton has been classified as high yield by the United States Geological Survey. This is the largest aquifer in Alton comprising over 2,500 acres extending south from Alton Village along the Merrymeeting River and Coffin Brook. According to the USGS, portions of this aquifer are capable of producing up to 1.1 million gallons per day.[64]

Medium Yield:

-Watson Brook/Loon Cove and along western shore of Winnipesaukee. 325 acres.

-Post Office Brook area, extending from Smalls Cove to the junction of Routes 11 and 11A. 37 acres.

-A portion of Sawmill Brook, Trask Swamp and extending south to Peggy's Cove. 374 acres.

-Beaver Brook from New Durham border nearly to Lake Winnipesaukee. 375 acres.

-Knight Pond outlet and along Rt. 28 in northeast Alton. 191 acres.

-Middle Coffin Brook along Coffin Brook Rd. 322 acres.

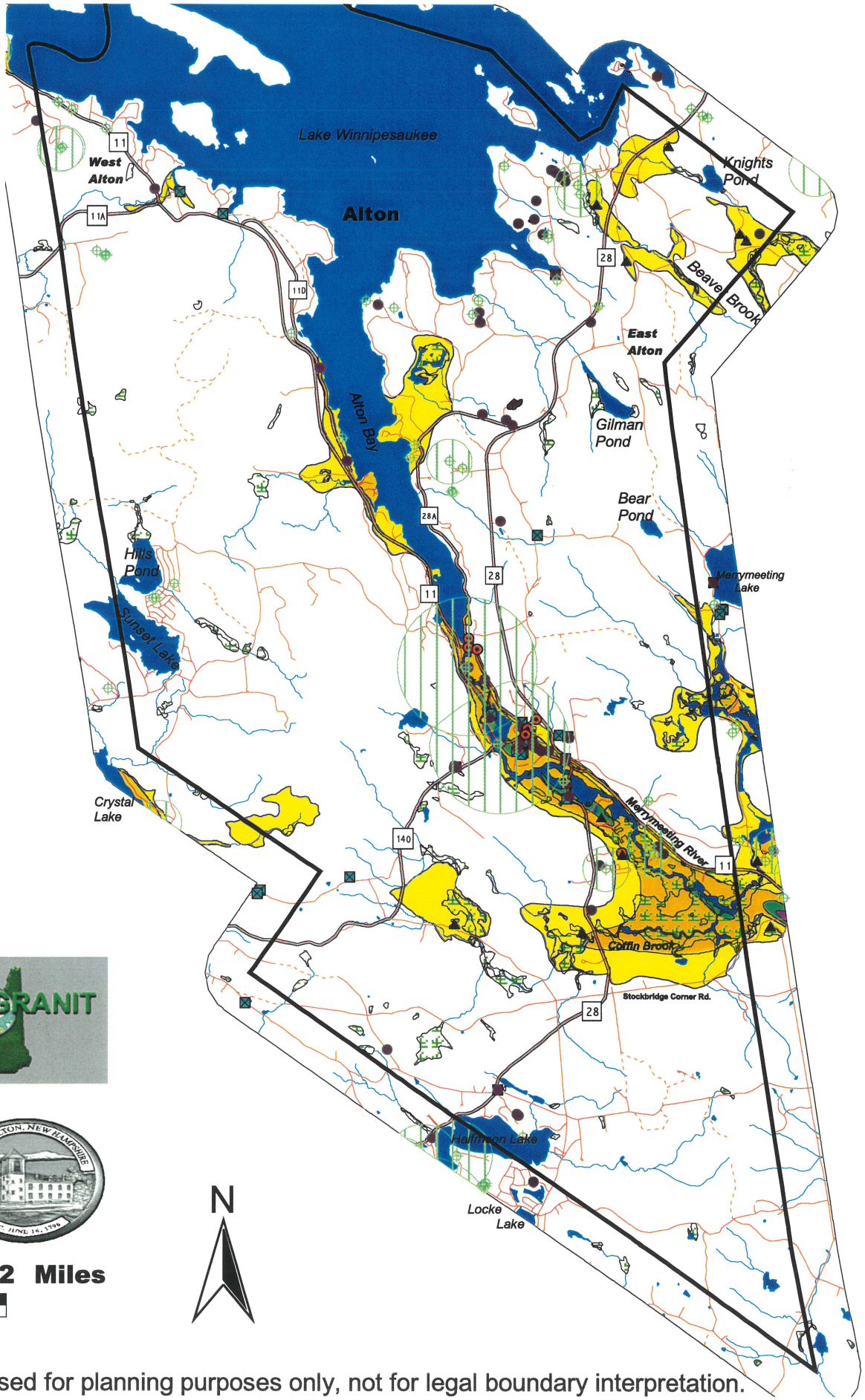
-North of Halls Hill Rd and continuing on into Gilmanton. 140 acres.

-Marsh Pond and along Merrymeeting River. 190 acres.[65]

Alton's two public water supply wells are located in the high yield aquifer along the Merrymeeting at Levey Park (32 feet deep, 300 gallons per minute) and near the firehouse on Rt. 140 (48 feet deep, 165 gallons per minute).[66] In the year 2000, Alton pumped over 62 million gallons from these wells. The public wells supply residents of Alton Village and portions of Alton Bay. A third public water supply well is currently under construction off of River Lake West Street to augment the system. Many of the qualities that make stratified drift aquifers ideal for water extraction, high porosity and transmissivity, also make them susceptible to contamination as water can quickly move through them with little filtering. The remainder of Alton's residents procures their water from private wells mainly drilled into low yielding bedrock formations.

Groundwater's importance is not restricted to direct consumptive uses by Alton's residents. Equally vital is the role groundwater plays in maintaining healthy, functioning aquatic and terrestrial ecosystems. Most vegetation receives its hydration from the ground, and vegetation in turn helps to allow water to seep into the ground by slowing the rate of runoff. Groundwater is an important source of water for many rivers and lakes, especially during dry times.[67] Many streams and lakes would be less hospitable to aquatic species without inputs of groundwater.

Alton Groundwater Resources: Potential Contamination Sources



Legend

Stratified Drift Aquifer (Transmissivity ft2/day)

- 0-1,000
- 1,000-2,000
- 2,000-4,000
- 4,000+

- Underground Storage Tank
- Point/Nonpoint Potential Pollution Sources
- Groundwater Hazard (Point)
- Potential Contamination Sites
- Public Water Supply
- Groundwater Hazard (Polygon)
- Wellhead Protection Area
- Wetland
- Road/Trail
- Town Boundary

Data Sources:
Aquifer data obtained from US Geological Survey, last revised Februray, 2000. Original Scale 1:24,000.

Groundwater hazard inventory data obtained from NHDES, last revised May, 1997. Original Scale 1:24,000.

Hydrography data obtained from US Geological Survey, last revised October, 1995. Original Scale 1:24000.

Point/Nonpoint PPS data obtained from NHDES, last revised March, 1995. Original Scale 1:24,000.

Roads data obtained from US Geological Survey, last revised October, 1995. Original Scale 1:24,000.

Underground storage tank data obtained from NHDES, last revised May, 1997. Original Scale 1:24,000.

Public water supply data obtained from NHDES, last revised May, 1997. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialis
January 22, 2002

1 0 1 2 Miles

Scale 1:65,000

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This map is to be used for planning purposes only, not for legal boundary interpretation.

Shared Water Resources/Regional Context

Water does not respect the arbitrary political boundaries established by people. Water helps to give a regional context to local decision-making processes. What happens in the upper portions of a watershed will affect downstream areas in some manner. Alton receives and supplies groundwater and surface water from and to neighboring communities. Alton's most significant hydrological connection in terms of receiving ground water and surface water is with the town of New Durham. New Durham forms the entire eastern border of Alton. The Merrymeeting River, one of Alton's most important natural resources, originates from Merrymeeting Lake in New Durham. The river travels several miles through New Durham before crossing Rt. 11 and entering Alton. Alton and New Durham share a major aquifer and a large wetland complex along the river.[68] Land use decisions in New Durham have a direct impact on the water quality and ecological integrity of the Merrymeeting. Beaver Brook also originates in New Durham from Shaws Pond. Beaver Brook drains a large area, contains several wetlands and aquifers and eventually empties into Lake Winnipesaukee. Alton receives minor inputs of surface and groundwater from other bordering towns.

Alton supplies large quantities of groundwater and surface water to Lake Winnipesaukee as most of the town is in the Lake's watershed. Approximately 16.8% of the Lake's watershed is found within the town's borders, which is the second largest percentage of any community in the watershed.[69] All but a few of the major brooks and aquifers in Alton are hydrologically connected to the lake.

Alton also serves as part of the headwaters of the Suncook River. Part of the Belknap Mountains, Hills Pond, Sunset Lake, Halfmoon Pond, Frohock Brook, and portions of South Alton belong to the Suncook River watershed. Gilmanton and Barnstead receive large quantities of surface and ground water from Alton. A small area of extreme southern Alton drains into the Cocheco River as well.[70]

Conclusion

Alton contains a diverse array of water resources within its borders. Some of these resources are contained entirely within the town; however, most are somehow connected to other communities. Three main watersheds exist in town: Winnipesaukee, Suncook, and Cocheco. Winnipesaukee is the largest watershed, followed by the Suncook and only a small part of the town is in the Cocheco watershed. As of the year 2001, water quality of most surface and ground water features is good to excellent.[71] This is due to the undeveloped nature of much of the watersheds and the presence of wetlands that absorb excess nutrients, sediments and pollutants.[72]

The potential for water quality to be degraded is great because of the highly developed shoreline of most lakes and ponds in town (especially the Big Lake) and increasing development pressure in the watersheds, especially near sensitive areas such as the Merrymeeting/Coffin Brook confluence. There are approximately 48 miles of lakeshore in Alton. The vast majority of shoreline, 72 percent or 35 miles, is comprised of Lake Winnipesaukee. Only 14.6% (seven miles) of the total lakeshore in Alton is undeveloped. Less than a mile or three percent of Lake Winnipesaukee's frontage in Alton remains undeveloped. Only 10 percent of Halfmoon Lake's shoreline remains undeveloped. Sunset Lake is fortunate that its remaining undeveloped shoreline, 27 percent of the total, is permanently protected with a conservation easement. A little over half of Hills Pond's shoreline remains undeveloped. Over 85 percent of Bear Pond's shoreline is undeveloped. Gilman and Knights Ponds' shorelines have already been completely protected and can never be developed. Undeveloped shoreline provides numerous social and ecological benefits, such as public recreation, aesthetic beauty, wildlife habitat, rare and endangered species habitat, water quality enhancement and corridors for wildlife.

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Open Space and Unfragmented Lands

Introduction

What are open space/unfragmented lands? Open space and unfragmented lands are those areas that have either no or very few roads and human habitation. Typically they are areas 500 acres or greater that for various reasons have not been developed.[1] Away from the lakes and village, there remain many viable parcels of open space/unfragmented lands in Alton.[2] These large tracts of open space are essential in maintaining a number of interrelated social and ecological values in town. Large tracts of open space provide some of the town's most viable wildlife habitat, protect water quality, offer recreational and natural resource management opportunities (forestry and agriculture), and contribute greatly to the town's aesthetic beauty and the all encompassing and elusive "rural atmosphere or character." Many wildlife species require large tracts of undeveloped land and corridors between these tracts to meet their needs.[3]

Open space areas, since they are void of development, generally have good water quality and help mitigate lower water quality in more developed areas. Hiking, snowmobiling, fishing, hunting, and wildlife viewing are common recreational activities that occur in the large open space areas in Alton. The large tracts of open space also provide Alton with the opportunity to expand and coordinate existing agricultural and forest management activities so as to develop a sustainable natural resource-based economy that provides many of life's essentials from within the town's borders. Large undeveloped tracts of land in Alton contribute greatly to the community's aesthetic beauty and rural character. Open space areas not only help to fuel the town's tourist dependant economy, which loves pleasing panoramas and rural atmosphere, but also make the town an enjoyable place for its residents.

Many communities in the surrounding region are not as fortunate as Alton and have only a few scattered parcels of open space left (Meredith, Laconia Wolfeboro). Alton's good fortune in possessing many large, nearly contiguous parcels of open space is more an artifact of chance and the limited development potential of some areas in town than of any concerted town effort to retain these valuable areas. Some of the town's open space areas contain significant cores of conservation land, but others do not. Development pressure can only be expected to increase in the coming years in Alton, and it will be the open space areas, especially the most developable, that receive much of this pressure.

Methodology

Open space areas/unfragmented lands were derived utilizing relevant GRANIT data layers and local knowledge. All roads class 4 (USGS Classification) or higher were buffered by 500' and then created polygons of unfragmented lands resulting from the 500' buffer. Natural resource values of open space areas were determined utilizing relevant GRANIT data layers, publications and local knowledge. Wildlife habitat and biodiversity were determined primarily in consultation with the NH Fish and Game publication, Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups, as well as other relevant publications, GRANIT data layers, field observations, site visits, and local knowledge. Soils were inventoried primarily utilizing the 1968 Belknap County Soil Survey conducted by the Natural Resource Conservation Service (Soil Conservation Service). Agricultural lands were inventoried through GIS analysis of 1998 Digital Orthophoto Quads and Digital Raster Graphics produced by USGS and GRANIT. Steep slopes were determined through GIS analysis of Digital Elevation Models and Digital Raster Graphics produced by USGS and GRANIT. Forests were inventoried utilizing relevant GRANIT data layers (primarily Land Cover), publications, local knowledge and field observations.

Open Space Areas (Greater than 500 acres)

Alton is fortunate to still contain many large, unfragmented parcels of open space. There are 10 blocks of open space in town that are greater than 500 acres. These **10** blocks of open space encompass approximately **20,425 acres or 50% of Alton's land base.**[4] Thus almost half of Alton's land base is comprised of large, unfragmented parcels that are essential to maintaining a number of interrelated ecological and social values previously mentioned.

Table 5: Alton Unfragmented Lands/Open Space Areas > 500 acres

Open Space Area	Acres	Conservation Land Acreage	Percentage of Area Protected	Natural Resources
Belknap Mountains	**5,244**	**275**	**5%**	**Mountains, forests, Hills Pond**
Rocky/Alton Mountain	**3,874**	**210**	**5%**	**Mountains, forests, pond, headwaters of Coffin and Frohock Brook**
Marsh Pond/Upper Merrymeeting	**2,438**	**522**	**21%**	**Marsh Pond, small aquifer, wetlands, Merrymeeting.**
Coffin Brook	**1,963**	**236**	**12%**	**Coffin Brook, numerous wetlands, productive soils, aquifer**
Gilman/Bear Pond	**1,609**	**407**	**25%**	**Gilman and Bear Pond, forests, endangered species, wetlands.**
Ragged Mountain	**1,315**	**0**	**0**	**Ragged Mountain, brooks, wetlands, forests.**
Prospect Mountain	**1,230**	**0**	**0**	**Ag. Land, forests, brooks, wetlands.**
Merrymeeting River/Lower Coffin Brook	**1,041**	**339**	**33%**	**Merrymeeting, Coffin Brook, largest wetland complex and aquifer, wildlife habitat.**
Stockbridge/Dudley Road	**1,111**	**200**	**18%**	**Coffin Brook, wetlands, productive soils.**
Knights Pond	**601**	**306**	**51%**	**Knights Pond, wetlands, forest aquifer**

Source: GIS Analysis of Alton Unfragmented Lands/Open Space Areas Map. 2001. Town of Alton. Alton Conservation Commission.

Alton Unfragmented Lands/Open Space Areas

Legend

Open Space Areas

- 500-1,500 acres
- 1,500-2,500 acres
- > 2,500 acres

- Conservation Land
- Wetland
- 500' Road Buffer
- Town Boundary

Data Sources

Buffer data obtained by creating 500' buffers along all Class 4 and better roads from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

Conservation land data obtained from SPNHF, last revised February, 2000. Original Scale 1:24,000.

Open space areas obtained by creating polygons of unfragmented lands resulting from 500' road buffer. November 2001.

Hydrography data obtained from USGS, last revised October, 1995. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
November 2, 2001

TOWN OF ALTON, NEW HAMPSHIRE
INC. JUNE 16, 1796

GRANIT

N

1 0 1 2 3 4 Miles

Scale 1:85,000

This map is to be used for planning purposes only, not for legal boundary interpretation.

Belknap Mountains (West Alton, approx 5,244 acres)
The Belknap Mountains in West Alton comprise the largest area of open space left in town. This area is bordered on the east by Rt. 11, on the north by Rt. 11A, on the south by Alton Mt. Road and Hills Pond and on the west by Gilmanton and Gilford town lines. This area is contiguous to other open space areas in Gilmanton and Gilford that cumulatively form the largest area of open space left in all of Belknap County. Most of the area drains into Lake Winnipesaukee, although a considerable portion serves as part of the headwaters of the Suncook River.[5] This rugged area of town has a high percentage of the town's steep slopes and conversely only a very small percentage of the town's wetlands. Hills Pond is the most significant water body in this area and retains a considerable percentage of its natural shoreline. The predominant natural features of the area, besides the mountains, are the forests. One encounters a variety of forest types and species in the area. This forest diversity is fostered by soils, topography, aspect, past land use, species intrinsic qualities and disturbance regime. Oak and beech are commonly found in lower elevations and spruce and shrubs inhabit the extreme environment of the ridge tops. Due to the extensive trail networks and great views afforded on the peaks, some portions of the area receive a high amount of recreational use from both residents and tourists. Thousands of acres of the Belknap Mountains in Gilmanton and Gilford are formally protected from development; whereas, very little acreage of the Belknaps has been protected in Alton.[6]

Rocky/Alton Mountain/Upper Coffin Brook (approx 3,874 acres)
The second largest tract of open space left in Alton is bounded by Alton Mountain Road to the north, Avery Hill Road and the Gilmanton town line to the west, Merrymeeting River to the east and Rt.140/Halls Hill Road to the south. The area serves as the headwaters of Coffin and Frohock Brooks, which are two important surface water features that are apart of the Winnipesaukee and Suncook River watersheds respectively. The area has a small amount of wetlands and Meadow Dam Pond. Numerous snowmobile and hiking trails lace the area and it receives a moderate amount of recreational use. The tract serves as a corridor between open space areas to the north and south. A significant percentage of the area is comprised of steep slopes due to the topographical relief of Rocky and Alton mountains. A small amount of prime agricultural land can be found near Rt. 140.[7] Alton Bay State Forest is the only conservation land presently located here.[8]

Marsh Pond/Upper Merrymeeting (approx 2,438 acres)
Located south of Gilman/Bear Pond open space area in East Alton, Upper Merrymeeting/Marsh Pond tract is the third largest area of open space in Alton. The area is a significant portion of the Merrymeeting River watershed and contributes to keeping the river healthy. Forests are the dominant natural resource feature in the area, covering most of the land base.[9] Within Alton, it is an area of mild topographical relief with few steep slopes.[10] The area contains numerous small wetlands, a few large wetlands associated with Marsh Pond and likely one of the highest concentrations of vernal pools in Alton. These large wetlands help to maintain the ecological integrity of the upper (and hence lower) Merrymeeting River by retaining nutrients and sediment from uplands, Merrymeeting Lake, and the fish hatchery.[11] There is a small amount of prime

agricultural land in the southern end of the area near Rt. 11.[12] The area receives little recreational pressure besides Marsh Pond. Two almost contiguous parcels of conservation land are found here. The Society for the Protection of New Hampshire's Forests owns approximately 236 acres known as the Marks Memorial Forest. SPNHF practices sustainable forest management that allows for the periodic harvest of timber while still maintaining the essential ecological functional values of the land (i.e. wildlife habitat, water quality, diverse stand composition and structure etc...). New Hampshire Fish and Game owns 286 acres on the west side of Marsh Pond and along the Merrymeeting River. The land, known as the Marks tract, is a Fish and Game Wildlife Management Area.[13] This piece of conservation land provides a critical vegetated buffer along the wetlands, pond and river that helps to keep these regionally valuable aquatic ecosystems healthy.

Coffin Brook (approx 1,963 acres)
Bounded on the north by Rt. 140, south by Rt. 28, east by Merrymeeting River, and west by Coffin Brook Road, this area provides an essential corridor between the Merrymeeting River to the south and Rocky and Belknap Mountains to the north. The area is a part of the Merrymeeting River and hence Winnipesaukee watersheds. Numerous wetlands, many associated with Coffin Brook, are located here that help to maintain the water quality of Lake Winnipesaukee and supply a myriad of niches for wildlife species to utilize.[14] Within Alton, the area is one of mild topographical relief with few steep slopes. A high percentage of Alton's prime agricultural soils are found here and as is usually the case, so is some of its most developable land.[15] The area also contains some of Alton's most productive forest soils, especially for white pine. Some of Alton's stratified drift aquifers are located here, in addition to valuable groundwater recharge areas. A couple hundred acres of conservation easements currently help to protect some of this area's valuable natural resources.[16]

Gilman and Bear Pond (approx 1,609 acres)
The Gilman and Bear Pond open space area serves as a significant core of open space in East Alton. Western portion of the area (Gilman Pond) is part of Winnipesaukee watershed, and the eastern portion (Bear Pond) is part of Merrymeeting River watershed. Gilman Pond is one of two great ponds in Alton with a totally undeveloped, protected shoreline. All the land that abuts Gilman Pond is permanently protected through conservation easements or fee ownership by conservation organizations and comprises the single largest area of contiguous conservation land in Alton (400+ acres).[17] The area is noteworthy not only for the pond and its associated conservation land, but also for the habitat it provides for the rare small whorled pogonia (*Isotria medeloides).*[18] The small whorled pogonia is listed as threatened on the Federal Endangered Species List. East Alton, especially around Gilman Pond, is home to the largest known population of small whorled pogonia orchids in the world.[19] Some of its habitat has been protected, but many potential habitats remain unprotected. Bear Pond also retains a high percentage of its natural shoreline, however, very little of it is formally protected. Recreational use of the area is best described as light to moderate. Most recreational activity in the form of fishing and hiking are centered around Gilman Pond.

Prospect Mountain(approx 1,189 acres)/Ragged Mountain(approx 1,315 acres)
These contiguous areas are located in the extreme southern part of Alton and are bisected by Prospect Mountain Road. Most of the area is apart of the Suncook River and Winnipesaukee watersheds and a small portion is apart of the Cocheco River watershed.[20] There is a moderate amount of steep slopes because of the presence of Prospect and Ragged Mountains.[21] A moderate amount of prime agricultural soils exist.[22] The summit of Prospect Mountain is one of the few remaining commercial farms in town. The bare summit is used for commercial blueberry production.[23] A number of wetlands of varying sizes are found here that aid in maintaining the water quality of Halfmoon Lake. There is currently no conservation land located in these areas.

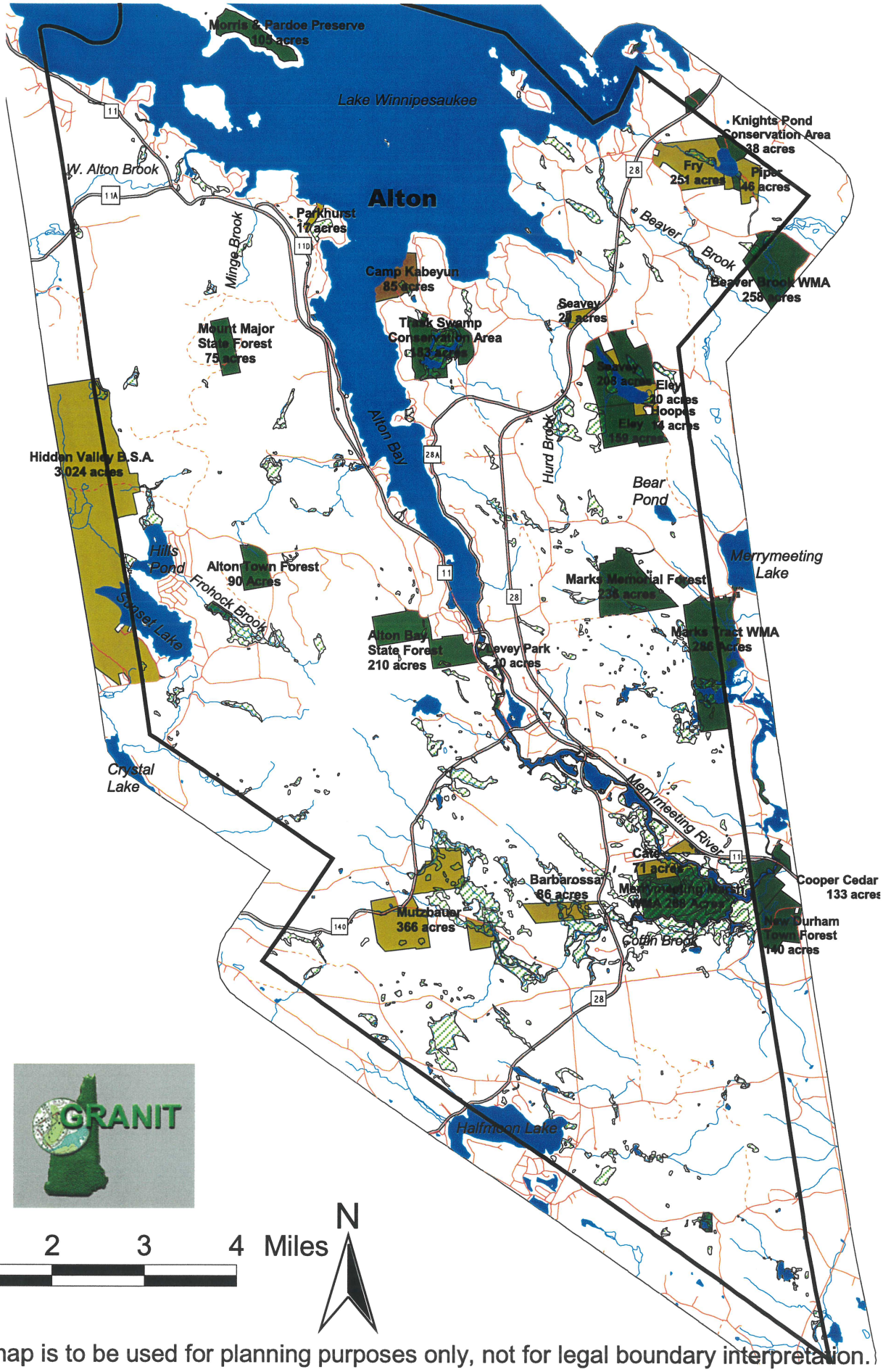
Stockbridge and Dudley Road (approx 1,111 acres)
This area is located in southwest Alton and abuts both Gilmanton and Barnstead. The area contains a moderate amount of wetlands and conservation land, as well as productive agricultural and forestland. A small part of Coffin Brook flows through the area. This area has experienced rapid residential development in recent years due to its convenient access to Rt. 28 and southern urban centers. New subdivisions have been created off Stockbridge and Dudley roads along with more typical roadside single-family housing.

Merrymeeting River/Lower Coffin Brook (approx 1,041 acres)
The Merrymeeting River/Lower Coffin Brook open space area lies within the Winnipesaukee watershed and contains some of the most diverse and productive ecosystems in Alton. As one would expect, water is the dominant natural resource feature in this area. The area contains Alton's largest aquifer, highest concentration of wetlands, largest river, and experiences a high amount of water-based recreation (e.g. fishing and canoeing).[24] Many large wetlands in this area have been suggested as candidates for prime wetland designation. These wetlands provide essential and productive wildlife habitat, have a high potential to trap sediments and filter out nutrients thus protecting the water quality of Lake Winnipesaukee and absorb floodwaters.[25] The river empties into Alton Bay and is one of Lake Winnipesaukee's largest tributaries. In juxtaposition to the high natural resource values of the area is the highly developed nature of the abutting landscape. Route. 11 and Rt. 28 run alongside and cross the river, Alton Village is located on the river, and Stockbridge Corner Road, one of the fastest growing areas in town, forms its southern boundary. The level of development increases the potential for one, or all natural resource values, to be degraded. Fortunately, several hundred acres of dedicated conservation land exist in some of the most sensitive areas.[26]

Knights Pond (approx 601 acres)
Alton is fortunate to have two great ponds with undeveloped shorelines. Both of these ponds are located in East Alton and one of these is Knights Pond. Knights Pond not only has an undeveloped shoreline, but that shoreline is also protected in perpetuity from development by conservation easements obtained in the early 1990's.[27] Knights Pond is a part of the Winnipesaukee watershed. In addition to the pond and riparian habitat, the area has hundreds of acres of open space. The area contains some steep slopes and prime agricultural soils.[28] A small amount of wetlands are associated with Knights Pond and the wetland along its outlet has been deemed a candidate for designation as prime due to

its ability to protect the water quality of Lake Winnipesaukee.[29] The area also serves as an important corridor between open space areas to the south and east and Lake Winnipesaukee to the west. Hundreds of acres of conservation land have already been established here, including the most sensitive and valuable land around the pond. Residents and tourists alike frequent the trail that follows the periphery of the pond and its wetland.

Alton Conservation Land



Data Sources:
All data layers obtained from the GRANIT database at the UNH Complex Systems Research Center.

Conservation land data obtained from SPNHF, last revised February, 2000. Original Scale 1:24,000.

Hydrography data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

NWI/Wetland data obtained from USF&WS, last revised October 1998. Original Scale 1:24,000.

Roads data obtained from US Geological Survey, last revised October 1995. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
February 25, 2002

This map is to be used for planning purposes only, not for legal boundary interpretation.

Conservation Land

Alton contains a variety of conservation lands throughout town. Conservation lands protect approximately **3,175 acres** (7.8% of land base) in town from development.[30] These lands are not evenly distributed throughout the town. East Alton has by far the greatest amount of conservation land. Approximately 1,500 acres of conservation land exist in East Alton, helping to maintain the ecological integrity of many valuable natural resources: Gilman and Knights Ponds, rare species habitat, Marsh Pond and its extensive wetlands, productive upland forest and the Merrymeeting watershed. Coffin Brook and Merrymeeting/Lower Coffin Brook open space areas contain the only other significant concentration of semi contiguous conservation land in town. Conservation easements protect 520 acres (6 separate parcels) that include some of the towns most productive white pine land, prime farmland, and frontage on Coffin Brook and its associated wetlands. The Merrymeeting WMA managed by NHF&G protects an additional 268 acres in the area. The remaining conservation land is scattered throughout town. West Alton has several widely scattered parcels of conservation land (Town forest, Alton Bay and Mount Major State forests, B.S.A conservation easement). Lakes Region Conservation Trust owns two parcels of conservation land in town: 105 acres on Rattlesnake Island and 183 acres that encompasses most of Trask Swamp. There is no conservation land in town that has frontage on Lake Winnipesaukee.

Most of the conservation lands in town are hydrologically connected to the Lake so they aid in protecting the water quality of the lake to some degree.[31] However, the absence of large conservation parcels on the shore of the Lake increases the likelihood of water quality being degraded due to the lack of an adequate buffer and deprives people access to this valuable resource. Undeveloped natural shoreline on the Lake in Alton is a rare and ecologically important habitat that every year is moving closer to extinction.[32]

There are many different types of conservation lands in town: town forest, state forests, wildlife sanctuaries, multiple-use areas, wildlife management areas, and conservation easements. Each type of conservation land has its benefits and drawbacks, but all protect the land from development, which is the most serious threat to the town's natural resources. Conservation easements are an innovative land protection tool that allows land to remain in private ownership and prohibits development at the same time. A landowner either sells or donates the development rights to a piece of property, usually to a land trust or government agency, and thereby the grantor or any future owners cannot develop the land because the right to do so has been rescinded.[33] Conservation easements are "negative easements" because they do not transfer the affirmative right to develop to the easement holder, but rather give the holder the legal power to prohibit the landowner from developing the land.[34]

Table 6: Conservation Lands in Alton

Property/Location	Acres	Type of Protection	Owner/Holder	Natural Resources Protected
Fry/NE Alton	251	Conservation Easement	State NH OSP	Knights Pond and adjacent uplands and wetlands.
Piper/NE Alton	20	Conservation Easement	LRCT and SPNHF	Knights Pond and adjacent uplands and wetlands.
Knights Pond Conservation Area/NE Alton	38.4	Fee Simple	LRCT	Knights Pond and adjacent uplands and wetlands.
Hoopes/E Alton	14	Conservation Easement	Alton	Gilman Pond adjacent uplands.
Seavey/E Alton	208	Fee Simple	Alton	Gilman Pond and adjacent uplands and wetlands. Endangered species habitat.
Seavey/E Alton	8.5	Conservation Easement	Alton	Gilman Pond
Seavey/E Alton	23.6	Conservation Easement	Alton	Gilman Brook and upland forest.
Eley/E Alton	159	Fee Simple	Alton	Gilman Pond and adjacent uplands and wetlands. Threatened species habitat.
Eley/E Alton	18	Conservation Easement	Alton	Gilman Pond
Marks Memorial Forest/E Alton	236	Fee Simple	SPNHF	Productive forest land, wetlands and part of Merrymeeting watershed
Merrymeeting Lake Preserve/E Alton	6.4	Fee Simple	Nature Conservancy	Habitat for threatened small whorled pogonia.
Marks Tract WMA/ E Alton	286	Fee Simple	NH Fish and Game	Significant wetlands and frontage along Marsh Pond.
Trask Swamp/ Alton Bay	183	Fee Simple	LRCT	Regionally significant assemblage of diverse wetland habitats, upland forest, heron rookery.
Clough-Morrill Trust/ Alton Bay	42	Fee Simple	Alton	Trask Swamp and associated uplands that provide a buffer for this unique resource.
Merrymeeting Marsh WMA/ S Alton	268	Fee Simple	NH Fish and Game	Large expanse of regionally significant wetland habitat along the Merrymeeting River. Aquifer and wildlife habitat.
Barbarossa/Jackson S Alton	86	Conservation Easement	Alton	Coffin Brook, wetlands and upland forest.
Mutzabauer/S Alton (3 parcels)	366	Conservation Easement	SPNHF	Coffin Brook, associated wetlands and upland forest.
Cate/ S Alton	71	Conservation	NEFF	Merrymeeting River, wetlands,

(2 parcels)		Easement		productive white pine forestland and abuts NH Fish and Game WMA.
Gontarz Wetland Conservation Area/ S Alton	15.4	Fee Simple	Alton	Large wetland.
Rattlesnake Island, Morris and Pardoe Preserve/ Lake Winnipesaukee	105	Fee Simple	LRCT	Upland forest, potential rattlesnake/raptor habitat (?) on one of the lake's largest islands.
Parkhurst/ W Alton	17	Conservation Easement	Alton	Frontage on Winnipesaukee and upland forest.
"Timbers at Rum Point"/ W shore of Lake Winnipesaukee	11	Conservation Easement	Alton	Forested wetland that due to its proximity to the Lake is very important in maintaining it's water quality.
Alton Town Forest/ W Alton	90	Fee Simple	Alton	Productive upland forest and part of Avery Hill.
Alton Bay State Forest/ SW Alton	210	Fee Simple	State of NH DRED	Productive upland forest and part of Merrymeeting watershed.
Mount Major State Forest/ W Alton	75	Fee Simple	State of NH DRED	Summit and forests on frequently visited Mt. Major
Hidden Valley BSA/ W Alton	350	Conservation Easement	State of NH OSP	Small part of larger 3,000+ acres under CE that protects a large area of the Belknap Mountain Range.
Frohock Brook Conservation Area/ W Alton	17	Fee Simple	Alton	Prime wetland along Frohock Brook

Source: Alton Conservation Land Map. 2001. Town of Alton. Alton Conservation Commission.

Total Conservation Land Acreage In Alton: 3,175.3 acres or 7.8% of Alton's land base.

Wildlife Habitat/Biodiversity

Alton is home to a plethora of flora and fauna. Many species are year round residents, while others only pass through once never to return or make yearly journeys to the town to feed and breed. Most of the large wildlife and plant species are native to the area having been here for hundreds if not thousands of years. However, ever since European settlement there has been a steady bombardment of exotic/alien species. Some of these exotic species have not been able to establish themselves, while others have been quite successful in filling niches occupied by native species.

All living things are intimately connected to the environments they inhabit, they both shape and are shaped by their environment. This symbiotic relationship creates dynamic ecosystems that are constantly evolving in response to various biological and physical factors. Since ecosystems are constantly changing, it is hard to make absolute value judgments as to whether a change is good or bad. Yet most ecologists agree that the loss of any one species, or a reduction in biodiversity, is detrimental not only for the ecosystems it inhabits, but also for the world because that species genetic evolution is lost forever. Maintaining biodiversity, the variety and variability of all living things, helps to maintain an ecosystem's capacity to adapt to change.[35]

The biggest threat to Alton's wildlife and biodiversity is habitat loss and alteration. Laws and social imperatives have been effective in controlling the direct exploitation of species, i.e. fishing and hunting. However, laws and social values, if anything, have promoted habitat loss and alteration, not curbed it. It is obvious that when a piece of land is paved over or built it upon it loses its habitat value for most species. Harder to discern are the indirect effects of development on remaining natural habitat. Development can lead to severe fragmentation whereby natural habitats become isolated islands that lose much of their value as habitat for a variety of species. Domestic pets can increase predation and competition with native species. Edges created by roads and buildings provide excellent pathways for the introduction of exotic species, which can directly compete with some native species while at the same time making the habitat less hospitable to others. Development that occurs in or near unique or important habitats such as rivers, wetlands, lakes, rare forest type or an endangered species habitat can degrade these habitats and reduce their functional values.[36]

Not all land is created equal in terms of its value as wildlife habitat. According to the Nongame and Endangered Species program of the New Hampshire Department of Fish and Game publication, Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups, the following qualify as significant wildlife habitat in New Hampshire:

Significant Wildlife Habitat[37]

Habitat of Rare and Endangered Species: These include habitat used by threatened and endangered species and habitat used by other rare wildlife or species of special concern. Examples of these habitats in Alton include: the forests of east Alton that are home to the small whorled pogonia, heron rookery at Trask Swamp, black gum swamps, possible eagle sites along the Merrymeeting and salmon habitat in the Merrymeeting River and West Alton Brook. Every fall land locked salmon ascend the Merrymeeting from Lake Winnipesaukee to complete and begin anew the circle of life. During late October through early December salmon enter the river and head upstream to spawn. Late November is the best time to view large numbers of salmon staging and spawning in the river. Salmon lay their eggs in the fall and they hatch in the spring. Unlike salmon in the Pacific Ocean, Atlantic salmon and their landlocked brethren can spawn multiple times and do not necessarily die after spawning. Lake Winnipesaukee and Sunset Lake also provide habitat for the common loon, which is a state threatened specie.[38]

Unfragmented Lands: These lands are large tracts, usually 500 acres or greater, of contiguous habitat that include a mix of forests, wetlands, riparian areas, or other habitat, which support wide-ranging mammals and forest interior birds. These areas have few or no roads, houses, businesses or other human habitation. **"Unfragmented land provides some of the most valuable wildlife habitat in the long term. It provides a range of contiguous natural habitats that often encompasses many habitat types, supporting a diverse array of native wildlife and ensuring that species common to the area remain common. In these unfragmented lands there is a large enough area for habitat dynamics to affect the landscape over time - changes occur naturally, creating a variety of habitats. Wildlife use of habitat is adapted to these changing dynamics and is actually dependent upon them. As habitat changes, wildlife moves from areas that no longer provide the habitat they need to new areas that meet their needs. This dynamic pattern of habitat use allows wildlife to continue to adapt to land use changes, including human induced changes, as long as there is enough available area left to move into."**[39] Alton is fortunate to have many large parcels of open space and unfragmented land in town. All parcels of open space in town over a 1,000 acres have considerable value as wildlife habitat, however, each open space area varies in its value as wildlife habitat depending upon diversity of habitats, presence of rare and endangered species, shape of parcel (circle or square shape parcels have more integrity because they have less edge in proportion to interior habitat than narrow rectangular parcels) and adjacent land use/habitats. Some of the most important open space area/unfragmented lands in Alton in terms of wildlife habitat value are:

1. Merrymeeting River/ Lower Coffin Brook
2. Coffin Brook
3. Marsh Pond/Upper Merrymeeting
4. Gilman and Bear Pond
5. Belknap Mountains
6. Prospect/Ragged Mountain
7. Rocky Mountain/Upper Coffin Brook[40]

Riparian Areas and Large Wetlands: Riparian areas are found along water courses, especially those areas that maintain connections between river corridors, wetlands, and unfragmented lands. They also include large wetlands or wetlands complexes that support a variety of reptiles, amphibians and other wetland-dependant wildlife such as waterfowl.

Riparian areas consist of the shorelines of lakes, rivers and ponds. Riparian areas serve as a transition zone between terrestrial and aquatic ecosystems. Many species from both aquatic and terrestrial ecosystems depend upon riparian areas for a variety of goods and services. Large trees, preferably dead or dying, along rivers and lakes provide nesting sites for ospreys, eagles, and herons. Most turtle species lay their eggs in riparian areas. The habitat diversity created by the gradient between upland and surface water provide numerous niches for a variety of species to utilize. Riparian areas serve as superhighways for wildlife. Birds and mammals use riparian areas as travel corridors during migrations and when in search of food or mates. Thus riparian areas are essential in maintaining the health and genetic fitness of many species.[41]

Due to the large amount of surface water in Alton, over 12,000 acres, there are hundreds of miles of riparian habitat in town. Unfortunately, much of Alton's lake riparian habitat has been developed or its value has been greatly diminished due to development. The shores of the four main lakes in town, Winnipesaukee, Halfmoon, Sunset and Hills Pond are for the most part heavily developed. Of the four, only Hills Pond retains a significant percentage of its original riparian habitat (56% or 1.2 miles of Hills Pond remains undeveloped).[42] Riparian habitat on the state's lakes has become a rare and endangered habitat thanks to the relentless development of the last several decades. However, Alton is fortunate to possess two great ponds, Knights and Gilman, with totally undeveloped and protected riparian habitat. Alton's rivers and streams have a much higher percentage of viable riparian habitat than the town's lakes. The most valuable stream riparian areas can be found along the Merrymeeting River, Coffin Brook, Frohock Brook, Halfmoon Brook, Hurd Brook, Watson Brook, Beaver Brook and West Alton Brook.

Wetlands are important wildlife habitat for a number of reasons. Many wetlands support habitat specialists such as rails and bitterns, otters, muskrat, and beavers that depend upon wetlands for their survival. Wetlands provide food and nesting sites for many species of birds including herons, osprey, ducks, and Canadian geese. Deer, moose and bear take advantage of the forage opportunities afforded by wetlands during various times of the year.[43] A diversity of wetland types and complexes can be found in Alton. Forested wetlands (also known as swamps), scrub-shrub wetlands, emergent wetlands (marsh), aquatic bed, open water and their variations exist in Alton. Often different wetland types combine to form wetland complexes that support a high diversity of plant and animal species due to the variety of niches. Interspersion, the amount of edge between two different types of vegetation, has been shown to correlate with the habitat value of a wetland. The greater the edge and different types of edge generally means higher wildlife populations and diversity. Wetlands that have a high degree of interspersion, i.e.

mixture of different wetland types (forested, scrub-shrub, emergent and their variations) usually have greater value as wildlife habitat than wetlands with low interspersion.[44] Wetlands are usually found in riparian areas and the vast majority of Alton's wetlands are intimately associated with brooks and rivers. Some of Alton's wetlands with high wildlife value include:[45]

1. Merrymeeting/Coffin Brook Confluence. Largest expanse of wetlands in Alton contains a diversity of productive wetlands.

2. Trask Swamp. "Trask Swamp probably has the most unique configuration and interspersion of vegetation types in Alton." Nancy Rendall, 1985.

3. Marsh Pond. One of the largest and most diverse expanses of wetlands in town.

4. Coffin Brook Wetlands.

5. Frohock Brook Wetlands.

6. Big River Wetlands/ Prospect and Ragged Mountain Area.

7. Hurd Brook Wetland.

8. Beaver Brook Wetland (Palmer Swamp).

Agricultural and Other Open Land: Large fields and shrublands that support species dependent on this vanishing open land type. Alton, like much of New Hampshire although perhaps not quite as extensive as neighboring locales because of the rugged topography, was primarily a farming community through the 1800's and early 1900's.[46] During Alton's agricultural peak, around 1850, open land habitat, such as fields and shrublands, were very common and the species that relied on this habitat were abundant. New Hampshire, and Alton as well, has lost much of its open land habitat to forests as farmers abandoned their fields during the late 1800's and early 1900's. While the reversion of fields to forest has benefited most species in Alton, the severe dearth of open land habitat has reduced some species populations to well below healthy levels. Many bird species rely on fields and shrublands for their foraging and reproductive needs, so too does the New England cottontail.[47] The loss of farmers and the landscape they created has not only significantly reduced Alton's agricultural production, but also threatens Alton's biodiversity and natural heritage.

There are currently only four active farms in town. The summit of Prospect Mountain is an important shrubland and some other mountain summits are as well to a much lesser extent.[48] Gravel pits are areas that can provide important shrubland habitat and they

should not be disregarded as wastelands. Gravel pits along Coffin Brook and along other streams in town no doubt supply habitat for a variety of species, especially given the close proximity to wetlands and surface water.

Other Unique or Critical Habitats: These include habitat that is rare statewide, habitat that is rare in a particular region, uncommon land features which provide essential habitat for certain species and habitat critical to certain species during a particular phase of their life cycle or a particular time of year. Examples in Alton include: Spruce-fir forests or swamps, rock cliffs, outcrops and piles, possible bird migration stopover habitat (Merrymeeting River and wetlands), possible bat hibernation sites, deer wintering areas, mast production areas, large wetland area at Merrymeeting/Coffin confluence, Belknap Mountains, salmon spawning habitat in Merrymeeting River and vernal pools.

Due to its extensive forest cover, there is little doubt that Alton contains numerous deer wintering and mast production areas. In Alton the most abundant deer wintering areas are stands of eastern hemlock and eastern white pine. Nearly pure stands of hemlock and pine help to greatly reduce the amount snow that accumulates on the ground, thereby affording the deer easier travel and access to forage. Mast refers to the nuts produced by trees, mainly oaks and beech, that many species rely on for sustenance.[49] Oaks and beech are common and often dominant components of Alton's forest stands.

Vernal pools are a unique wetland habitat. They may appear to be just large puddles or pools of water in the middle of a forest, but it is precisely these characteristics that make vernal pools qualify as significant wildlife habitat. Vernal pools hydrological isolation (no streams running through) and ephemeral nature (usually dry up by mid to late summer) provide ideal conditions for amphibian breeding. Salamanders and frogs experience high rates of reproductive success in vernal pools, due to the lack of predators (fish cannot survive in vernal pools due to their ephemeral nature) and abundance of food.[50] There are vernal pools in Alton, but their distribution has yet to be determined. Marsh Pond/Upper Merrymeeting open space area likely contains a high concentration of vernal pools.

Wildlife Travel Corridors: These are undeveloped lands that serve as connections between large, undeveloped tracts of land. What qualifies as a wildlife corridor depends upon the species. For squirrels a corridor maybe oaks trees along a fence line that connects two stands that are separated by a field. Larger mammals, such as deer and moose, typically follow natural features such as streams and ridgelines. Rivers and streams are some of the most important corridors because they provide pathways between uplands and lowlands. Corridors are vital in allowing species to find adequate shelter and food, and perhaps most importantly, adequate mates. Corridors allow for genetic exchange between different populations of the same species and thereby help to maintain the health and vigor of the species. The need for corridors is a reflection of our increasing understanding of the interconnectedness and interdependency of ecosystems and the species that inhabit them.[51] All ecosystems are connected and the corridors which allow for the movement of species between different habitats must be maintained in order to have healthy, functioning ecosystems.

Alton has too many wildlife corridors to list. However, some of the most important corridors in town can be found:

-Along rivers, brooks and streams.
-Areas that connect large blocks of unfragmented land.
-Shores of lakes and ponds.
-Edges of wetlands
-Ridgelines

Road kill data obtained from the NH Fish and Game Department highlights areas in Alton of significant wildlife activity and movement. From 1991 to 2002, 63 road kill permits were filed with NH Fish and Game in Alton. NH Fish and Game only records road kills of large species such as bear, deer and moose. The vast majority of the road kill permits, 58, are from 1999-2002. The 63 road kill permits are comprised of 9 moose and 54 deer. The road kill permits help to reveal corridors and general habitat areas in Alton that deer and moose frequent.

Table:7 NH Fish & Game Road Kill Permits in Alton[52]

Location	Number of Permits	Deer/Moose	Percentage of Permits
Rt. 11E (Traffic Circle to New Durham)	10	8/2	15.8%
Rt. 28S (Stockbridge Corner Rd. to Lamper Rd.)	7	5/2	11.1%
Rt. 11W (Jesus Valley Rd.)	5	5/0	8%
Rt. 28S (Halfmoon Lake, Dudley Rd.)	3	3/0	4.7%
Rt. 11W (Gilford to Traffic Circle, not including Jesus Valley Rd.)	12	11/1	19%
Rt. 28N (Traffic Circle to Wolfboro)	10	9/1	15.8%
Rt. 140 (Alton Village to Gilmanton)	6	5/1	9.5%
Other (Rest of Alton)	10	8/2	15.8%

Source: New Hampshire Fish and Game Department. "Alton Road Kill Permits." Karen Cleveland, Data Manager NHF&G. 2002.

Rare/Endangered Species and Unique Natural Communities

Alton provides essential habitat for rare/endangered species, in addition to more common and abundant species. The New Hampshire Natural Heritage Inventory, state program responsible for tracking and researching the status of rare species and habitat in NH, has documented 14 locations in Alton that contain rare species or habitat. All but two of the rare species known to exist in Alton are plants. The most well-known and documented rare species inhabiting Alton is the small whorled pogonia (*Isotria medeoloides*). The small whorled pogonia is a small orchid and is listed as a federally threatened and state endangered species. The forests of East Alton are home to the largest known small whorled pogonia population in the world.[53] Other rare/endangered species known to have inhabited Alton include: Blanding's turtle, Bailey's sedge, flatstem pondweed, green adder's-mouth, large marsh bedstraw, smooth rock-cress, sprout muhlenbergia, and round whitefish. Only one unique natural community has been documented in Alton by the NHNHI: SNE Acidic Rocky Summit/Rock Outcrop Community, which has been found to exist in 18 locations across the state.[54] Rare black gum trees and swamps, the oldest trees in the state, have been documented in a few locations in Alton near Lake Winnipesaukee.[55] It is important to note that it is likely there are other rare species and unique natural communities in Alton that have not yet been discovered or documented. Alton has numerous areas in town that qualify as potential habitat for bald eagles and osprey. Rare/endangered species and unique natural communities contribute to maintaining the biodiversity of the town, state, and the world.

Atlantic Salmon and Salmon Habitat in Alton

When one thinks of salmon, images of the tremendous runs of Pacific salmon typically come to mind. Salmon remain an important component of the cultural identity of the Pacific Northwest, even though many runs are precariously close to extinction. Yet, salmon are still found in the Atlantic Ocean and its tributaries. Unlike its Pacific brethren, salmon in the Atlantic are comprised of only one species: Atlantic salmon (*Salmo salar).* Atlantic salmon are not cultural icons like Pacific salmon, mainly due to the fact that they have been hovering precariously close to extinction in New England for generations. Most of New England's rivers were tapped for their power in the 1700's and 1800's with the construction of thousands of dams. The dams along the main stems of the region's major rivers (Connecticut, Merrimack, Saco etc...) blocked salmon from returning to their natal breeding grounds. Dams, in concert with habitat alteration that consumed large percentages of many watersheds and over-fishing, led to the disappearance of Atlantic salmon throughout much of its historical range.[56] Many efforts have been made to restore Atlantic salmon to New England's rivers, but these have mainly been measures, such as stocking hatchery fish, that ignore the complex ecological and social realities that led to the decline of Atlantic salmon in the first place. Only a few rivers in Maine have what could be considered marginally healthy salmon populations in comparison to other contemporary New England rivers and not historical population levels.

However, healthy Atlantic salmon populations exist in many of northern New England's lakes. For some evolutionary reason or another, these Atlantic salmon do not go to the ocean after they are large enough. Rather they emerge from their natal streams and spend their adult lives consuming smelt in freshwater lakes, thus they are known as "landlocked salmon." Lake Winnipesaukee is New Hampshire's largest landlocked salmon fishery and the only lake in Alton that contains salmon.[57] Atlantic salmon have an interesting and complex life history that science is just beginning to unravel.

Landlocked salmon return to their natal streams to spawn every fall. In Alton, the Merrymeeting River and West Alton Brook are two of the main breeding grounds for salmon. Salmon enter these streams as early as October, although the largest migration and spawning activity occurs from November through early December. Salmon seek out gravelly areas of the streams typically near fast water and they then prepare their spawning beds known as "redds." The females lay their eggs in the gravel beds and the males fertilize them. They then cover them with gravel and repeat the process until the female is spent of eggs. Females produce an average of 700 eggs per pound of body weight. Atlantic salmon usually do not die after spawning and they will either return to the lake immediately or in the spring. Atlantic salmon can spawn more than once although rarely more than three times.[58] The eggs hatch sometime in April or May depending upon conditions and the hatchlings, known as alevins, remain in their gravel beds for protection from predators and absorb their large yolk sac. After a month the alevins emerge from the gravel and are now about one inch long and known as parr or fry. Parr eat mainly aquatic insects, but will also eat other invertebrates. Parr usually live in shallow riffle areas that have gravel or stony bottoms during the summer months and in the winter they stay under rocks. After about 2-3 years, parr are about six inches long and known as smolts.[59] Smolts leave their natal streams to primarily feed on smelt in the lake. The salmon then return to the streams in 1-3 years to start the process all over again.

Average size of landlocked salmon in Lake Winnipesaukee is 3.5 pounds, although they can get as large as 10-15 pounds. New Hampshire Fish and Game stocks Lake Winnipesaukee with salmon to supplement natural reproduction. Salmon in freshwater are usually a bronze-purple color on the top with silvery sides. The name salar comes from the Latin "salio" which means to leap. Atlantic salmon can make leaps 12 feet high and 16 feet long. Typical life expectancy is 6-8 years with a few individuals living more than a decade.

Salmon require cold, well-oxygenated water in every cycle of their life. For this reason salmon are most active during early spring and late fall. In the summer, salmon reside in depths ranging from 20 to 80 feet. Efforts made to maintain the health of Lake Winnipesaukee will in turn help to maintain healthy salmon populations. More research is required to better understand smelt populations in Lake Winnipesaukee. Smelt, like salmon, use tributaries of the lake to reproduce. Smelt enter the Merrymeeting and other tributaries in early spring, usually sometime in April, to spawn. Since smelt comprise the vast majority of landlocked salmons' diet, the health of the salmon population is directly correlated to that of smelt.[60]

As has already been mentioned, the Merrymeeting River and West Alton Brook are the town's two main spawning streams. This is based on information obtained in a survey of Alton's streams conducted in November 2001. The Merrymeeting River and West Alton Brook were the only streams where salmon were observed. This does not mean that other tributaries to Lake Winnipesaukee do not contain salmon habitat.

Value of Lake Winnipesaukee Tributaries as Salmon Habitat

Merrymeeting River: The Merrymeeting River has the highest salmon habitat value of any tributary feeding Lake Winnipesaukee. The Merrymeeting has historically been an important contributor to the Lake's salmon fishery and that legacy continues. Approximately 1.15 miles of the Merrymeeting is available to salmon due to the dam.[61] The most valuable section of the Merrymeeting for salmon is a 0.5 mile section from the base of the dam to where the river makes a left turn near the junction of Letter S road and Rt. 11. This section contains the fastest moving water and thus the highest percentage of gravel substrate because the flow is fast enough to keep the gravel beds free of sediment. In November 2001, scores of salmon were observed utilizing this section of the river. The quality of the Merrymeeting River salmon and coldwater fish habitat has been degraded through the years due to a variety of factors including: non-point source pollution, eutrophication, exotic species (mainly milfoil) and competition from warmwater species. Non-point source pollution contributes sediment and nutrients that cover gravel beds and reduce oxygen levels. Milfoil has colonized a large percentage of the river bottom making it unsuitable for salmon to spawn. Bass and pickerel compete with coldwater species for food and prey on young salmon and trout. Also Letter S road runs alongside some of the most valuable salmon habitat with little or no buffer. There are also several storm drains that deposit large quantities of sediment in this section of the river. Currently, NH Fish and Game stocks approximately 9,400 fingerlings and 13,759 unfed fry landlocked salmon in the river each year.[62]

West Alton Brook (Post Office Brook): West Alton Brook provides high value salmon habitat. In excess of fifty salmon were observed in the lower reach of the brook in November 2001. From where the brook empties into Smalls Cove to approximately 0.5 mile upstream is the most valuable habitat for salmon, although more potential habitat exists upstream. The water is crystal clear and there is a good quantity of gravel throughout. Salmon were observed from the mouth to 0.2 miles past the Rt. 11 bridge although it is assumed there were more upstream. Most of the salmon were quite healthy with nice girth. Average size of the fish was approximately 3-4 pounds. West Alton Marina mows very close to the brook's edge leaving little to no forested buffer and it appears the brook is used as a leaf dump by the marina and residents along the brook. Given the mostly undeveloped nature of the brook's watershed it does not face as many threats to its integrity as the Merrymeeting. NH Fish and game stocks 350 brook trout annually in the brook.[63]

Beaver Brook: Beaver Brook has high value as potential salmon habitat. A site visit conducted on the lower reach in November 2001 recorded no salmon, however, two trout

(12-14" in length) were observed and they may have been spawning. According to residents, salmon have historically used the brook. The brook is large enough and has adequate food supply and substrate for salmon. Most of the brook's bank is well forested except at road crossings and natural wetlands. Beaver Brook has the third largest watershed of any brook in Alton.[64] Currently, NH Fish and Game stocks 1,200 brook trout in the brook each year.[65]

Hurd Brook: Hurd Brook has low to moderate value as potential salmon habitat. No salmon were observed on a site visit conducted in November 2001. Substrate is largely boulders in the lower reach and sand in the upper reaches with small pockets of gravel. Numerous small fish (2-4") were observed that could possibly have been parr or native brook trout. If more extensive surveys reveal that Hurd Brook is not a salmon stream, than it should be managed for brook trout. Hurd Brook drains a watershed of approximately 3,000 acres and is one of the larger brooks in town.[66] Currently, most of its watershed is undeveloped and its banks are mostly forested except along its extensive wetlands and road crossings. NH Fish and Game stocks 350 brook trout in the brook each year.[67]

Watson Brook: Watson Brook has moderate to low value as potential salmon habitat. The lower reach of the brook upstream from the lake is mainly a wetland with mucky/sandy bottom. No salmon were observed in the lower reach in November 2001, but the upper reaches were not examined. NH Fish and Game stocks 150 brook trout in the brook each year.[68]

Knights Pond Brook: Knights Pond Brook has low to marginal value as potential salmon habitat. No salmon were observed in the lower reach on a site visit conducted in November 2001. The brook has several diffuse channels when it reaches the Lake because of man made alterations and a wetland associated with its mouth. Most likely salmon do not utilize the brook, due to a lack of suitable habitat and adequate food supply.

Minge Brook: Minge Brook has low to marginal value as potential salmon habitat. No salmon were observed on a site visit conducted in November 2001. There is a small amount of moderate value potential habitat near the lake, but most of the brook has little to no value due to its small size and steep gradient. According to residents, salmon have utilized the lower portion of the brook in the past.

Cascade Brook: Cascade Brook has marginal value as potential salmon habitat. No salmon were observed on a site visit conducted in November 2001. There is a small amount of moderate value potential habitat near the lake, but most of the brook has no value because of the steep waterfalls that prohibit salmon passage.

Soils and Topographical Features

Alton's Important Agricultural Soils[69]

The Soil Conservation Service has rated 2,271 acres in Alton as prime farmland.[70] This is 5.6% of Alton's land base. The greatest concentrations of prime agricultural soils are located between and adjacent to Rt. 140 and Rt. 28 in south Alton and along the east side of the Merrymeeting River and Rt. 28 north past the traffic circle.[71] There are approximately 1,100 acres enrolled in Current Use as farmland as of 2000.[72] Only four active farms, comprising 704 acres, remain in town.

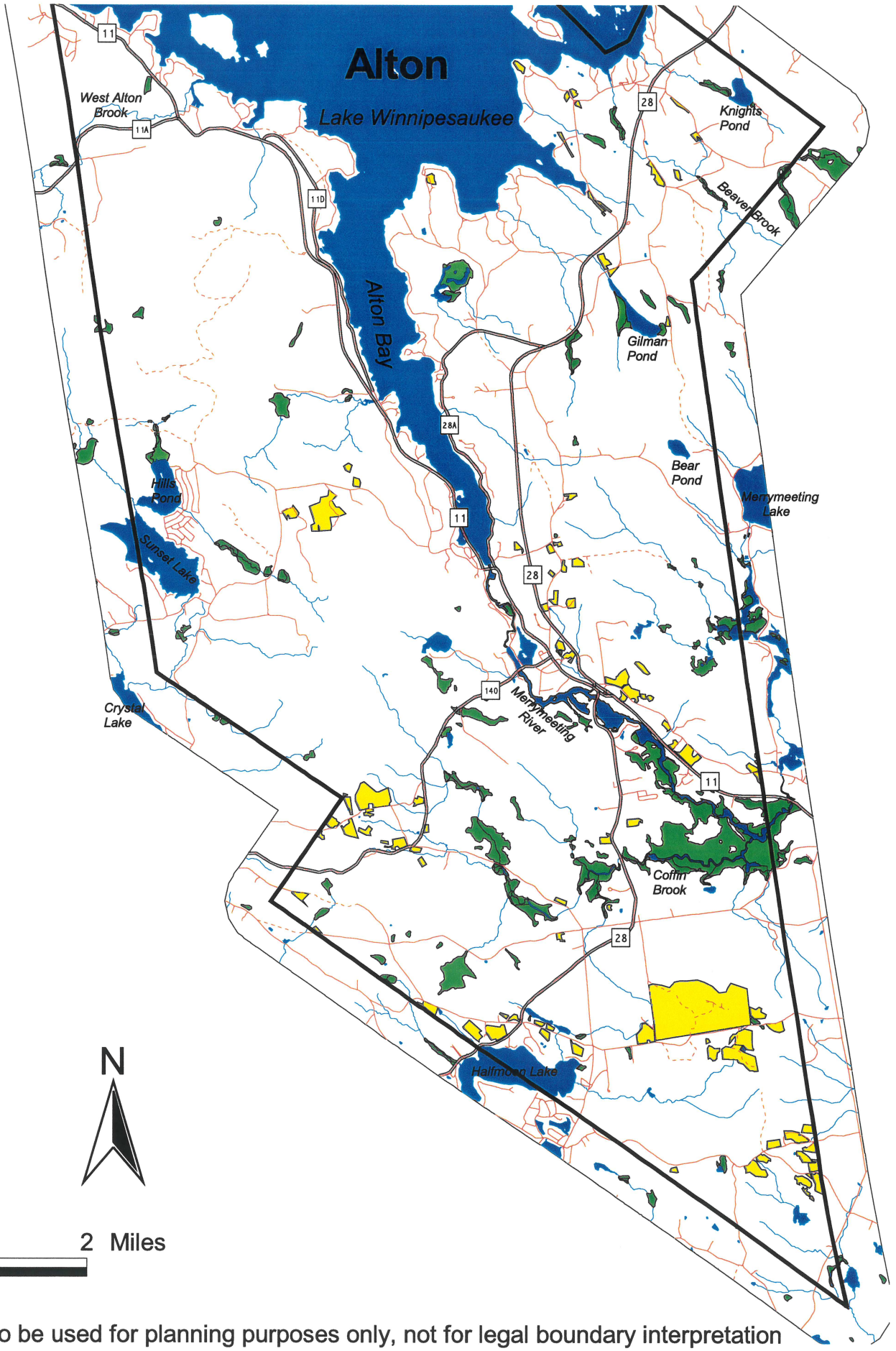
Charlton: Loam, 3 to 25% slope. A well drained soil found on crests of hills and plains of the glaciated uplands. Depth to bedrock is more than five feet. Lower slopes are suited for growing hay, pasture and row crops; whereas higher slopes, greater than 8% are suited for hay and pasture. The largest concentrations of Charlton soils are found near the traffic circle east of Rt. 11 and along Muchado Hill Rd.

Gloucester: Sandy loam, 3 to 25% slope. A well drained soil found on plains and hilltops of the glaciated uplands. Depth to bedrock is generally more than five feet. Lower slopes are suited for growing hay, pasture and row crops; whereas higher slopes, greater than 8% are suited for hay and pasture. Largest concentrations of Gloucester soils are found near the traffic circle east of Rt. 11 and there are few other scattered locations throughout town.

Paxton: Loam, 0 to 25% slope. A well drained soil found on the crests of smooth sided hills of the glaciated uplands. Depth to bedrock is generally more than five feet. Lower slopes are suited for growing hay, pasture and row crops; whereas higher slopes, greater than 8% are suited for hay and pasture. Paxton soils are the most abundant and well distributed important agricultural soils in Alton. Large concentrations of Paxton soils can be found near the traffic circle east of Rt. 11, along Rt. 140 near the Gilmanton town line, near Halfmoon Lake along Prospect Mountain Rd., along Muchado and Meaderboro roads in extreme south Alton, Stockbridge and Dudley roads and on Alton Mountain.

Woodbridge: Loam, 0 to 15% slope. A moderately well drained soil found on concave lower foot slopes and on broad crests of smooth landforms in the glaciated uplands. The areas are generally somewhat oblong. Depth to bedrock is more than five feet. Lower slopes are suited for growing hay, pasture and row crops; whereas higher slopes, greater than 8% are suited for hay and pasture. No significant concentrations of Woodbridge soils exist in Alton; rather Woodbridge soils can be found scattered within areas that contain a high concentration of agricultural soils such as Muchado/Meaderboro Rd., near the traffic circle east of Rt. 11, near Halfmoon Lake, Dudley Road, and along Rt. 140 near the Gilmanton town line.

Alton: Agricultural Lands



Legend

- Agricultural Land
- Lake/Pond
- Wetland
- Stream
- Town Boundary
- Local Road

Data Sources:

Agricultural land data derived from 1998 USGS Digital Orthophoto Quads. Last revised December, 2001 Granit. Original Scale 1:12,000.

Hydrography data obtained from USGS, last revised October, 1995. Original scale 1:24,000

Road data obtained from USGS, last revised October, 1995. Original scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
February 11, 2002.

USGS

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Scale 1:75,000

This map is to be used for planning purposes only, not for legal boundary interpretation

Farms in Alton[73]

Bauman Farm: Located on Halls Hill Road. A 365 acre diversified farm that raises cattle, horses, and hay.

Calvert Farm: Located on New Durham Road. This 21 acre farm leases land to farmers in the area. Currently the farm is used for the raising of cattle and hay.

Morse Farm: One of the oldest, if not the oldest farm in town located on Alton Mountain Road. A variety of livestock are raised on this 200 acre farm including cattle, sheep, and chickens.

Foulkes Blueberries: Encompassing the summit of Prospect Mountain, Foulkes farm is a commercial blueberry operation consisting of 118 acres.

Alton's Important Forest Soils[74]

Forests cover nearly 29,000 acres or 71% of Alton's land base. Before European settlement began in earnest a little over two hundred years ago, nearly all of Alton, besides the lakes, ponds, rivers, and open wetlands, was forested. Thus, except for the very poorly drained hydric soils, almost all soils in town are suitable to varying degrees for growing trees. Some soils are more productive for certain tree species or groups of species than others. Also some soils pose more serious forest management constraints than others due to slope, stoniness or erosion potential. Productive forest soils are a regionally important natural resource that deserve protection and wise stewardship.

Charlton: Very stony loam, 3 to 60% slope. This well drained soil is found on crests of hills and plains of the glaciated uplands. Stones averaging 20 inches in diameter are 10 to 50 feet apart and cover 0.5 to 3% of the surface area. Depth to bedrock is generally more than five feet. These soils are well suited to growing high quality hardwood veneer and sawtimber, especially sugar maple, white ash, yellow birch, and northern red oak. Early to mid-successional stands frequently contain a variety of hardwoods such as northern red oak, red maple, beech, sugar maple, yellow, gray and white birch, white ash, aspen in varying combinations with white pine, red pine, eastern hemlock and red spruce. These soils are not abundant in Alton. Largest concentrations occur in the Muchado Hill Road area of south Alton and in east Alton near Old Wolfeboro Road.

Deerfield: Loamy sand, 0 to 8% slope. This moderately well drained soil is found on glacial outwash plains and stream terraces. Permeability is rapid in the subsurface and very rapid in the subsoil substratum. Available water capacity is low. Depth to bedrock is more than five feet. These soils are well suited to growing high quality softwood sawtimber, especially white pine, in nearly pure stands. Successional trends on these soils are toward stands of shade tolerant softwoods i.e., red spruce and hemlock. White pine, red maple, aspen, gray and paper birch are common in early and mid-successional

stands. With modest levels of management, white pine can be maintained and naturally reproduced on these sites. Only a tiny fraction of Alton's soils are composed of the Deerfield type. A few scattered parcels of Deerfield soils are located in West Alton near brooks.

Gloucester: Very stony sandy loam, 3 to 60% slopes. This well drained soil is found on glaciated upland plains and hilltops. Stones averaging 20 inches in diameter are 10 to 50 feet apart and cover 0.5 to 3% of the surface area. Available water capacity is high. Depth to bedrock is generally more than five feet. These soils are well suited to growing hardwoods such as white birch and northern red oak that are less nutrient and moisture demanding than other species. Successional trends on these soils are toward a climax of tolerant hardwoods, predominantly beech. Early and mid-successional stands are commonly composed of hardwood species such as northern red oak, beech, red maple, sugar maple, white and yellow birch, white ash and aspen in varying combinations with white pine, hemlock and red spruce. Softwoods may be scarce to moderately abundant and generally are managed in groups or as part of a mixed stand. Once slopes exceed 25% forest management becomes more difficult and costly due to the steep slopes themselves, bedrock outcrops, surface boulders, extreme stoniness and erosion potential. Forest management activities occurring on slopes greater than 25% must employ best management practices to mitigate their impact to the site and surrounding resources. Gloucestster soils are one of the most abundant and well distributed soil types found in Alton. Almost all areas of Alton contain some variation of the Gloucester soil type.

Hinckley: Loamy sand, 0 to 15% slope. This excessively drained soil is found on glacial outwash plains and terraces. Permeability is rapid to very rapid. Available water capacity is low. Depth to bedrock is more than five feet. These soils are well suited to growing high quality softwood sawtimber, especially white pine, in nearly pure stands. Successional trends on these soils are toward stands of shade tolerant softwoods i.e., red spruce and hemlock. White pine, red maple, aspen, gray and paper birch are common in early and mid-successional stands. With modest levels of management, white pine can be maintained and naturally reproduced on these sites. The Hinckley soil type is moderately abundant in Alton, however its distribution is limited. The greatest concentration of Hinckley soils is found near and along Coffin Brook and the Merrymeeting River.

Paxton: Very stony loam, 3 to 60% slope. This well drained soil is located smooth sided hills of the glaciated uplands. Stones averaging 20 inches in diameter are 10 to 50 feet apart and cover 0.5 to 3 percent of the surface area. Permeability is moderate in the solum and slow to moderately slow in the compacted substratum, or hardpan. Available water capacity is moderate. The dense hardpan is at depths of 18 to 36 inches and limits the rooting depths of plants. Depth to bedrock is generally more than five feet. These soils are well suited to growing high quality hardwood veneer and sawtimber, especially northern red oak, sugar maple, yellow birch and white ash. Early to mid-successional stands frequently contain a variety of hardwoods such as northern red oak, red maple, beech, sugar maple, yellow, gray and white birch, white ash, aspen in varying combinations with white pine, red pine, eastern hemlock and red spruce. Successional

trends are usually towards a climax of tolerant hardwoods i.e. sugar maple and beech. Softwoods are usually less abundant and are best managed as a minor component of predominantly hardwood stands. Once slopes exceed 25% forest management becomes more difficult and costly due to the steep slopes themselves, bedrock outcrops, surface boulders, extreme stoniness and erosion potential. Forest management activities occurring on slopes greater than 25% must employ best management practices to mitigate their impact to the site and surrounding resources. Paxton soils are fairly abundant and can be found in all portions of town except the Belknap Mountains.

Windsor: Loamy sand, 0 to 60% slope. This excessively drained soil is found on glacial outwash plains, terraces and escarpments. Permeability is rapid to very rapid. Available water capacity is very low. Depth to bedrock is greater than five feet. These soils are well suited to growing high quality softwood timber, especially white pine, in nearly pure stands. Successional trends on these soils are toward stands of shade tolerant softwoods i.e., red spruce and hemlock. White pine, red maple, aspen, gray and paper birch are common in early and mid-successional stands. With modest levels of management, white pine can be maintained and naturally reproduced on these sites. Once slopes exceed 25% forest management becomes more difficult and costly due to the steep slopes themselves, bedrock outcrops, surface boulders, extreme stoniness and erosion potential. Forest management activities occurring on slopes greater than 25% must employ best management practices to mitigate their impact to the site and surrounding resources. Only a small amount of Windsor soils exist in Alton and they are mainly concentrated along the east side of Alton Bay, near the Gilmanton town line and along Rt.11A.

Woodbridge: Very stony loam, 0 to 15% slope. This moderately well drained soil is on broad crests, concave lower foot slopes, and along drainageways of smooth landforms of the glaciated uplands. Stones averaging 20 inches in diameter are 10 to 50 feet apart and cover 0.5 to 3% of the surface area. Permeability is moderate in the solum and slow to moderately slow in the compacted substratum or hardpan. Depth of hardpan is 18 to 32 inches and limits the rooting depth of plants. Available water capacity is moderate. Depth to bedrock is more than five feet. These soils are well suited to growing high quality hardwood veneer and sawtimber, especially northern red oak, sugar maple, yellow birch and white ash. Early to mid-successional stands frequently contain a variety of hardwoods such as northern red oak, red maple, beech, sugar maple, yellow, gray and white birch, white ash, and aspen in varying combinations with white pine, red pine, eastern hemlock and red spruce. Successional trends are usually towards a climax of tolerant hardwoods i.e. sugar maple and beech. Softwoods are usually less abundant and are best managed as a minor component of predominantly hardwood stands. A moderate amount of Woodbridge soils can be found rather well distributed throughout town with the exception of the Belknap Mountains.

Hydric (Wetland) Soils[75]

Hydric soils are those soils classified by the Natural Resource Conservation Service as being either poorly or very poorly drained. In Alton 3,320 acres are classified as very

poorly drained and 1,297 acres are classified as poorly drained. Poorly drained soil types found in Alton include: Ridgebury, AuGres, Rumney, mixed alluvial and Scarboro. Very poorly drained soils include: marsh, muck and peat, and Whitman. Hydric soils, especially very poorly drained soils, are usually associated with wetlands. Distribution of hydric soils in Alton is very similar to that of wetlands.

Au Gres: Loamy sand, 0 to 8 percent slope. This poorly drained to somewhat poorly drained soil is found in depressions on glacial outwash plains and stream terraces. The areas are generally irregular or oblong. Depth to bedrock is more than 5 feet. The seasonal high water table is between the surface and a depth of 1.5 feet from December through April.

Marsh: Moderately decayed organic matter 16 inches to more than 51 inches thick, 0 to 1 percent slope. This very poorly drained soil is found in marshes, beaver ponds, and along the border of lakes, ponds and major streams. Usually covered by shallow water most of the year.

Muck and Peat: This nearly level, very poorly drained soils is found in depressions on outwash plains, terraces, glaciated uplands and along borders to lakes, ponds, and streams. The areas are generally irregularly shaped. Depth to bedrock is more than 5 feet. A high water table is between a depth of 1 foot above the surface and 1 foot below the surface from September through June.

Ridgebury: Loam and very stony loam, 0 to 8 percent slope. This poorly drained to somewhat poorly drained soil is found in depressions and along drainageways of the glaciated uplands. The areas are somewhat oblong, long and narrow or irregularly shaped. Depth to bedrock is more than 5 feet. The seasonal high water table is between the surface and a depth of 1.5 feet from November through May.

Rumney: Fine sandy loam, 0 to 3 percent slope. This poorly drained soil is found in depressions and on low bottoms of floodplains. The areas are long and narrow or oblong. The high water table is between the surface and 1.5 feet from September through June. This soil is subject to frequent flooding which generally occurs between October and May.

Scarboro: Fine sandy loam, 0 to 3 percent slope, but dominantly less than 1 percent slope. This very poorly drained soil is found in depressions and along drainageways on glacial outwash plains and terraces. The areas are irregular or are long and narrow. Depth to bedrock is more than 5 feet. The high water table is between a ponded depth of 1 foot above the surface and 1 foot below the surface from September through July.

Whitman: Very stony loam, 0 to 8 percent slope. This very poorly drained is found in upland basins, on the lower sides of hills and along drainageways. Depth to bedrock is more than 5 feet.

Steep Slopes

Steep slopes are noteworthy mainly for the constraints they pose to development. Steep slopes are considered those areas where slope is 15% or greater. Given the mountainous and hilly topography of Alton one would assume that the town contains a large amount of steep slopes and indeed it does: 4,500 acres in Alton (11% of land base) has a slope of 25% or greater. West Alton, due to the presence of the Belknap Mountains and Alton/Rocky Mountains, possesses the majority of steep slopes in town. Some steep slopes are scattered along the shores of Lake Winnipesaukee and hills of east Alton. Prospect Mountain area also has a significant amount of steep slopes.[76] Developing steep slopes is a costly proposition both monetarily and ecologically. Expensive engineering methods must be employed to ensure proper drainage and septic system design on steep slopes. Even utilizing the best engineering methods there will be an ecological cost in terms of erosion of topsoil which leads to increased sediment loads in the brooks and less productive soils in the uplands. Steep slope areas in Alton, because of the extra expense associated with developing them, have typically been avoided (except along the lakes where the return outweighed the cost) and as a result they are usually a significant component of some of the town's largest areas of open space.[77] Thus, another reason steep slopes should not be developed in Alton is the ecological degradation that results from fragmentation of open space areas.

Alton is generally a town of rugged topography. Elevation varies from as low as 504ft at Lake Winnipesaukee to as high as 1910ft atop Straightback Mountain. Many hills and mountains traverse the landscape. Combined with the many surface water features in town the hills and mountains contribute greatly to the aesthetic beauty and appeal of the community.

Table 8: Hills in Alton (greater than 850 ft in elevation)[78]

Avery	**1461 ft**	**West Alton, just east of Hills Pond.**
Cates	**1080 ft**	**East Alton, northeast of Gilman Pond.**
Evans	**1014 ft**	**Near Rt. 28A and Trask Swamp.**
Hardhead	**880 ft**	**Between Roberts and Chestnut Coves.**
Hayes	**942 ft**	**East Alton, south of Rines Hill.**
Rines	**1020 ft**	**East Alton, south of Knights Pond.**

Table 9: Mountains in Alton[79]

Alton	**1489 ft**	**West Alton, off Alton Mountain Rd.**
Mt. Bet	**1400 ft**	**East Alton, straddles New Durham townline.**
Cedar	**1082 ft**	**West Alton, south of Mt. Major.**
Mt. Major	**1786 ft**	**West Alton, near Rt. 11.**
Prospect	**1440 ft**	**South Alton, summit is blueberry farm.**
Ragged	**1340 ft**	**Extreme South Alton.**
Rocky	**1421 ft**	**West Alton, south of Alton Mountain.**
Straightback	**1910 ft**	**West Alton, most remote section of town.**

Alton: Steep Slopes

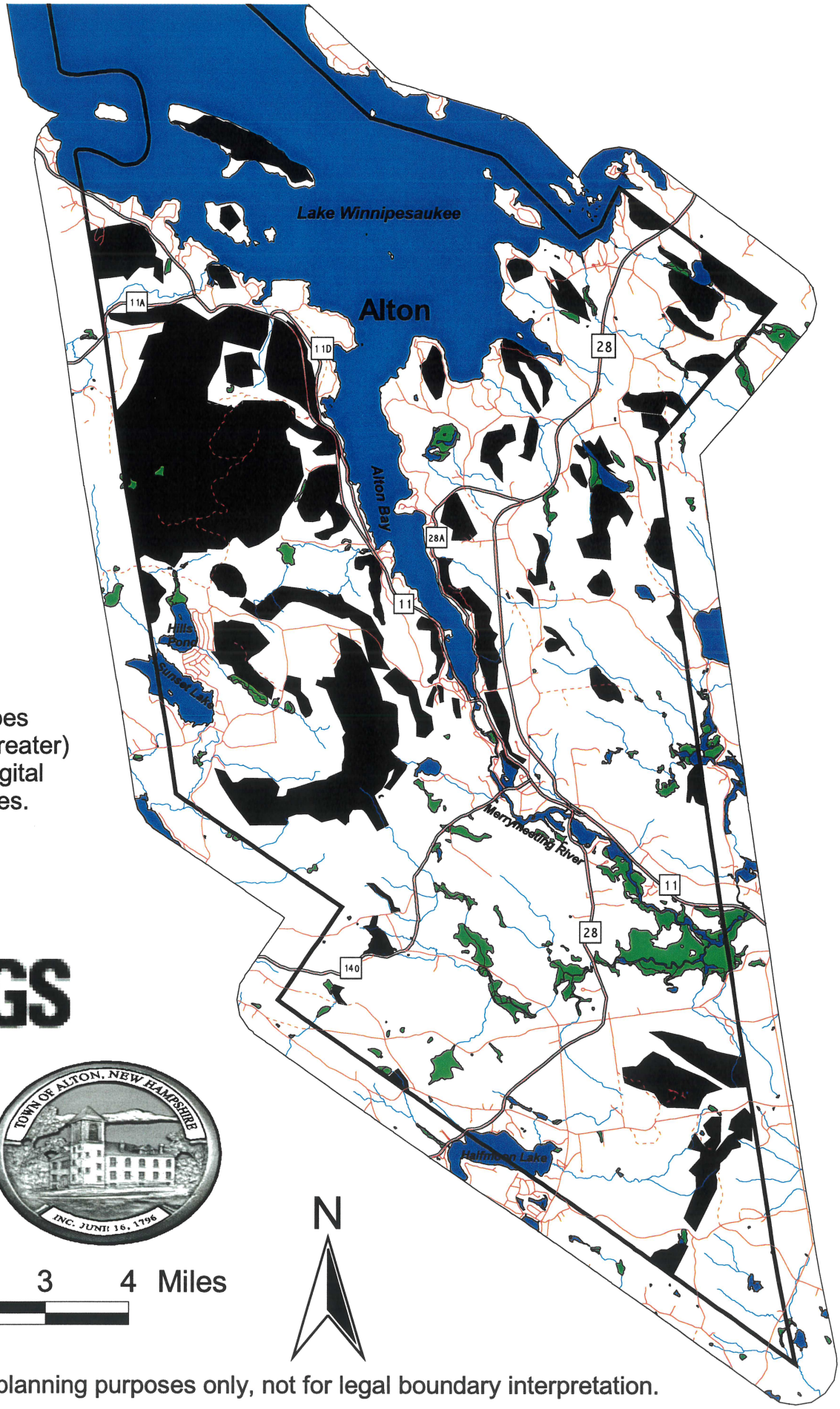
Legend

- Steep Slopes (Slope >15%)
- Wetland
- Lake/Pond

Data Sources:
Hydrography data obtained from USGS, last revised October, 1995. Original Scale 1:24,000.

Steep slope data created by GIS analysis of Digital Raster Graphics obtained from USGS, last revised Fall, 1997. Original Scale 1:24,000. Slopes of 15% or greater where digitzed based on twenty foot contour lines.

Map Created By:
Charles Hersey
Natural Resource Specialist
March 18, 2002



Total Acreage of Steep Slopes in Alton (slopes of 15% or greater) based on GIS analysis of Digital Raster Graphics: 9,224 acres.

USGS

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TOWN OF ALTON, NEW HAMPSHIRE
INC. JUNE 16, 1796

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Scale 1:75,000

This map is to be used for planning purposes only, not for legal boundary interpretation.

Forests

Forests are by far the dominant natural feature of Alton. A variety of forest types cover nearly **29,000 acres** or **71%** of the town's land base.[80] Forests are a unique ecosystem in their own right, but they are also intimately connected to other ecosystems in town. Alton's forests help to maintain the water quality of the town's lakes, rivers, groundwater, and wetlands by trapping nutrients and sediment and moderating peak and low flows.[81] Many species of wildlife are directly and indirectly dependent upon forests for their health and survival. The abundance of forests in Alton greatly adds to the town's aesthetic appeal and recreational opportunities. Most hiking and snowmobile trails are in the forests and the myriad of colors every fall are the results of the many different tree species inhabiting Alton. Many landowners, including the town, actively manage their forestland for the sustainable production of forest products. Forest management activities provide taxes to the town and a supply of locally grown, responsibly harvested forest products that contribute to the region's sustainable forest economy. The diversity of tree species allows for a diversity of products and management techniques that sustain, rather than degrade the forest.

Forest Types and Tree Species in Alton

When describing forests, most people refer to forest types or forest communities. Forest types are generic classifications of species that are associated with one another due to soils, climate, and intrinsic species qualities. A variety of forest types inhabit New England: boreal forest, northern hardwoods, oak-pine, pine barrens, transition forest and others. When talking on a regional scale, forest types are helpful in making general distinctions between areas. On a local scale, however, forest types lose much of their meaning. Forest composition is affected by a number of interrelated factors, the most important being: soil, climate, elevation, aspect, intrinsic species qualities, past land use, disturbance regime, pests, diseases, herbivores and other factors. Locally, these factors can be quite different than they are regionally thereby limiting the usefulness of forest type classification.

Given this caveat, forest types are still effective as a general introduction to the forests of an area. The main forest type or community in Alton is known as the **transition forest.** The transition forest is exactly what the name suggests, a transition between the northern hardwood and spruce-fir forests of northern New Hampshire and the oak-pine-hemlock forests of southern New Hampshire.[82] Alton's forests are a rich mosaic of northern and southern species. Northern species, such as sugar maple, beech, yellow birch, and spruce can be found alongside red oak, white oak, hemlock, and white pine commonly found in more southern locales. Depending upon numerous factors, one can find stands in town that are nearly pure examples of northern species or southern species or more commonly a mixture of both. Along Coffin Brook and the Merrymeeting River past land use and the sandy soils left by the glacier have combined to create extensive stands of white pine and oak. In the Belknap Mountains with different soils, climate, disturbance regime and land use history, northern species such as beech and sugar maple are more prevalent.

The most common tree species found in Alton are: white pine, beech, white birch, sugar maple, hemlock, red oak, and the ubiquitous red maple. Less common species found in town include: white ash, black birch, yellow birch, white oak, red pine, pitch pine, tamarack, black gum, balsam fir and red spruce. Forests are not just trees, they are a complex interaction of physical and biological factors. Various shrubs (blueberries) and herbaceous vegetation (ferns, orchids) along with numerous other plant, animal, insect, and microbial species call the forests of Alton home. Some species are very site specific, while others are more tolerant and widespread.

Table 10: Alton Tree Species[83]

Common Tree Species in Alton	Less Common Tree Species in Alton
Beech	**Balsam Fir**
Eastern Hemlock	**Black Birch (Sweet Birch)**
Red Maple	**Black Gum**
Red Oak	**Black Oak**
Sugar Maple	**Pitch Pine**
White Birch	**Quaking Aspen (Poplar)**
White Pine	**Pitch Pine**
	Red Pine
	Red Spruce
	Tamarack (Larch)
	White Ash
	White Oak
	Yellow Birch (Silver Birch)

Forest Management

Many landowners in town practice forest management on their properties. On average the town of Alton receives 36 notices of intents to cut timber per year. White pine is the tree species with the greatest volume of timber harvested each year. In the 1999/2000 and 2000/2001 tax years over 1.9 million board feet and over 1.6 million board feet of white pine were harvested respectively. Oak supplies the second greatest volume of timber harvested per year. In tax years 1999/2000 and 2000/2001 around 492,000 board feet of oak were harvested each year.[84] Other commonly harvested species include: beech, red maple, white ash, hemlock, white birch, yellow birch, sugar maple, and spruce.

Alton: Land Cover

Legend

Forest

- Deciduous
- Evergreen
- Mixed

Wetland

- Emergent
- Woody

- Surface Water
- Agricultural Land
- Shrubland
- Developed Land
- Stream

Data Sources:
Land Cover data obtained from USGS Multi-Resolution Land Characterization data set., last revised March 2000. 30-meter resolution.

Road data obtained from USGS, last revised 1995. Original Scale 1:24,000.

Stream data obtained from USGS, last revised 1995. Original Scale 1:24,000.

Map Created By:
Charles Hersey
Natural Resource Specialist
January 10, 2002.

USGS

TOWN OF ALTON, NEW HAMPSHIRE
INC. JUNE 16, 1796

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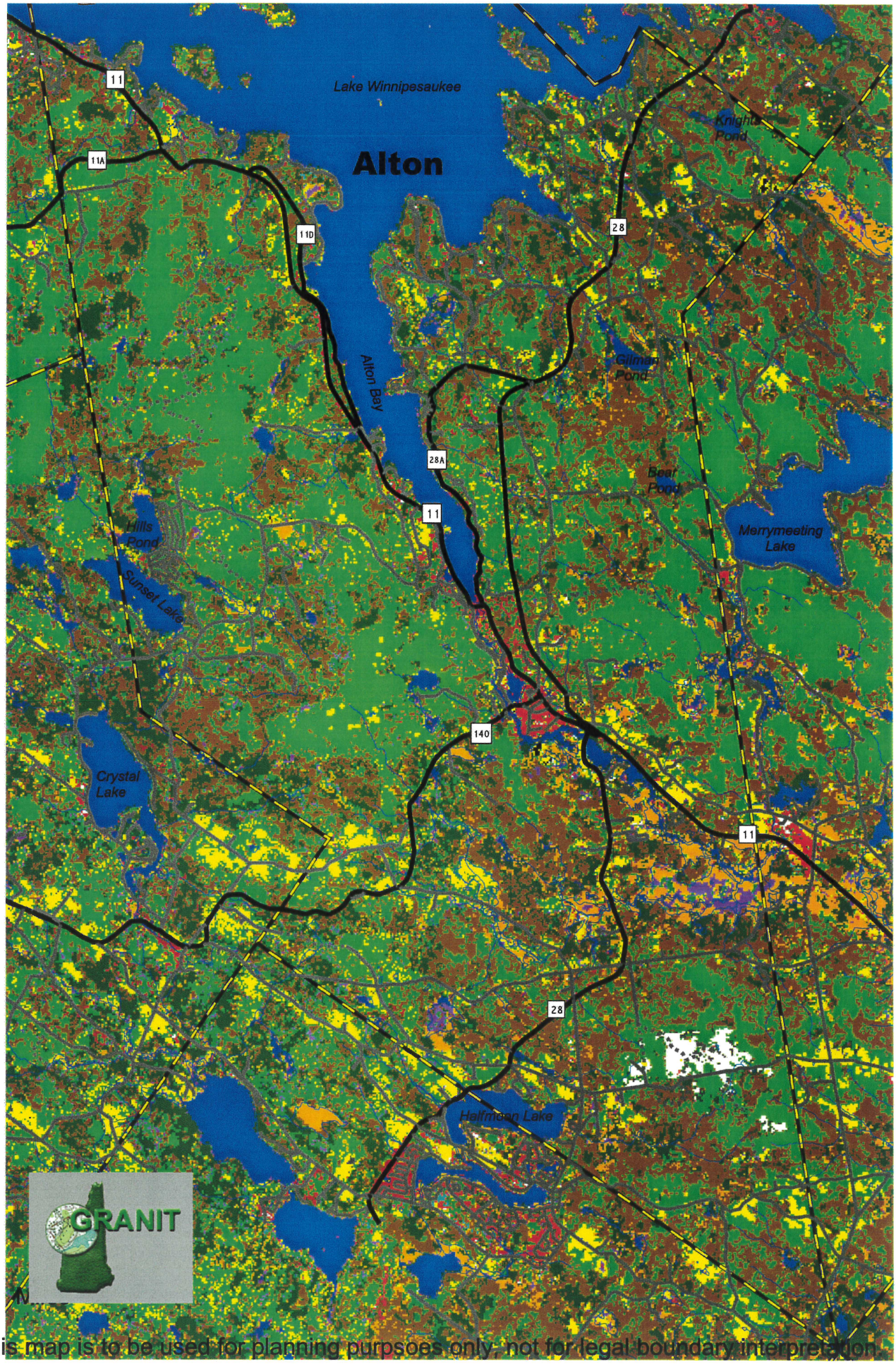
Scale 1:65,000



This map is to be used for planning purposes only, not for legal boundary interpretation.

Table 11: Total Volume of Sawtimber Harvested in Alton: Select Years[85]

Tax Year	Board Feet
1994/1995	3,373,006 BF
1999/2000	3,438,000 BF
2000/2001	3,117,000 BF

The Tree Farm program has a long history of recognizing and promoting sound forest stewardship in New Hampshire. In order for a property to be certified as a tree farm, the landowner must manage the land in ways that maintain the long-term integrity of its water, recreational and wildlife resources, as well as that of the timber resources. According to the New Hampshire Tree Farm Committee, there are a total of 15 tree farms in Alton encompassing 2,164 acres or approximately 5% of the town's land base.[86] Thus, a significant percentage of forestland in town is being managed in the long-term interest of the landowner, community and environment.

Shared Resources/Regional Context

Alton shares many natural resource features with neighboring communities. Three of the large unfragmented blocks of open space in Alton do not stop at the town's borders, but rather continue on into adjacent towns. Merrymeeting River open space area abuts hundreds of acres of forest and wetlands in New Durham which are apart of the same hydrological system. The Gilman and Bear Pond open space area abuts thousand of acres of undeveloped land in New Durham that connects to Shaw's Pond and Knights Pond. Belknap Mountain open space area in West Alton abuts thousands of acres of undeveloped land in Gilmanton and Gilford.[87] Obviously wildlife species do not live according to town boundaries, but rather the habitat they need to survive. The Merrymeeting River and its associated wetlands and uplands serve as an important wildlife corridor that allows species to meet their habitat needs in response to changing factors. The Merrymeeting has productive wildlife habitat near its shores and it provides access to large undeveloped tracts of land in Alton and New Durham.[88]

Some natural resources in town represent regionally rare/unique habitat as well. The Merrymeeting, Marsh Pond/Upper Merrymeeting, Coffin Brook, Gilman/Bear Pond, Rocky/Alton Mountain and Belknap Mountain open space areas contain a regionally significant amount of unfragmented land in the rapidly developing Lakes Region of NH.[89] Coffin Brook open space area possesses a unique mixture of wetlands, productive forest and agricultural land, and riparian habitat that is important for its value in maintaining the region's ecological integrity and the opportunity it presents for sustainable natural resource management ventures (farming and forestry). Merrymeeting open space area contains the largest wetland complex in Alton and in the region, thereby making it one of most regionally significant natural resource areas in town. Marsh Pond/Upper Merrymeeting open space area contains a regionally significant assemblage of diverse and productive wetlands. Gilman and Knights Pond are of statewide importance, due to their totally undeveloped and protected shoreline. The land surrounding Gilman and Knights Ponds also can be classified as globally important because of the habitat it provides for the largest known population of the federally threatened small whorled pogonia.[90]

Conclusion

Alton is fortunate to still contain many large, diverse parcels of open space. From the summits of the Belknap Mountains to the floodplains of the Merrymeeting River and Coffin Brook, the open space areas in Alton retain a remarkable diversity that contributes greatly to maintaining the ecological integrity and aesthetic beauty of the community. Also of note is the relative connectivity of the open space areas in Alton. Most open space areas in Alton are only separated from each other by a single road. Suburban sprawl has not yet taken over the community and fragmented it beyond hope, although that is a likely possibility. Many of the open space parcels in town are important not just to Alton, but are of regional, state, and even global importance due to their size and diversity. Mountains, a variety of forests, wetlands, brooks, rivers, lakes, ponds, endangered species habitat, riparian habitat, and early successional habitat can all be found in Alton's open space areas to varying degrees.

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[1] Kanter, John, Rebecca Suomala and Ellen Snyder. Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups. 2001. New Hampshire Fish and Game Department: Concord, NH. Pg. 17.

[2] Town of Alton. GIS Analysis of Alton Unfragmented Lands/Open Space Areas Map. 2001. Alton Conservation Commission.

[3] Kanter, John, Rebecca Suomala and Ellen Snyder. Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups. 2001. New Hampshire Fish and Game Department: Concord, NH. Pg. 17-18.

[4] Town of Alton. GIS Analysis of Alton Unfragmented Lands/Open Space Areas Map. 2001. Alton Conservation Commission.

[5] New Hampshire Department of Environmental Services. Granit Data Layer: Watershed Boundaries. 1994.

[6] Society for the Protection of NH Forests. Granit Data Layer: Conservation Lands. 2001.

[7] Natural Resource Conservation Service. Belknap County Soil Maps: Alton, NH. 1968.

[8] Society for the Protection of NH Forests. Granit Data Layer: Conservation Lands. 2001.

[9] Town of Alton. GIS Analysis of Alton Land Cover Map. 2002. Alton Conservation Commission.

[10] Town of Alton. GIS Analysis of Alton Steep Slope Map. 2001. Alton Conservation Commission.

[11] Town of Alton. GIS Analysis of Alton Wetland Resources Map. 2001. Alton Conservation Commission.

[12] Natural Resource Conservation Service. Belknap County Soil Maps: Alton, NH. 1968.

[13] Society for the Protection of NH Forests. Granit Data Layer: Conservation Lands. 2001.

[14] Town of Alton. GIS Analysis of Alton Wetland Resources Map. 2001. Alton Conservation Commission.

[15] Natural Resource Conservation Service. Belknap County Soil Maps: Alton, NH. 1968.

[16] Society for the Protection of NH Forests. Granit Data Layer: Conservation Lands. 2001.

[17] Society for the Protection of NH Forests. Granit Data Layer: Conservation Lands. 2001.

[18] NH Natural Heritage Inventory. Granit Data Layer: Natural Heritage Inventory. 2000.

[19] Gawler, Susan C. and Hank Tyler. The Small Whorled Pogonia: A Recovering Endangered Species. 1995. United States Fish and Wildlife Service. Brochure.

[20] New Hampshire Department of Environmental Services. Granit Data Layer: Watershed Boundaries. February, 1994.

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