



Stewardship Plan for Page Pond Community Forest

*Meredith, NH
Belknap County
January, 2019*

**Submitted by:
Meredith Conservation Commission
Meredith, NH**

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I. Project Background:

Introduction

This is an update to the original Page Pond Stewardship Plan to include an additional 199 acres that were conserved and added to existing property in 2017. The combined property was approved by the town as a Community Forest at Meredith's 2018 town meeting and named the "Page Pond Community Forest, hereinafter "the Property".

This Stewardship Plan for the Property is submitted on behalf of the Meredith Conservation Commission (MCC) and the town of Meredith. The 765+/- acre Property in Meredith, New Hampshire has been managed for timber and agriculture for over a hundred years. The Town of Meredith will manage the Property for wildlife habitat, sustainable timber management, watershed protection, agriculture, and low impact public recreation. Permanent conservation of the Property achieves multiple community benefits, including protecting critical wildlife habitat, prime wetlands and water quality, providing recreational and educational resources, protecting historical and culturally significant aspects of Meredith's past, preserving a working landscape, and helping to protect a completely undeveloped 19-acre Great Pond (Page Pond).

In its entirety, the Property represents approximately one half of the largest unfragmented block of land in the eastern half of Meredith. The 1,400+ acre unfragmented block is surrounded by high-density development along the shores of Lake Winnepesaukee, and therefore has extremely high development potential. The Property, less than ½ mile from Lake Winnepesaukee, sits at the very core of this unfragmented land, and has been largely undisturbed since the days of previous pasturage over 140 years ago. (See Map A: Topographical Map)

Community Plan of the Town of Meredith

The Property, located in the center of Meredith Neck, has been a high priority for conservation by the Town of Meredith for over 25 years. This specific area of Meredith Neck was first identified for resource protection and public access in Meredith's first master plan in 1969 (Hans Clunder Associates, 1969: Section III, pIII-38 and Section IV, pVI-12). In 1990, the Town was very close to acquiring a conservation easement over the property, but was ultimately unsuccessful.

The Town of Meredith is actively pursuing conservation strategies to protect waterfront, riparian and groundwater resources. In the Town of Meredith's 2002 Community Plan, the Property was specifically identified as a priority area for protection (Edgar, 2002). Additionally, protection of this property is consistent with the seven objectives set forth in the Lakes Region Natural Resources Report, prepared by the Lakes Region Planning Commission, including land use (p. II-3), water, lakes and rivers, (p. II-4), wetlands (p. II-4,5), forests/woodlands (p. II-7), conservation & public lands (p. II-7), unfragmented lands (p. II-8), and natural communities (p. II-8).

The 2002 Meredith Community Plan clearly underscored the importance of maintaining the quality of life and protecting the natural resource beauty of the town by protecting open space, lakes, forests, and ponds for wildlife habitat and recreational opportunities. One of the main

aspects of the community's vision for the future is to conserve "critical natural resources such as significant wetlands, undeveloped shoreline areas, scenic vistas, wildlife corridors, groundwater supplies, large forested areas, and agricultural soils....through a comprehensive open space strategy."

Given the proximity of this property to Meredith's town center and development pressure in Belknap County, forest blocks greater than 200 acres are "large" in this community. According to the Town's 2002 Community Plan, an estimated 80% of Meredith's land area is forested, including significant unfragmented parcels. Recognizing the importance of preventing fragmentation, the Community Plan goes on to state that, "Due to the large amount of forested acreage and a relatively low to moderate level of fragmentation, there are opportunities in Meredith to conserve significant wildlife habitat to a meaningful degree." The Page Brook Forest property is the largest unfragmented block of forest land under one ownership in the Town of Meredith.

In the field-based natural resources inventory of the Town of Meredith, the Property contained over 70% of the 920-acre Co-Occurrence Area #3 (Van de Poll, 2005). Co-occurrence areas represent the highest and best aggregation of natural resources in the Town of Meredith – the Page Pond area was the third largest among nine such areas in Meredith. Later fieldwork added roughly 80 acres to Co-Occurrence Area #3, bringing its total acreage up- to about 1000 acres. Additionally, an inventory of visual resources in Meredith in 1999 concluded that the Page Brook wetlands view shed is considered to be "highly significant" by the community and representative of the town's landscape (Kokx, 1999). Protection of the Property will help the town of Meredith continue to be a leader as a visitor destination and a recreation center, without compromising the quality of the natural environment.

New Hampshire State Wildlife Action Plan Priorities

The Property includes a portion of Tier 1 lands (highest quality habitat in NH), identified in the 2015 Revised Edition of the NH State Wildlife Action Plan (SWAP). The Property also contains four types of known and potential critical wildlife habitat types identified in the SWAP: peatlands, wet meadow-shrub wetland, hemlock-hardwood pine, and grasslands. The property also includes 160 of agricultural soils of statewide or local importance including 27 acres of fallow fields, and 34 acres of Tier 2 and 72 acres of Tier 3 habitat according to the Wildlife Action Plan. Additionally, the property is within a 5-mile radius of Meredith's water intake (US EPA Public Water Supply ID# 1521010), and the expansion protects a portion of a prime wetland complex (mostly protected in the existing community forest) and an additional 20 acres of designated wetlands.

Conservation and management of the Property will achieve multiple objectives outlined in the 2005 New Hampshire SWAP, including:

- Objective 502: *Generate early successional and young forest habitats*

Timber management goals for the property include promoting a forest that reflects a diversity of stand ages, including early successional habitat.

- Objective 701: *Protect riparian/shoreland habitat and other wildlife corridors*

The Property contains a series of wetlands that provide critical habitat to a variety of species and natural communities, as well as 4506 feet of shoreline on Page Pond, important wildfowl habitat, 2800 feet of frontage on Bicknell Brook, and over 2 miles of frontage on Page Brook, the largest perennial stream on Meredith Neck.

- Objective 702: *Protect unfragmented blocks and other key wildlife habitats*

Located in the center of Meredith Neck in Meredith, New Hampshire, this unfragmented block of 4 parcels has over 500 acres of prime forestland and nearly one half of Meredith's Page Pond Prime Wetland is contained within the Property. Exceptional wildlife habitat and recreational values have been recognized by N.H. Fish & Game Department for the Page Pond Forest Matrix Area.

- Objective 1301: *Incorporate habitat conservation into local land use planning*

Protection of this property is adhering to the goals and the results of Meredith's 2002 Community Plan, which incorporated habitat conservation in their planning, among other community values.

Regional Significance

The Property is adjacent to the 94-acre, conserved Moulton Farm property (protected in the late 1980s through the NH LCIP program), as well as part of a mosaic of over 1,600 acres of conserved lands throughout the Town of Meredith. In addition to the farmland to the northwest, the Property is adjacent to forested land, open water areas, as well as private residences and camps.

As an "outdoor classroom," the Property provides a setting for environmental education and field studies of the region's natural ecological communities for individuals and school groups from towns throughout the greater Lake Winnepesaukee Region. In addition, the project area provides local economic benefits through sustainable timber management and ecotourism.

History

The Property has been used for agriculture, light industry, timber production, and recreation, as evidenced by a number of stone piles, barbed wire fencing, stone walls, a small hard-rock quarry and an old sawmill. According to a former quarry worker, the quarry closed sometime in the 1970s. The Property has long been managed for its timber resources by the prior owners. According to Rick Van de Poll, PhD., a consultant with Ecosystem Management Consultants, the Page Brook Forest Area has excellent long-term forest management potential, and has been maintained in Current Use for many years. Throughout the period of ownership the property was been selectively timbered and used for recreational purposes.

In the late 1980s a 38- unit subdivision by the name of Beaver Creek was approved on the upper parcel, including lots fronting on Page Pond and view lots. The approved project never advanced to construction due to the economic recession in the early 1990s. In 2002, The Wilds Christian Association, the current landowner, received conditional approval for a camp and conference center encompassing all four lots with a maximum total capacity of approximately 500 campers plus staff. The plans included extensive road construction, wetland crossings, an administration building, a dining facility, camper housing, single family and multi-family employee housing,

ball fields and waterfront improvements including extensive dockage and a water slide into Page Pond. This approval was conditional on securing the required permits from the Department of Environmental Services.

The Town of Meredith has sought to protect this important landscape for more than 25 years despite numerous proposals to develop the property. In 2008 the Meredith Conservation Commission purchased 566 acres to create the Page Pond and Forest conservation area. In 2017 the Meredith Conservation and TPL worked together again to purchase an additional 199 acres. The town of Meredith voted in 2018 to combine the two tracts and create the Page Pond Community Forest. The property now has six miles of marked and maintained trails which are used for walking, running, snowshoeing and cross country skiing.

Administration of Page Pond Community Forest

The Town of Meredith currently owns and manages over 1,050 acres, and holds easements over an additional 433 acres. The stewardship of the property will be undertaken by the Meredith Conservation Commission with assistance from a New Hampshire licensed forester, certified wildlife biologist and other qualified individuals. The MCC has an excellent stewardship track record. It currently owns and stewards eleven forests and a similar number of town-held conservation easements. Boundaries of all these properties are walked annually, with records kept. The MCC has conducted several timber harvests on town forest lands, and it has an active relationship with a consulting forester. It has designed, built, and maintained 18 miles of passive recreational trails in the 500 acre Hamlin-Eames town forests. This trail system was selected for inclusion in a guide to the best hiking areas in New England, as well as the “Best Snowshoeing Areas in New England.” The MCC engages professional advice regarding how to manage the town forests to create and protect wildlife habitat for species experiencing population decline. The MCC consists of seven full members, five alternate members, and volunteer stewards who assist with monitoring.

These parties will undertake responsibilities manifest in managing the Property and working for implementation of established goals. The overall management will be done in accordance with the deed language, access deed and Stewardship Plan approved by LCHIP and the USDA Forest Service. All management decisions, legal responsibilities, and fiduciary responsibility for the Property (both income and expenses) will be overseen by the Town of Meredith and/or the Meredith Conservation Commission.

Stewardship Plan

This Stewardship Plan identifies known information relative to the Property, presents the goals of the Town of Meredith, and puts forth prescriptions for management and conservation activities for the next ten years, all within the context of the overlying ownership purposes and the requirements of the deed restriction held by the State of New Hampshire.

LCHIP Deed Restriction

The purchase of this Property was made possible with \$400,000 from the State of New Hampshire’s Land and Community Heritage Investment Program (LCHIP), \$300,000 from the

USDA Forest Service Community Forest Program, \$750,000 from the Town of Meredith, and \$1,450,000 in private donations from foundations, businesses and individuals.

The Land and Community Heritage Investment Program Authority (LCHIP) holds an executory interest and a contingent right of termination on the Property. This interest is conveyed for the purposes of protecting the Property for the following purposes and uses:

Scenic values, cultural significance, forest management, low-impact outdoor recreation, water quality, fish & wildlife habitat, and other conservation purposes.

Conditions of Executory Interest and contingent right of termination:

(For complete language please see the Deed Language.)

- The Property may be used only in a manner consistent with the purposes of RSA chapter 227-M: “to conserve and preserve New Hampshire’s most important natural, cultural, and historical resources....for the primary purpose of protecting and ensuring the perpetual contribution of these resources to the state’s economy, environment and overall quality of life”;
- The Property cannot be sold, transferred, conveyed or released from public trust, except as provided in RSA 227-M:13 (for expansion, modification or alteration of existing roads);
- The Property shall have a Stewardship Plan approved by the Executory Interest, and be managed in accordance with said Stewardship Plan and the purposes of RSA 227-M;
- No portion of the Property may be sold, transferred or conveyed to any entity that is not a municipality, the State of New Hampshire or a state agency, or a publicly-supported non-profit organization;
- The Property may not be given, granted, sold, conveyed, transferred, mortgaged, pledged or otherwise unencumbered without prior written approval by LCHIP;
- The Property shall be open in perpetuity for passive recreational purposes, including pedestrian access to, on, and across the property for hunting, fishing, and transitory passive recreational purposes by members of the public. LCHIP has the discretion to limit or prohibit passive recreational use on a case-by-case basis where the activity would be inconsistent with the purpose for protecting the property and/or when public safety would be at risk;

Rights of the Executory Interest Holder (Refer to the property deeds for full details on reserved rights.)

The Executory Interest Holder, on behalf of the State of New Hampshire has the right and power:

- To enforce the conditions of the deed by remedies set forth in RSA 227-M;

- To terminate the interest of the Town of Meredith in the Property in the event that a material breach of the conditions of the deed has not been cured after reasonable notice (at least 90 days) and opportunity to cure;
- To reasonable access to the Property for inspection to determine compliance, enforce terms, exercise rights, carry out duties assumed by the Executory Interest Holder and maintain boundaries;
- To assign or transfer these interests to any party qualified by the State of New Hampshire to become the Authority's assignee or transferee.

II. Land Owner Objectives:

The Town of Meredith has expressed interest in stewarding this property for its future timber revenue as well as its recreational, wildlife habitat, and water quality protection attributes. The Town already owns several town forests that are actively managed. As a result, the town is experienced in developing management plans that ensure long-term stewardship for many uses. In a community that is rapidly becoming an exclusive second-home and retirement residential area near the shores of Lake Winnepesaukee, this area could serve as an invaluable local resource for wood products, recreation, environmental education, and tourism.

Due to the central location of the Property there is a high demand for recreation on the property which must be coordinated with the overriding conservation goals. These include hiking trails, accessible walking trails, a dog park, a frisbee course, a wildflower garden, recreational and competitive nordic skiing trails, and a cross-country running course. A master plan will be developed to determine which of these activities can be accomodated.

Purposes

- a. To preserve and conserve 765+/- acres of open space and scenic vistas for the enjoyment and education of the general public;
- b. To provide for the continuation of traditional forest uses including sustainable forest management and outdoor recreation;
- c. To protect water quality by preserving and conserving waterfront, streams, riparian areas, wetlands, and the quality of aquifers, groundwater, and surface water resources on the Property;
- d. To protect and enhance fish and wildlife habitats, rare and exemplary plants and natural communities, including deep water emergent marsh, short graminoid-forb emergent marsh, black ash-red maple seepage swamp community, and Appalachian oak-pine rocky ridge, and the ecological processes that sustain these natural heritage features;
- e. To re-establish an agricultural use for local food since a portion of this property includes abandoned agricultural fields with good soils. The plan is to recruit a local farmer to utilize a portion of the property under a lease arrangement. There are very few agricultural properties available in Meredith, so this opportunity is particularly significant.
- f. To preserve cultural resources, including the historic mill site, a cemetery, and an old homestead;

- g. To provide public pedestrian access on the Property, which will allow the general public to hike, hunt, fish, cross-country ski, observe wildlife, and participate in other low-impact outdoor recreational activities, and snowmobile on designated trails, if any, on the Property; and
- h. To retain the Property in perpetuity as a sustainable tract of land for the production of timber, pulpwood and other forest products, although no management activities shall be undertaken with the primary purpose of income generation.

Wildlife Habitat and Natural Resource Goals

- Maintain and protect native biodiversity and ecological integrity;
- Conserve rare and exemplary natural communities;
- Preserve and conserve the quality and quantity of the groundwater and surface water resources;
- Protect or enhance water quality, forested and non-forested wetlands, riparian areas, shrublands and aquatic habitats;
- Protect and enhance a variety of habitats for native species through uneven-aged management and retention of downed woody debris, snag trees, cavity trees, very large or old trees, and early successional habitats;
- Provide a healthy mix of natural communities throughout the Property (recognizing the value of neighboring landscapes);
- Protect existing and potential deer wintering areas; and
- To the extent possible, prevent the introduction or spread of invasive plant and animal species.

Recreation, Educational and Cultural Goals

- Promote and encourage traditional forest uses including low impact outdoor recreation for residents and visitors;
- Maintain the tradition of open access for non-motorized low impact recreation;
- Maintain public access for hunting and fishing;
- Educate the citizens of Meredith and the Lakes Region, and students in the Inter-Lakes School District about natural communities, biodiversity, the working forest, and good stewardship practices;
- Preserve open space and maintain the traditional landscape;
- Develop and maintain a trail system connecting Quarry Rd, Blueberry Hill Rd, Barnard Ridge Rd, and the mill-site;
- Manage recreational uses so as to not negatively affect the wildlife and natural resource goals of this Stewardship Plan;
- Coordinate with the state to construct a sidewalk connecting the property to Inter-Lakes High School and the Meredith Middle and Elementary schools; and
- Conserve unique historic, archeological and cultural features.

Timber Management Goals

A Timber Management Plan has been prepared for the entire 765 acre property. For details, refer to the Page Pond Community Forest Management Plan, October 19, 2018.

- Any cutting of trees or vegetation on the Property shall be practiced primarily to enhance or protect wildlife habitat, maintain the health of the forestland, or reasonably provide for limited educational or non-commercial recreational opportunities;
- Maintain and protect biological diversity and integrity through the promotion of a forest that reflects a diversity of stand ages and naturally occurring forest types in a majority of the forest;
- Manage the timber resource in a sustainable manner with an emphasis on harvesting timber at its maturity, and production of high quality forest resources, such as sawlogs and veneer;
- Create the conditions to encourage regeneration of desirable timber species;
- Encourage desirable advanced regeneration that is already on site;
- Identify and protect special natural areas for their intrinsic values;
- Limit impact on sensitive riparian areas, wetlands, and sites with steep topography;
- Protect and/or enhance water quality;
- Augment, modify and renew wildlife habitat to encourage specific wildlife species;
- Support the region's rural economy;
- Maintain forest health through monitoring and control of fire, disease, and insect outbreaks; and
- Maintain long-term soil productivity.

III. Infrastructure

To manage 765 acres of land requires the maintenance of roads and trails. This section briefly presents an inventory of roads, trails and boundary lines.

Roads

There are a limited number of forest roads and overgrown logging and skidder roads on the Property. Access to the northern section of the Property is gained from a gated extension of Quarry Road, off Route 25. Access to the southern end of the Property is gained from the west, along a rutted, un-maintained and un-gated extension of Blueberry Hill Road. Access to the western section of the property is gained from a to-be-gated entrance on Barnard Ridge Rd. There is also deeded access from the east, off Veasey Shore Road.

Road maintenance objectives include:

- ensuring safe conditions for a variety of uses including logging and recreational;
- minimizing erosion and runoff;
- prevention of ATV/ORV use on the Property;
- restoring new logging and skidder roads after timber management activities; and
- minimizing disruption of wildlife travel corridors.

Trails

The land already benefits from a network of approximately six miles of trails and three bridges that can be used for hiking, hunting, wildlife viewing, environmental education, fishing access, cross country skiing, and snowshoeing (See Map B: Access and Recreation). At the time of this report, the Conservation Commission is working on a plan for trails that will connect the existing trails to a new trail head on Barnard Ridge Rd.

Boundary Lines

Boundaries are marked by blazes around much of the perimeter, with some areas marked by stone walls or barbed wire fences. These boundaries will be walked and monitored annually by the MCC and will be blazed and painted periodically (approximately every 7-10 years) by the MCC.

IV. Geology and Soils

Bedrock Geology

The bedrock and surficial geology help determine the location of aquifers, wetlands, and forests. Bedrock constituents have the potential to impact water quality, types and depth of soils, topography, vegetation, and potential for various uses. The United States Geological Service (USGS) has conducted many studies in NH on bedrock geology and its effects on water quality. Bedrock geology clearly influences the presence of radon and arsenic in drinking water. The materials that comprise bedrock vary in density and permeability. Water “pools” in some areas, while running quickly through other areas, creating aquifers (water-saturated areas underground) and wetlands. Fractures in the bedrock also provide sources for water supplies.

The underlying bedrock of the Property is comprised of the Meredith Porphyritic Granite phase of the Kinsman Granodiorite (Lyons et al 1997). This is made up of foliated granite, granodiorite, tonalite, and minor quartz diorite with large megacrysts of potassium feldspar and locally abundant garnet. It is an igneous body that is known as the Cardigan Pluton of the New Hampshire Plutonic Suite. Typical of central New Hampshire, this igneous rock from the early Devonian period (approximately between 410 and 420 million years old) is highly resistant to weathering. During the most recent glaciation (~18,000 years ago), bedrock surfaces were smoothed, and a thin coating of glacial till was left on the slopes and valleys. As the glaciers melted and retreated, thousands of large boulders were deposited throughout the river valley. The lack of minerals such as calcium and other plant nutrients in this bedrock type leads to relatively infertile soils.

A study in southeastern NH showed that 10-20% of groundwater samples from private bedrock wells in areas of Kinsman Granodiorite contain concentrations of arsenic greater than 0.01 milligrams per liter, the U.S. EPA's maximum contamination level for public water supplies (Montgomery et al 2003). 13 other types of bedrock in southeastern New Hampshire had greater percentage of wells with concentrations of arsenic greater than 0.01 milligrams per liter, while 11 types of bedrock had less.

A very small corner of the Property, and areas to the east of the Property, have bedrock geology of Winnepesaukee Tonalite, a calc-alkaline from the early Devonian era. The Winnepesaukee tonalite is a light gray, coarse- to fine-grained, equigranular rock composed of feldspar, quartz, biotite mica and muscovite mica. This bedrock is also known to yield water with high arsenic concentrations (Lyons et al 1997).

Soils

For typical forestland in the region, soil types are mapped in approximately fifty-acre minimum units (Order III mapping) by the Natural Resource Conservation Service. Soil types are referenced by number and include a topographical reference that is depicted by a letter. There are five possible slope classifications, from A (level ground) to E (the steepest areas with slopes over 25%). Soil types on the tract are shown in Map C: Soils map.

In managing conservation land, a more useful tool is to combine the soil types into "Important Forest Soil Groups." The soils are grouped together by common characteristics such as drainage patterns, stoniness, and expected forest successional trends. There are six "Important Forest Soil Groups" for use in this region:

- *Group IA* - deeper, loamy textured, moderately well and well-drained soils
- *Group IB* - sandy or loamy over sandy textures, and slightly less fertile than group IA
- *Group IC* - outwash sands and gravels
- *Group IIA* - same characteristics as group IA and IB but have been separated due to physical limitations such as steepness, bedrock outcrops, and surface boulders
- *Group IIB* - poorly drained soils
- *Group NC* - soils with limited potential for commercial production of forest products.

Soil types are important in managing timber due to differences in productivity and management limitations. Some soils are more fertile than others and thus, more productive. Productivity standards define which species will compete best on any given soil type, and are useful when developing silvicultural prescriptions for specific stands. Also, certain soil types have management limitations that must be considered. Limitations are typically defined by a soil's characteristics such as wetness and erodibility. For instance, an area with wet soils should be harvested in the winter when the ground is frozen to avoid damage. Conversely, drier soils can usually be safely harvested in the summer without negative disturbances. These considerations are also important in defining management and silvicultural decisions. Basic productivity and limitations for the Important Forest Soil Groups are as follows:

Group IA

- The best soils for growing hardwood timber
- The dryness of these soils makes summer harvesting possible.

Group IB

- Soils are very good for growing hardwood timber, but may be better for growing softwood.
- The dryness of these soils makes summer harvesting possible.

Group IC

- Soils best suited for growing softwood timber, especially white pine.
- The dryness of these soils makes summer harvesting possible.

Group IIA

- Soils suited for growing hardwood timber.
- The limitation of slope, and rockiness make winter harvesting preferred.

Group IIB -

- Soils suited for growing softwood timber.
- Winter harvesting is a necessity.

The Property contains good to excellent forest land soils (See Map F: Farmland, and Table 1 below). It is immediately adjacent to the best agricultural soils in Meredith, where prime farmland has been permanently protected on one of the last two remaining farms in Meredith. The soils on this Property are primarily Tunbridge-Lyman-Becket complex, which are formed in glacial till on hills, ridges and mountains. Tunbridge, Lyman and Becket soil types are so intermingled that it was not practical to map them separately. Tunbridge soils are well drained and have bedrock at a depth of 20-40 inches, while Lyman soils are somewhat excessively drained and have bedrock at a depth of 10-20 inches. Becket soils are well drained and have a depth to bedrock of more than five feet. Approximately 431 acres, or 76% of the Property falls in important forest soils group IA or IB, demonstrating the forest productivity of the Property.

Table 1. Soil types on Page Pond & Forest Property

Description	Map Symbol	Map Unit Name	Forest Soils Classification	Area (acres)
Prime Farmland Soil	558B	Skerry fine sandy loam, 3 - 8 % slopes	IA	1.5

Good forestland soils	169B	Sunapee fine sandy loam, 3-8 % slopes, very stony	IA	28.6
	559B	Skerry fine sandy loam, 3-8 % slopes, very stony	IA	.4
	380C	Tunbridge-Lyman-Becket complex, 8-15 % slopes, very stony	IB	199.5
	380D	Tunbridge-Lyman-Becket complex, 15-25 % slopes, very stony	IB	163
	143C	Monadnock gravelly fine sandy loam, 8-15 % slopes, very stony	IB	21.2
	143B	Monadnock gravelly fine sandy loam, 3-8 % slopes, very stony	IB	16.4
Hydric Soils	97	Greenwood & Ossipee soils, ponded	NC	66.9
	347A	Lyme & Moosilauke soils, 0-3 % slopes, very stony	NC	2
	347B	Lyme & Moosilauke soils, 3-8 % slopes, very stony	IIB	17
	647A	Pillsbury fine sandy loam, 0-3 % slopes, very stony	IIB	6.2
	295	Greenwood mucky peat	IIB	35.6
Other	380E	Tunbridge-Lyman-Becket complex, 25-60 % slopes, very stony	IIA	4.3
	W	Water		3.8

V. Timber Management

Note: Timber management on the property is described in the Forest Management Plan prepared by Shaun Lagueux, October, 19, 2018.

The primary purpose of timber management is to enhance the natural resource values and recreation opportunities. Any cutting of trees or vegetation on the Property shall be practiced primarily to improve or protect wildlife habitat, maintain the health of the forestland, or reasonably provide for limited educational or non-commercial recreational opportunities. In addition, such activities shall comply with the purposes of this Stewardship Plan, shall not damage or destroy rare species or exemplary natural communities, and shall not degrade or otherwise impact water quality or aquatic habitats. No management activities shall be undertaken with the primary purpose of income generation. However, it is understood that some management activities, as prescribed by a licensed forester, certified wildlife biologist, or other qualified person, may generate marketable forest products. Income from these sales will be used towards stewardship costs.

As maintenance and protection of biological diversity and integrity is the main stewardship goal for this Property, management activities will promote a forest that reflects a diversity of stand ages and naturally occurring forest types in a majority of the forest. Special attention will be given to the conservation of rare and exemplary natural communities, and the conservation and enhancement of native plant and animal species and their habitats, including, but not limited to, the establishment and retention of a range of sizes and types of downed woody debris, snag trees, cavity trees, occasional very large/old trees, and early successional habitats.

In order to improve and manage wildlife habitat, openings will be created or maintained for the benefit of early successional species. These openings will provide browse, dense cover, edge, and the quickly-changing stand dynamics of young forest. As a general rule, all dead snags and current “biological legacies” (old pasture trees, wolf pines, etc) will be retained for the benefit of wildlife and stand diversity, as well as for their educational and aesthetic value. New “biological legacies” will also be encouraged by setting aside one or two trees per acre that are representative to the stand. This will add to the structural complexity of the stand and will also eventually create larger pieces of coarse woody material, providing shelter and food for numerous wildlife species.

There are some areas of the Property that will be regarded as low priority management areas, due to their limited access and/or ecological sensitivity. Harvesting in areas that have extensive riparian and wetland ecosystems or unique ecological qualities and low value timber would be costly and have excessive environmental impacts. There are also large areas of land in which timber can be managed easily, with simple access and few impediments due to site or topography. These areas will be the focus of timber management and harvesting efforts.

Silvicultural Treatment

All activities on the Property shall be performed in accordance with then current, generally accepted best management practices for the sites, soils and terrain of the Property as described in “Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire” (State of New Hampshire, Department of Resources and Economic Development, 1998) and successor documents, “Best Management Practices for Erosion Control During Trail Maintenance and Construction” (State of New Hampshire, Department of Resources and Economic Development, Division of Parks and Recreation, Trails Bureau, 1996) and successor publications; and “Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire” (Division of Forests and Lands, Department of Resources and Economic Development and Society for the Protection of New Hampshire Forests, 1997) and successor documents.

Management of Special Management Areas

Special Management Areas shall be managed to protect the natural resource qualities associated with these areas. Management activities will be in compliance with the recommendations of the publication “Good Forestry in the Granite State”, as they apply to the qualities to be protected within the Special Management Areas, as more particularly set forth in Sections 1 through 4, and 6.6 (entitled “Soil Productivity”; “Water Quality, Wetlands and Riparian Areas”; “Habitat”; “Unique and Fragile Areas”; and “Cultural Resources”), and in accordance with “Erosion Control on Timber Harvesting.”

Management of Riparian Areas

The principal goal for management within the Riparian Areas is the establishment and maintenance of a high quality buffer that provides an array of ecological benefits including but not limited to:

- i. buffering aquatic and wetland plants and animals from disturbance;
- ii. preventing wetland and water-quality degradation, including water temperature changes;
- iii. providing important plant and animal habitat;
- iv. providing adequate corridors for species that require such areas for their seasonal, annual, or dispersal movements/migrations; and
- v. providing organic matter, nutrients, and structure to aquatic systems.

For the purposes of defining Riparian Areas and guiding Forest Management Activities on the Property, the width and location of the Riparian Areas are listed in Table 2. The Riparian Areas widths used to develop the SMA are suggested in Good Forestry in the Granite State.

Table 2: Riparian area widths used to develop the SMAs

Waterbody Type	Riparian Area Width
1 st and 2 nd Order Streams	100 feet
3 rd Order Streams	300 feet
4 th Order Streams	600 feet
Ponds <10 acres	100 feet
Great Ponds >10 acres	300 feet
Non-Forested Wetlands <10 acres	100 feet
Non-Forested Wetlands >10 acres	300 feet

There are three streams on the Property that are of stream order 1, that join together in the center of the Property to then form Page Brook, a second order stream (See Map E: Aquatic Resources).

The width of Riparian Areas shall be measured upland from the normal high water mark of the water body or wetland edge, on both sides of a stream. The widths of and management guidelines for Riparian Areas may be modified as appropriate, based upon the specific conditions of the site, including but not limited to, flooding zones, slopes, erodible soils, riparian vegetation communities, and roads.

These forested buffers filter surface and subsurface water, trapping sediment, nutrients, chemicals and other pollutants. Forested buffers also improve habitat for trout and other fish, by providing shade and woody debris. Large trees within riparian areas also provide perching and potential nesting sites for Osprey (*Pandion haliaetus*), Great Blue Heron (*Ardea herodias*), Belted Kingfisher (*Megasceryle alcyon*), and other aquatic birds. Riparian forests provide breeding habitat for a number of bird species, including the veery (*Catharus fuscescens*), American redstart (*Setophaga ruticilla*), warbling vireo (*Vireo gilvus*), and Baltimore oriole (*Icterus galbula*). Mammals such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Neovison vison*) and river otter (*Lutra canadensis*) use these habitats, as well as many amphibians and reptiles. Canada warblers (*Wilsonia canadensis*) and chestnut-sided warblers (*Dendroica pensylvanica*) may make use of streamside thickets and shrubby, younger portions of riparian buffers.

The Riparian Areas shall also be managed in compliance with the following additional provisions and restrictions:

- New roads and landings will be located outside of riparian areas wherever possible, except where doing so would result in greater overall impact.
- Roads and skid trails will be designed within riparian areas to minimize the total long-term impact on both water quality and wildlife habitat.
- Small patch cuts may be created around the margins of the beaver ponds for the purpose of encouraging hardwood regeneration to provide a source of food for beaver and to enhance nesting opportunities for certain songbirds (e.g., Canada warbler and chestnut-sided warbler).
- Log yards, landings, and staging areas will be constructed in Riparian Areas in compliance with “Good Forestry in the Granite State” and in compliance with the then current best management practices for the sites, soils and terrains of the Property as described in the “Best Management Practices.”
- The number and width of crossings shall be kept to a minimum and will include the installation of all erosion control devices and employ all recommended practices described in the “Best Management Practices”.

No-Cut Riparian zone

No timber harvesting, except in connection with the construction and maintenance of roads, bridges and crossings within Riparian Areas, shall occur in the twenty-five foot wide area measured upland from the normal high water mark of the following Riparian Areas: Great Ponds, and Non-Forested Wetlands greater than 10 acres in size (the “No-Cut Riparian Zones”).

Beyond this 25-foot no-cut zone, but within the Riparian Management Zone, harvesting will only be done by singletree selection or small group cuts. Long rotations will be used to develop older, uneven-aged stands with at least 70% crown closure. Erosion will be monitored before, during and after harvesting, and no pesticides will be used within these Riparian Management Zones. Harvesting will be done in winter to minimize disturbance to the forest floor and understory vegetation and to avoid conflicts with breeding wildlife.

Vernal Pools

The upland forest surrounding vernal pools support amphibians the majority of the year. Some salamanders and wood frogs are especially sensitive to desiccation and temperature extremes so they need areas of uncompacted, deep litter, coarse woody debris, and patches of canopy shade. Some vernal pools on the Property have been mapped, a more thorough inventory will be completed as part of the expanded Natural Resource Inventory. Best Management Practices for timber harvesting near vernal pools include:

- No disturbance of the vernal pool depression;
- Maintain or encourage a closed canopy stand in a pole- or greater size class that will provide shade, deep litter, and woody debris in a 100 foot zone around the pool;
- Limit harvesting to uniformly distributed, light, partial cutting while leaving a minimum of 70-80% canopy cover in the 100 foot zone around the pool;
- Harvesting operations will occur only when ground is frozen, when juveniles and adults are inactive; and
- Maintain a shaded moist forest floor in the 100-500 foot buffer around vernal pools by leaving at least 50-60% canopy cover, and using single-tree or group selection harvesting.

(For a full description of BMPs for harvesting near vernal pools, see Calhoun 2000).

Avoiding Conflicts with Recreation

If timber management is to take place anywhere near hiking trails, care will be taken to avoid affecting or blocking the trail. In situations where impeding the trail is unavoidable, trails will be temporarily closed or rerouted. The location of the rerouted trails will be at the discretion of the Meredith Conservation Commission, reflecting relevant site conditions at the time of harvest, and will be routed to avoid impacts on wetlands, springs, riparian areas, fields, and other sensitive natural or cultural features. After harvesting, skidder paths will be cluttered with debris to prevent illegal ATV use.

The MCC finds the Randolph Mountain Club's Forest Harvesting Policy useful to follow to help minimize the impacts of forest harvesting on Page Pond & Forest trails. Their recommendations include:

- Trails will be adequately marked and signed to assist both harvesting the timber and trail users in locating the affected path.
- Where practical, a 150-foot buffer zone of partially cut or uncut forest be left along trails. This is consistent with the recommendations in Good Forestry in the Granite State.

- Forest harvesting machinery use should be minimized on and near existing trails. This would include limiting the number of skid road crossings and keeping them at right angles to the trail whenever possible.
- The accumulation of woody debris and slash on existing trails should be minimized.

VI. Wildlife

In its entirety, the Property represents nearly one half of the largest unfragmented block of land in the eastern half of Meredith. The 1400+ acre unfragmented block is surrounded by high-density development along the shores of Lake Winnepesaukee. The property sits at the very core of this unfragmented land, and has been largely undisturbed since the days of previous pasturage over 140 years ago. (See Map G: Wildlife Habitat)

The Meredith Natural Resource Inventory recognizes the regional significance of a 265-acre prime wetland along Page Brook (155-acres which is part of the Property). The Page Brook prime wetland is the most diverse and highly valued prime wetland in Meredith, providing exceptional habitat for fish and wildlife. The beaver complex and open water areas of the upper part support a diverse array of warmwater fish, muskrat, otter, mink, moose, and waterfowl.

Birds

Over 55 species of passerine birds have been recorded on the Property during breeding season. Page Pond is a large migratory stop-over habitat for shorebirds in Meredith; prior visits identified 12 Killdeer (*Charadrius vociferus*), 4 Solitary Sandpipers (*Tringa solitaria*), 3 Semi-palmated Sandpipers (*Calidris pusilla*), 2 Wilson's Snipe (*Gallinago delicata*), and a Woodcock (*Scolopax minor*). Upstream of this marsh system is an active Great Blue Heron rookery with 3 nests. Breeding populations of Red-tailed Hawks (*Buteo jamaicensis*), Barred Owls (*Strix varia*), Great Horned Owls (*Bubo virginianus*) and Broad-winged Hawks (*Buteo platypterus*) have all been recorded there.

The hardwood uplands and juxtaposition between forest and wetlands on the property provide an important nesting area for landbirds such as Woodcock and habitat for Wood Thrush (*Hylocichla mustelina*), Black-throated Blue Warbler (*Dendroica caerulescens*), Chestnut-sided Warbler, Eastern Wood Pewee (*Contopus virens*), Veery (*Catharus fuscescens*), Wilson's Snipe and Yellow-bellied Sapsucker (*Sphyrapicus varius*).

A wildlife inventory of the Property conducted by Kristine Bontaites, a biologist with New Hampshire Fish and Game, identified the parcel as important habitat for Great Blue Heron, Green Heron (*Butorides virescens*), state-threatened Osprey, Canada Geese (*Branta canadensis*), Ringnecks (*Aythya collaris*), Mallards (*Anas platyrhynchos*), Black Ducks (*Anas rubripes*), Wood ducks (*Aix sponsa*), Blue and Green winged Teal (*Anas discors*, *Anas crecca*), Buffleheads (*Bucephala albeola*), Common Goldeneye (*Bucephala clangula*), Swamp Sparrow (*Melospiza georgiana*), Northern Waterthrush (*Seiurus noveboracensis*) and Hooded mergansers (*Lophodytes cucullatus*).

Mammals

As the last large track of undisturbed forest area in the eastern section of Meredith, upland areas provide ideal habitat for game and non-game species. Virtually all of the upland and wetland wildlife species occur on the property, including some regionally unique or unusual species. As illustrated on Map D (Landcover Map), the Property is mostly forested, consisting primarily of Hemlock-Beech-Oak-Pine forests. These tree species provide top-quality seed and nut mast and excellent browse for white-tailed deer (*Odocoileus virginianus*), bear (*Ursus americanus*), raccoon (*Procyon lotor*), snowshoe hare (*Lepus americanus*) and microtines (voles, muskrats and other rodents) as well as their predators such as fisher (*Martes pennanti*), ermine (*Mustela erminea*), long-tailed weasel (*Mustela frenata*), and bobcat (*Lynx rufus*), a state species of special concern.

In addition to the forested uplands, the Page Brook property contains a 155-acre wetland complex that supports populations of mink, river otter, muskrat and moose. There are active beaver populations in the ponds on the Property as evidenced by numerous beaver-chewed trees and at least four well-maintained lodges.

Both lowland and upland habitat is important to bear, moose, as well as bobcat, all regular residents of the Property. The Property's beech nuts and acorns could provide an important fall food source for bears. White tailed deer are also found on the Property, taking refuge in some dense hemlock stands that serve as important deer wintering areas. The Property includes a

portion of a 183-acre deeryard designated by NH Fish and Game (See Map H: Wildlife Habitat Quality). Other mammals present include coyote (*Canis latrans var.*), fox (*Urocyon cinereoargenteus*), and porcupine (*Erethizon dorsatum*).

Fish, Amphibians and Reptiles

The extent and interspersed of marsh and nutrient-rich open water habitat with other wetland types and the forested upland make this wetland complex important for foodchain production for the area with implications for Fish Cove and Lake Winnepesaukee. According to Don Miller, a State Fisheries Biologist, Page Pond adds a nutrient input for the growth of fishes, such as smelt (*Osmerus mordax*), an important forage species for Salmon (*Salmo salar*) and Lake Trout (*Salvelinus namaycush*) in Lake Winnepesaukee.

The shallow waters of Page Pond provide an extensive and complex shoreline with an abundance of aquatic vegetation. This shallow shoreline creates ideal habitat for fish and aquatic invertebrates, as well as the wide variety of wading birds, moose, and aquatic mammals mentioned previously. Red-Spotted Newts (*Notophthalmus viridescens*), Pickerel Frogs (*Rana palustris*), Bullfrogs (*Rana catesbeiana*) and both Painted and Snapping turtles (*Chrysemys picta*, *Chelydra serpentina*) breed in the property's pond and wetland. Several species of warmwater fish abound, and the site is well-known for its compliment of a variety of dragonflies and damselflies.

General Wildlife Considerations

Overstory Inclusions

Overstory inclusions are small patches of forest cover that are distinct from the surrounding forest, but are too small to be treated as a separate stand. Examples include patches of softwood cover in hardwood stands, and/or patches of hardwood in softwood stands. Such inclusions increase the habitat diversity in an area, and provide feeding, nesting, and shelter opportunities that may not be available in stands of a single type. For example, coniferous overstory inclusions of spruce and fir can provide feeding, nesting, and winter shelter opportunities in deciduous stands that pure hardwood stands cannot provide. Likewise, deciduous overstory inclusions of beech and other hardwoods can provide mast and other foraging and nesting sites that pure coniferous stands cannot provide.

Overstory inclusions may result from either small-scale site differences, or variations in the past disturbance history of the stand. They can vary significantly in size, from a group of stems to an acre or more. It has been shown that wildlife use of overstory inclusions increases with the tree size class; more species use the saw-timber size class than the regeneration size class. While larger inclusions may more significantly diversify available habitat, smaller inclusions are also very important. The value of a small inclusion increases proportionately to how different it is from the surrounding forest. Even a single hardwood tree in a pure softwood stand can greatly increase the variety of habitats. Over a quarter of New England's bird species and a lesser number of mammals use overstory inclusions in one way or another. Therefore, the objective for forest management will be to maintain and regenerate inclusions of softwood cover in predominantly hardwood stands and inclusions of hardwood cover in predominantly softwood stands. (DeGraaf et al. 1992, NHDRED 1997)

Permanent Forest Openings

Permanent forest openings are areas that are usually less than 10% stocked with trees and are dominated by grasses, forbs, brambles, and fruiting shrubs. Although these areas represent only a small portion of New Hampshire's landscape, they may contribute a disproportionately high share of wildlife habitat to the overall forest environment. These areas provide necessary habitat for about 22% of New England's wildlife species, and are seasonally important habitat to nearly 70% of species. They are valuable to wildlife because with more light reaching the forest floor, the number of plant species available increases, thus diversifying the forest structure and providing seasonally important foods. Habitat components for many woodland species are also made available, and new habitats for open and edge-adapted species are provided. The value of these openings depends largely on the surrounding landscape. For example, such openings will be more beneficial in large expanses of continuous forest than in areas containing a mixture of forest and non-forested habitats.

Prior to European settlement, these non-forested habitats were found mostly in wet areas and in areas cleared by Native Americans. With the expansion of agriculture through the 1800s, these habitats increased greatly. However, for the last 150 years this type of habitat has been declining as forests returned on abandoned pastures. Cropland and pasture constitute only a small percentage of New Hampshire land today. It has thus been suggested that 3-5% of forestland should be maintained in permanent forest openings to maintain this habitat. Topography, aspect, size of the opening, and distance to other openings will influence the use of new openings by wildlife and will be considered when planning cutting operations. The primary sources of permanent forest openings in a managed forest are remnant meadows and pastures, as well as log landings created during harvesting operations that are maintained afterward. In general, an opening of moderate size with a southern exposure will be most useful, especially when other openings are not already available within an otherwise mature forest. Overall, the objective in forest management should be to create or permanently maintain openings dominated by grasses, forbs, or shrubs within forest-dominated upland landscapes. (Oliveri 1988, NHDRED 1997)

Beaver-created Openings

Beaver are renowned for their manipulation of water, and the ecological changes associated with it. The activities of beaver in a forested landscape create a series of habitats: from newly flooded areas, to stagnant ponds, to open meadows. Initially, nutrients are released from the soil into the water, supporting a wide variety of plant and animal communities. Nutrients then accumulate in the bottom organic matter as water flow decreases. When beaver eventually abandon these flowages and water levels drop, the organic matter decomposes, allowing grasses and forbs to colonize the area. In time, shrubs and trees reoccupy these beaver meadows and the cycle continues.

Each of these successional stages provide habitat for a variety of wildlife species. Frogs, turtles, otter, mink, and other species thrive in the open water stage of beaver-created openings. Wood ducks, black ducks, and other waterfowl depend on beaver flowages for feeding, nesting, and brood-rearing habitat, as well as refuges during the autumn migration. Hooded mergansers, common golden eyes, owls, wood ducks, tree swallows, woodpeckers, flying squirrels and other cavity-nesters use the dead and dying trees created when the flooding occurs. Different species of swallows and flycatchers are attracted to these areas because of the abundant insect

populations and perch sites. The diverse vegetation of the wetland edge attracts species such as yellow warblers and common yellowthroats. Herons, eagles and ospreys also use these habitats for feeding and nesting. Because of the early “green-up” along these wetland edges and at beaver meadows, species such as moose, deer, and bear are attracted to these areas as well.

Besides benefiting wildlife, beaver flowages also influence water quality. Their dams reduce erosion by trapping sediments, thereby recycling nutrients that would have been washed further downstream. Wetlands created by beavers can also slow spring run-off, decrease downstream flooding, and help in groundwater discharge. Therefore, beaver and their habitat should be recognized as essential components of a healthy diverse forest ecosystem. Specific plans to encourage beavers would have objectives such as maintaining hardwoods, especially aspen, along drainways in places where beaver dam-building activity and subsequent wetland openings are desired, and where water levels can be controlled so that damage to roads and personal property is minimal. (Diefenbach et al. 1988, NHDRED 1997)

Deer wintering areas

In New Hampshire, white-tailed deer live near the northern-most edge of their geographical range in the northeastern U.S. Because of the severe winter conditions experienced in this area, deer require special habitats called deer wintering areas, or deer yards, to help them survive. These areas are typically lowland softwood stands, usually associated with waterways and riparian habitat. Compared to more open areas, these softwood stands provide shelter from harsh winter weather by reducing snow accumulation and wind speeds, allowing for overhead thermal cover, and increasing nighttime temperatures and relative humidity. Because of the young hardwoods growing intermixed with the softwood, they also allow access to food supplies as well as escape from predators. These factors all serve to reduce heat loss and energy demands placed on the deer in winter when food availability and quality is reduced. Yard size varies from small yards of only a few dozen acres to thousands of acres, and the number of deer present in the yard varies with size. Overall, deer wintering areas compromise 3% of the land base in New Hampshire.

Two basic habitat elements need to be present in order for an area to be classified as a deer wintering area. These are: 1) a core area identified by concentrations of dense softwoods, and 2) mixed hardwoods and softwoods adjacent to or within the core area which provide accessible forage. The severity of the winter often determines whether a certain area is used as a wintering area in a given year. In mild winters, deer often use habitats further away from dense softwood stands, which may be used during severe winters. Proper management planning for deer wintering areas should provide at least 50% of the entire area in functional shelter at all times - meaning softwood cover at least 35 feet tall with crown closures averaging 65 to 70%. The remainder of the wintering area should be in younger age classes that will provide hardwood browse and softwood regeneration that will provide shelter in the future. Also, because not all available browse is good quality for deer in winter, preferred foods such as red maple, sugar maple, mountain maple, striped maple, hobblebush, and birch should be retained whenever possible. In order to allow for deer mobility and access throughout the wintering area, it has been suggested to manage unbroken, dense lanes of softwood cover at least 200 feet wide as sheltered travel corridors, utilizing existing networks of softwood riparian habitat wherever possible.

Besides benefiting deer, managing existing deer wintering areas will ensure a continued yield of forest products and abundant regeneration. Also, diversifying the age and size classes of softwoods will provide quality habitat for a large variety of wildlife species. Therefore, a forest management objective should be to manage existing and potential deer wintering areas to provide shelter, travel lanes to access food, escape from predators, and access to preferred browse. (Wiley 1988, NHDRED 1997)

Mast

“Mast” is the nuts, seeds, and fruits of woody plants that provide food for wildlife, and are broken down into two categories. “Hard mast” refers to nuts and seeds, while “soft mast” refers to fruits and berries. Hard mast is a very nutritious food, containing high levels of fat and protein. This is important in contributing to fat stores critical for migration in species such as wood duck, or hibernation in species such as bears and raccoons. It is also important to the survival of newly fledged young such as cedar waxwings and robins. Birds and mammals depend heavily on mast during peak production periods either in late summer, early fall, or during the winter when sources may still be available on trees and shrubs, on the ground, or stored in caches.

While many trees and shrubs are mast producers, some are more important than others in terms of wildlife value and merit special attention. In terms of hard mast, beech trees provide an especially important autumn food for black bears in New England. Often these trees will be scarred with claw marks on the trunk or there will be clumps of broken branches in the crown where they sat and consumed beech nuts. Beech nuts are also important to a number of other wildlife species including raccoons, red squirrels, white-tailed deer, ruffed grouse, wild turkey, and rose-breasted grosbeak. Birches are also important mast producers because of their abundance and the fact that they retain much of their seed crop above the snow through the winter. Many small birds and mammals rely on birch seeds, including redpolls and pine siskins. Softwood trees including white and red pine, white, red and black spruce, hemlock, tamarack, and balsam fir are important seed sources for wildlife, especially because of its availability in winter. Many birds and small mammals, including mourning doves, chickadees, crossbills, finches, grosbeaks, pine warblers, nuthatches, mice, voles, and red squirrels make use of softwood mast.

As with hard mast, there are a number of important soft mast species that are beneficial to wildlife. Black, pin, and choke cherry provide abundant fruit that are eaten by many birds and mammals. Wild apple trees are also extremely valuable as wildlife food. Wild apples are eaten by a wide variety of wildlife species, including deer, bear, fisher, grouse, and various songbirds. Many shrubs also produce valuable food for wildlife, including alder, mountain ash, beaked hazelnut, dogwood, blueberry, raspberry, viburnums, and elderberry. Because all of these sources of mast are critical to wildlife survival, it is important to manage mast producing trees for a continuous source of wildlife food and quality seed for regeneration. (Oliveri 1988, NHDRED 1997)

Cavity trees, dens, and snags

Snags (dead or partially dead standing trees) and den trees (live trees with existing cavities) are essential to the well being of many kinds of wildlife. Collectively, the term “wildlife tree” includes both snags and den trees. Snags can either be classified as hard snags which often have

some limbs remaining and fairly sound sapwood, or soft snags which usually have no limbs and are in the advanced stages of decay. Ten species of New Hampshire's forest birds excavate cavities for nesting and roosting, while another 15 birds and 18 mammals use natural or excavated cavities in forested habitats for nesting, roosting, or denning. These species require a wide range of cavity-tree size classes in order to provide suitable shelter. Bats and brown creepers also use the spaces beneath the loose bark of dead or dying trees as resting sites.

Many of the species that use wildlife trees, especially cavity-nesting birds, are insectivorous. These birds help to decrease populations of insects that attack trees, buffer epidemic outbreaks, and increase the effectiveness of insects that parasitize those insects attacking the trees by chipping the bark off of infested trees. One benefit of this biological control is reduced economic loss in damaged trees. However, regardless of their role in insect control, these birds (and all other species that use wildlife trees) are part of the forest community, a fact that seems reason enough to justify preservation of suitable habitat.

The use of a wildlife tree by a certain species depends both on the characteristics of the tree (live/dead, DBH, height, type of decay), and of the surrounding vegetation (species composition, age, stand size). Larger trees with cavities are more valuable since they are known to accommodate more species - including providing resting sites for pine marten and fisher, as well as a place for them to raise their young. Also, the presence of heart-rot allows for easier excavation, and sound sapwood provides insulation from temperature extremes and protection from predators. Snags and wolf trees (very large, wide-spreading mature tree that likely grew alone in a field without competitors) that do not currently have cavities are also very important components of the habitat. They provide foraging sites and perches for insectivorous birds, kingfishers, and raptors. They also provide singing perches for many species of songbirds, and nest sites for species like great blue herons and ospreys. Therefore, a forest management objective would be to retain snags and den trees (a minimum of six per acre - one exceeding 18 inches DBH and three exceeding 12 inches DBH) in order to help maintain populations of cavity-nesting wildlife. (Elliott 1988, NHDRED 1997)

Dead and Down Woody Debris

Dead and down woody debris (also referred to as coarse woody debris) refers to dead trees or portions of trees lying on the forest floor, including logs, stumps, limbs, upturned tree roots, and slash. Such material may play several roles in forest ecology including providing a base for the growth of new trees ("nurse logs"), harboring fungi that aid in nutrient retention and cycling, and providing habitat for wildlife. Dead and downed material is used as habitat by over 30% of the region's mammal species (mostly rodents, shrews, and carnivores), 45% of amphibians (primarily salamanders) and 50% of reptiles (mostly turtles and snakes). It is used as feeding sites by rodents, shrews, black bears, and woodpeckers, and provides shelter for many species of small mammals. Seventeen species of New Hampshire mammals also den in or around downed logs. Moist micro-habitats are created when downed logs cause the formation of pools and riffles in streams which provide important fish habitat, as well as basking and nesting locations for turtles, waterfowl, mink, and otter. Ground-nesting birds (including juncos and winter wrens) also nest within upturned tree roots. Dead and downed material provides habitat for lower organisms which contributes to the food chain - including insects and other invertebrates,

mosses, fungi, and lichens. It is also used as lookout sites, preening and drumming sites, and natural bridges across streams.

In general, larger (18+ inches) hollow or rotten logs and stumps have the highest value for wildlife. Softwood stands also seem to contain more and longer-lasting woody debris than hardwood stands. However, the amount of dead and down material is low in many of New Hampshire's forests. It has been viewed as fuel that creates fire hazards, as potential wood products that should be salvaged, and as physical barriers to forest operations and regeneration. As forests are maturing, the supply of dead and down material is naturally increasing due to the older trees dying and falling over. Factors that could reduce the supply of such material include greater utilization of cull material through chipping or whole tree harvesting, increasing the intensity of forest management, and the shortening of rotation lengths. Therefore, it is important to manage for dead and down woody debris in forests by retaining material that currently exists and allowing its accumulation where it is currently missing. (Elliott 1988, DeGraaf et al. 1992, NHDRED 1997)

Vernal pools

Vernal pools are small depressions in the ground that fill with water during the melting of snow in the spring, or during the accumulation of rain in autumn. They may also fill when the groundwater level rises above the level of the depression, and they have no inlet or outlet. Because vernal pools lack fish (due to the pool being temporary, too warm, too shallow, oxygen poor, or because they may freeze in winter), they provide a unique habitat for a number of aquatic organisms that would otherwise be prey for fish - including many species of amphibians. For example, wood frogs and mole salamanders only breed in vernal pools, and ten other species of reptiles and amphibians use these habitats for breeding or feeding.

Vernal pools exist throughout the Property. Such pools provide important breeding habitat for various amphibians including wood frog (*Rana sylvatica*), spring peeper (*Pseudacris crucifer*), spotted salamander (*Ambystoma maculatum*), and red spotted newt (*Notophthalmus viridescens*). Deep vernal pools, like some on the Property, provide the long-lasting habitat that is essential to amphibian reproduction. Adequate conservation of this resource would require maintenance of appropriate forested buffers. These should be taken into account as part of timber sale restrictions.

Insects and invertebrates, including tiny snails and clams, also live in vernal pools. While some may spend part of their life cycle in other habitats besides vernal pools, a number survive in the mud during dry periods. During these times, matted and discolored leaves in a small depression may be the only evidence that signifies this area as a vernal pool. So, while vernal pools are quite inconspicuous, they provide critical habitat for a number of species - and protection of these pools is especially important in maintaining local amphibian populations. Management of vernal pools for amphibian habitat would include maintaining trees surrounding the pools to avoid increases in temperature or siltation. Hiking trails should not be located adjacent to vernal pools. (NHDRED 1997)

Woodland raptor nest trees

In New Hampshire, many species of raptors - including red-tailed, red-shouldered, broad-winged, sharp-shinned, northern goshawk, and Cooper's hawks - build large stick nests in the major forks of mature hardwoods and on whorls of large branches of white pines. Many species often reuse the same nest year after year. Some may build a new nest nearby, while others may remodel a nest originally constructed by another species. However, suitable trees for supporting large stick nests are limited in present-day forests in New Hampshire. This is especially critical for those species of concern in New Hampshire, including the red-shouldered hawk, northern goshawk, and Cooper's hawk. Compounding this problem is the fact that these raptors can be sensitive to human disturbance as well as habitat changes in the vicinity of their nests. Excessive activity around their nests during the early weeks of the breeding season may cause a pair to abandon the nest. It may also cause the female to flush from the nest, leaving the eggs vulnerable to predation or fatal chilling. Therefore, it is important to manage for suitable nest trees for woodland-nesting raptors and avoid disturbance of nesting pairs. (NHDRED 1997)

Osprey nests

Osprey is a species of concern. In order to ensure their existence in New Hampshire, an adequate amount of nest trees must be provided. Osprey require large bodies of water for foraging since the osprey feeds almost exclusively on fish. Ospreys nest in dead or dead-topped trees, often white pines or other tall softwoods. Osprey nests may be miles away from open water. Many are associated with a wetland or riparian areas, or in upland settings. While there are no currently known osprey nests on the Property, they have been known to nest in Meredith, and the Property could be a potential nesting site in the future. Their nests are used for years or even decades, with pairs adding additional nesting material annually. Therefore, forest management should include maintaining existing osprey nest trees and potential replacement trees. It is also important to avoid disturbance in the vicinity of active nests during the breeding season. (NHDRED 1997)

Great Blue Heron Rookeries

All attempts should be made to limit human disturbance around the Great Blue Heron Rookery found on the Property, which can lead to low productivity or nest abandonment. *Good Forestry in the Granite State* recommends that a no harvest, no recreation buffer of 330 feet be maintained around heron rookeries. They further recommend a buffer of up to 660 feet from the rookery of limited disturbance during the nesting season, and only selection harvesting, and a buffer of 1320 feet where high disturbance activities such as road building and construction are avoided during the nesting season.

Recommendations:

Wildlife Management

Many features of the Stewardship Plan will have favorable impacts on wildlife using the Property. Foremost of these is the simple act of preserving the Property in a relatively undeveloped state and thus preserving valuable habitat which would otherwise be lost.

Additional active steps already mentioned include:

- Creating Special Management Areas and buffers in areas of special ecological significance
- Taking steps to protect vernal pools during timber harvesting activities
- Creating areas of early successional forest growth through patch cutting
- Preserving micro-habitats through appropriate tree selection and use of “dead” wood
- Encouraging recreational use in areas of lower ecological significance and discouraging recreation in areas of greater ecological sensitivity
- Ensuring multiple age classes in trees and shrubs to provide a variety of habitat types for a multitude of wildlife species.

Natural Resource Inventory

Identification and inventory of different ecological features of the Property could be an active and valuable element of an educational program. This could include:

- A botanical survey that may identify rare species on the Property;
- A survey of resident, breeding and migratory birds that use the Property; and/or
- Identification and mapping of vernal pools in early spring when vernal pool amphibians are breeding (Calhoun 2000).

Wildlife monitoring

Annual collection of wildlife data can become a critical component of ongoing stewardship efforts, and can add an active and participatory element to an environmental education program. The goal of wildlife monitoring is to collect population information to see how management (or lack of management) of specific habitats is affecting wildlife populations over time. Some examples of the types of monitoring projects appropriate for the region and these timber types are:

1) Woodcock singing ground surveys

These surveys are conducted in order to look at woodcock populations and to determine how these populations fluctuate from year to year. Survey protocol should be consistent with the U.S. Fish and Wildlife Services North American Woodcock Singing Ground Survey.

2) Grouse drumming surveys

These surveys are used to assess the current grouse populations and to track population changes over time.

3) Breeding song bird surveys

These surveys are usually conducted during late May through early July in the very early morning. Observers note species of birds heard, as well as the types and sizes of vegetation nearby.

4) Track surveys

Track surveys could be used to look at animal activity in the winter throughout different areas and habitats throughout the Property.

VII: Water Resources:

The Property contains a portion of the Lake Winnepesaukee watershed, as well as a 47-acre stratified drift aquifer. The entire 765-acre parcel is within a 5-mile radius of Meredith's water intake (US EPA Public Water Supply ID# 1521010) and includes 4,176 feet of frontage on Page Pond (a state designated Great Pond).

Wetlands

The Property includes the largest state designated prime wetland complex in Meredith, the Page Pond Prime Wetland. Within it lies every wetland type known for the region, from small forest woodland vernal pools to a 100-acre emergent marsh. The latter, known as Page Pond, is perennially flooded by beavers yet contains an extensive assortment of floating bog mats and peat-loving forbs. The medium to deepwater marsh aspect of this pond is noted as an exemplary natural community for the region, and is the most biologically diverse wetland of the entire Town (Van de Poll 2007).

There are approximately 85.7 acres of palustrine wetlands found on the Property based on wetlands data courtesy of the Town of Meredith, derived from National Wetlands Inventory maps, NRCS hydric soil maps, USGS hydrography maps and map truthing from 1998 aerial photographs. These consist of 0.8 acres of emergent marsh, 0.8 acres of submerged aquatic vegetation, 61.5 acres of forested wetlands, and 22.4 acres of scrub/shrub wetlands. These wetlands serve important functions in providing habitat and maintaining, or improving, water quality. These wetlands are protected by the State of NH and all management activities will be designed to preserve their integrity. Riparian management zones have been identified in order to protect water and other natural resource values on the Property (See Map E, Aquatic Resources Map).

The northwestern area of the Page Brook wetland is considered to be a low-yield aquifer, according to data from USGS (1997). Stratified drift aquifers are deep, layered beds of water-sorted sands and gravels, and occasionally clayey silts, with potential for supplying drinking water. Only 7% of aquifer areas in Meredith are on conserved lands, so protection of this 47-acre aquifer is significant, even though it is low-yield.

Rivers and Streams

The Property contains 11,215 feet of frontage on Page Brook, the largest wetland drainage on Meredith Neck. Page Brook is the primary tributary to Fish Cove, a warmwater cove of Lake Winnepesaukee. Page Brook's forested watershed helps to maintain lake water quality by reducing erosion and surface water turbidity. Page Brook's lush complement of aquatic emergents and marsh vegetation along its extensive wetland system slow down surface waters, providing flood retention and also uptake excess nutrients. Given that Fish Cove's perimeter is densely developed and has an average depth of only 10 feet, preserving the hydrologic function of Page Brook is essential to maintaining its water quality.

The Page Brook watershed encompasses approximately 665 acres, the majority of which is located on the property. Page Pond is the largest open water body on the tract, occupying approximately 19 acres, and is fed by Page Brook. The shallow pond, averaging 8 feet deep, is surrounded by dense vegetation, consisting of 31 species of plants, including red maple, high-

bush blueberry, speckled alder, sedges, cattails, pickerelweed and arrow arrum. These two areas provide habitat for waterfowl and contain an abundance of game and nongame fish species, including yellow perch, golden shiners, chain pickerel and horned pout.

VIII: Recreation and Education:

Through protection of this Property the public will be allowed access to exceptional public recreation opportunities for hiking, fishing, hunting, cross-country skiing, snowshoeing, canoeing, kayaking, photography, wildlife-viewing, nature study and snowmobiling on designated trails. Page Pond itself provides for tranquil, wilderness-like paddling and fishing experiences more often found in northern New Hampshire. In the winter, Page Pond may possibly support ice fishing and cross-country skiing. As reflected in Meredith's Master Plan, the town's aquatic and backcountry recreational resources are valued by the majority of its residents and seasonal visitors, and are what make Meredith a truly unique and desirable community. Recreation will be promoted on the Property, but all recreational activities must be consistent with the purposes of the LCHIP deed restriction and the purposes of this Stewardship Plan.

The land has a network of woods roads established principally for logging operations that are no longer active. These logging roads connect to a network of trails, running north-south following Page Brook, that have traditionally been used by the public for hiking, camping, mountain biking, cross-country skiing, and snowmobiling. Hunters and fishers also use these trails to access the diverse, unfragmented habitat on the property. Species hunted on the property include deer, bear, birds, and small game; while fishers enjoy angling for Yellow Perch, Smallmouth Bass, Chain Pickerel and Horned Pout on 19-acre Page Pond.

Permanent conservation of this property will provide opportunities to bolster tourism. The property is in close proximity to several Lakes Region hotels, motels, campgrounds, and local businesses. Trailhead access to the property will be just a short distance from NH Route 25, a major east-west travel corridor in the region.

Hiking and dispersed pedestrian recreation

The land already benefits from a network of six miles of trails that are used for hiking, hunting, wildlife viewing, environmental education, fishing access, cross country skiing, and snowshoeing. Dispersed non-motorized pedestrian access is provided throughout the Property. Due to nuisance, forest management and natural resource concerns, no recreational motorized wheeled vehicles (including, but not limited to, motorbikes, dirt bikes, three-wheelers, four-wheelers, ATVs) will be permitted on the Property. Snowmobiling, mountain biking and equestrian use will only be allowed on trails designated for those particular uses.

Over the next five years the Meredith Conservation Commission will determine where additional trails may be beneficial. A goal for the first two years of ownership is to create an east-west linkage between existing trails on the east side of the property and a new entrance on Barnard Ridge Road. Over the next two years, the Conservation Commission will also engage with the Meredith Pathways Committee and the public to improve pedestrian access to the Property via a

sidewalk along the state-road Barnard Ridge from the Interlakes school campus, and/or from Veasey Shore road. There currently is a 100-foot strip for a future 50-foot right-of-way on the northeastern boundary of the Property that could allow pedestrians from Veasey Shore road to easily access the property; a connecting trail would need to be built. The feasibility of an accessible trail following the Quarry Road loop near the Quarry Road entrance will also be studied.

Minor trail maintenance activities will take place as needed, including installing water bars and removing fallen trees. If there is a major storm wash-out of a current road or trail, efforts will be made to repair the trail to restore public access and prevent further erosion or damage. New trails will be routed to avoid any adverse impact on wetlands, springs, riparian areas, and other sensitive natural features. Nesting areas, fragile habitats, and wetlands will be off-limits to the public.

All new trails will be constructed and maintained in a manner to minimize wildlife and environmental impact, be compatible with other uses in the forest, and be in accordance with then-current best practices. Trails will be routed to avoid impacting areas of highest quality wildlife habitat. The UNH Extension Service and NH Fish and Game have tools to identify areas impacted by trails. (See Map I: Wildlife Impact) These will be used to design new trails, and possibly to relocate existing trails.

The infrastructure needed to improve public access from Barnard Ridge Road including bridges, trail signs, an informational kiosk, gates, maps, and a four-season parking area, will be put into place in the next two years by MCC, Meredith Public Works, and local volunteers. Subsequent maintenance of the trails and recreation infrastructure will be performed by volunteers.

Educational Activities

Given the proximity to the Town center, schools and Lake Winnepesaukee, the Page Brook property could present significant educational opportunities for many groups. A short drive from Town center, school children of all ages could use the property for field trips to learn about local environmental, historical and cultural resources in their backyard. Additionally, Meredith's reputation as a recreational destination could be enhanced by offering visitors the opportunity to observe the property's rich diversity of wildlife.

Temporary Closure

The Town of Meredith may restrict or prohibit public access in areas involved in active timber harvesting, or road construction. The Property may be posted against public access in the interest of public safety or to prevent natural resource degradation. If timber management or road construction is to take place anywhere near hiking trails, care will be taken to avoid affecting or blocking the trail. When actively logging, Meredith Conservation Commission and/or the forester will post affected trails within the immediate vicinity of activity with a sign prohibiting pedestrian access. The prohibition will end at the conclusion of logging activity, and the landowner will remove these signs.

Parking

A new parking area will be created along Barnard Ridge Road. The Town of Meredith will clear, brush and prepare the parking area with gravel, and will maintain it as needed.

Monitoring of Public Use

Meredith Conservation Commission will monitor public access and use of areas that are ecologically fragile to ensure that the current ecological conditions are not diminished or degraded by the public. If public access or other use issues develop, MCC will consider management options, including posting to limit or close access to the trails. If needed, the Town of Meredith will obtain assistance from NH Fish & Game and Meredith Police Department for enforcement of prohibitions.

Boating

The Property provides a diversity of opportunities for anglers as well as canoeists, kayakers, and other small boaters. Only non-motorized boats will be permitted.

Camping

There are currently no campgrounds on the Property and camping is not a planned use.

Hunting and Fishing

Hunting will be permitted in accordance with New Hampshire state law. The Town of Meredith does not intend to post the Property against hunting. No permanent deer stands, blinds or structures will be permitted. Trapping is prohibited, with the exception of live-trapping of animals for habitat management at the request of MCC. Various opportunities exist for warm-water fishing. Page Pond provides habitat for waterfowl and contains an abundance of warmwater fish species, including yellow perch, smallmouth bass, chain pickerel and horned pout.

Scenic Resources

From the highpoint of land, the property offers seasonal views of Lake Winnepesaukee and the Belknap Mountains. The Page Brook property is also viewable from Crawford Notch to the southern end of Lake Winnepesaukee and from the Belknap Mountain Range.

In 1999, the Town of Meredith conducted an inventory of visual resources in the town. The study concluded that wetlands are a key visual attribute that helps define the overall visual character of Meredith. Of the 92 scenic resources documented by the community, the Page Brook wetlands are considered to be “highly significant” by the community and representative of the town’s landscape. Thomas L. Kokx, the study’s author, summarized the visual significance of this wetland by saying... “the proximity of the Lakes Region Scenic Tour Byway (State Highway 25) to the Page Brook Prime Wetland is a key attribute. Although not directly adjacent to the wetland, the Scenic Byway is located just north of the area. The wetland is easily accessible from this travel route. As a result, the wetland features would provide a special and outstanding source of interest, point of education, and opportunity for passive recreation activities (hiking, photography, viewing wildlife, etc.) for those traveling the Byway for recreation and scenic pleasure. The potential is high to tie the Scenic Byway to the wetland as one of the best environments of this type around the Lakes Region to experience.”

IX. Rare Species and Exemplary Natural Communities

To date, there are no known unique or unusual species or natural communities. However, as mentioned above, the recent Natural Resources Inventory Project in Meredith identified the 900-acre area surrounding Page Brook as one of the highest-valued co-occurrence areas among the 9 areas targeted. Wildlife habitat, prime wetland ecosystems, unfragmented forest, and proximity to Lake Winnepesaukee served as primary ranking factors in this assessment. The Page Brook property would conserve over 62% of this highly valued co-occurrence area. Additionally, the common loon (*Gavia immer*), considered a state threatened species, is found within one mile of the property.

At least three exemplary natural communities exist on the Property: the medium to deepwater emergent marsh described above, the short graminoid-forb emergent marsh/mudflat that forms a tight matrix with the deeper water marsh, and a black ash-red maple seepage swamp community that is halfway between a southern and northern example of this circumneutral swamp type. In addition, there are at least two rocky ridge communities on the eastern boundary, one of which hosts the largest upland population of pitch pine on the Property and is more aptly recognized as an Appalachian oak-pine rocky ridge (Van de Poll 2007).

X. Cultural Resources

During the period of European settlement, much of the land was cleared for farming. There are a large number of historic sites contained on the Property, and evidence of pre-colonial farms, stonewalls, old wells and cellar holes abound. The Property also has historical value due to the past operation of a quarry and a lumber mill, which was powered by an undershot water wheel with extensive stonework that encompasses the dam and site of the Dudley Leavitt homestead (see photos attached). The sawmill is at the southern end of Page Pond and the field stone foundations remaining from several homesteads in the area are near the extension from Blueberry Hill Road.

The property also abuts a family cemetery once used by the Leavitt family. The cemetery contains the headstone of Dudley Leavitt (1725 – 1851), the author of Leavitt's Farmer's Almanac first published in 1797. These two locally significant historical sites could serve as educational attractions. See B: Access and Recreation Map. A second, smaller Leavitt cemetery is located on the eastern tract of land protected in 2017 in the vicinity of another small cellar hole, a larger barn cellar hole, and some old farm equipment.

A cultural resources plan would be a valuable addition to assist in maintaining the integrity of the cultural resources on the Property. It would also provide cultural and historical information that would be useful as an educational resource to teachers and the general public. Such a plan would detail any special maintenance and protection needed to maintain historical information and would be available on the informational kiosks and shown on the maps available to the public.

XI. Proposed Action Schedule-

This section outlines the proposed action plan for 2019 through 2023. Specifics such as trail locations and areas to be managed for wildlife habitat will be based on a master plan prepared to best achieve the objectives stated previously in a non-conflicting manner.

Year 2019

- Establish Master Plan for the property to designate uses and geographic locations
 - Forestry
 - Agriculture
 - Recreation
 - Wildlife habitats
- Establish trailhead at Barnard Ridge Road
 - Parking area
 - Signs and informational kiosk
- Determine location and construct trail from Barnard Ridge trailhead to existing trails
- Continue management of invasive species
- Create historic preservation plan for mill site
- Determine feasibility and location of an accessible trail

Year 2020

- Continue management of invasive species
- Construction of accessible trail
- Initiate agricultural agreements with farmers
- Execute logging and habitat management per plan

Year 2021

- Begin agriculture as appropriate
- Continue execution of Master Plan

Year 2022

- Update Stewardship Plan
- Update Master Plan
- Continue execution of Master Plan

Year 2023

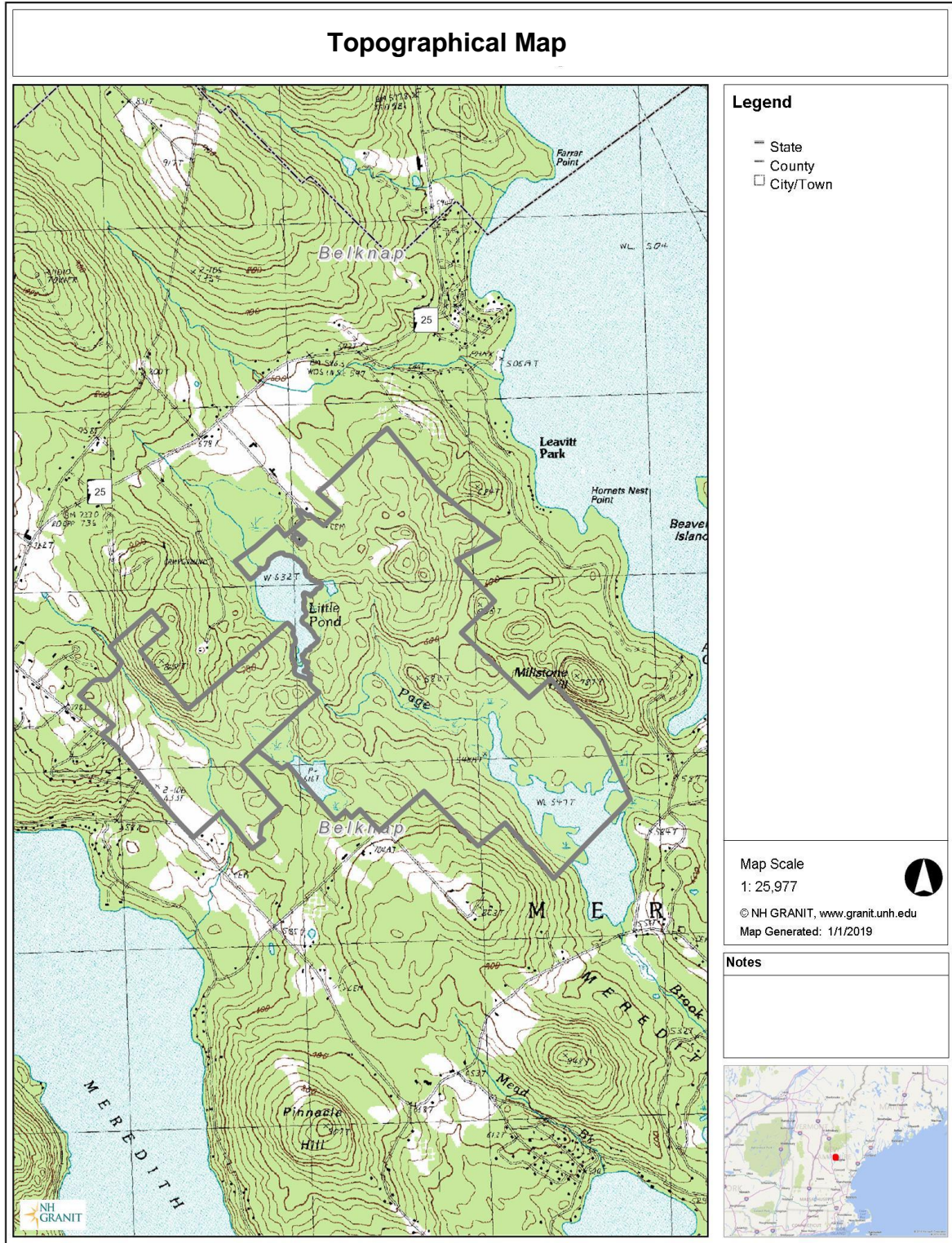
- Update Forestry Plan
- Continue execution of Master Plan

XII. Literature Cited:

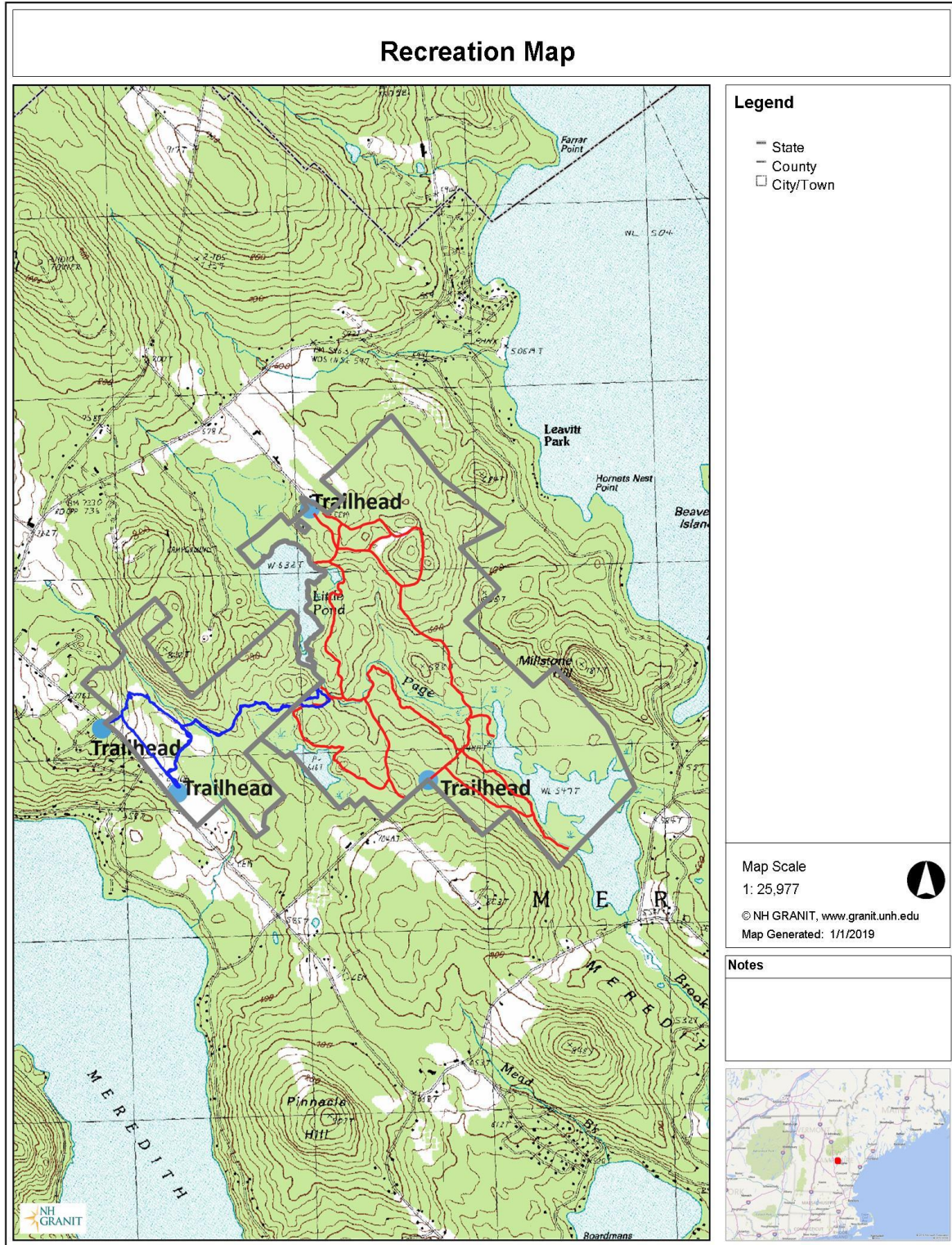
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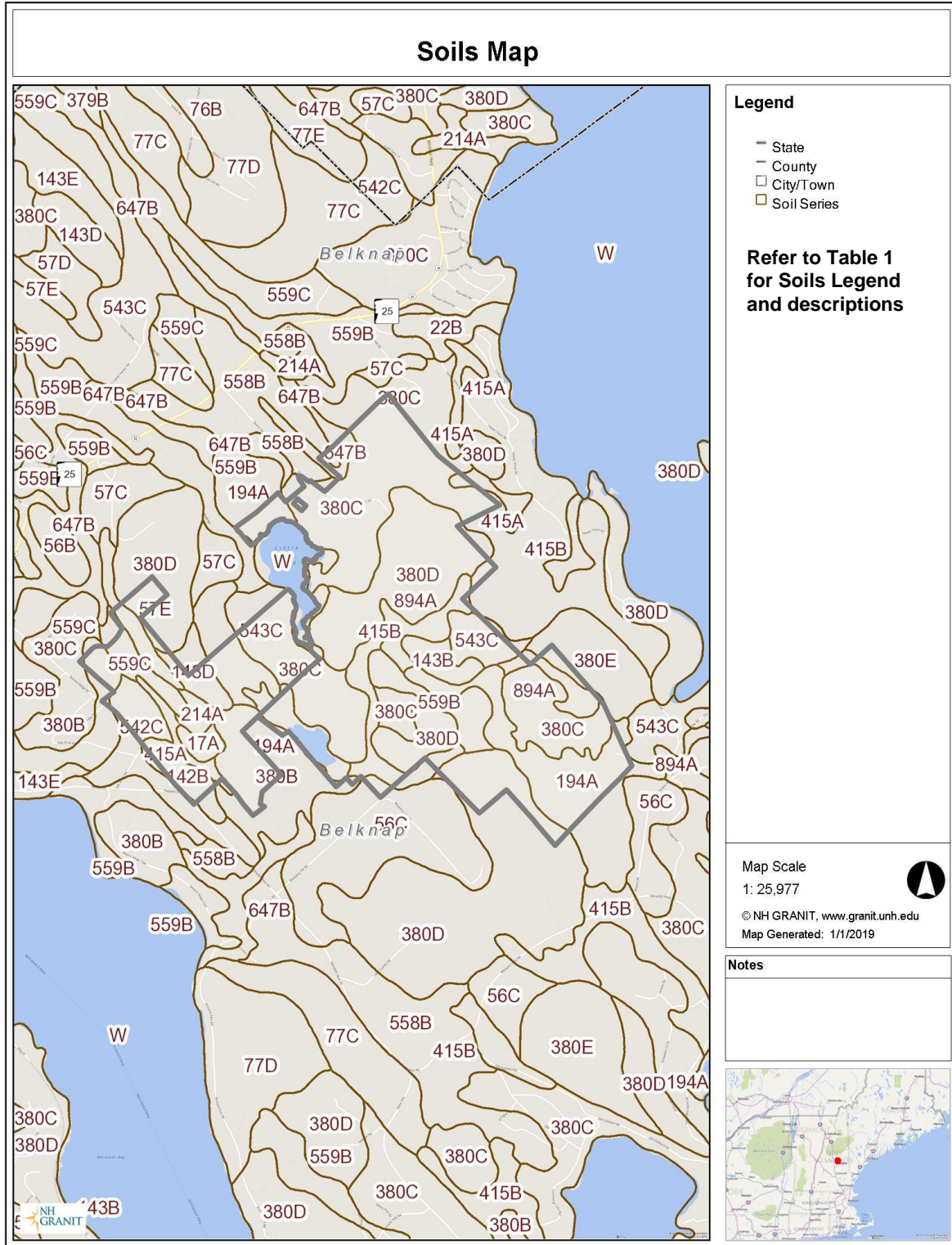
Map A: Topographical Map



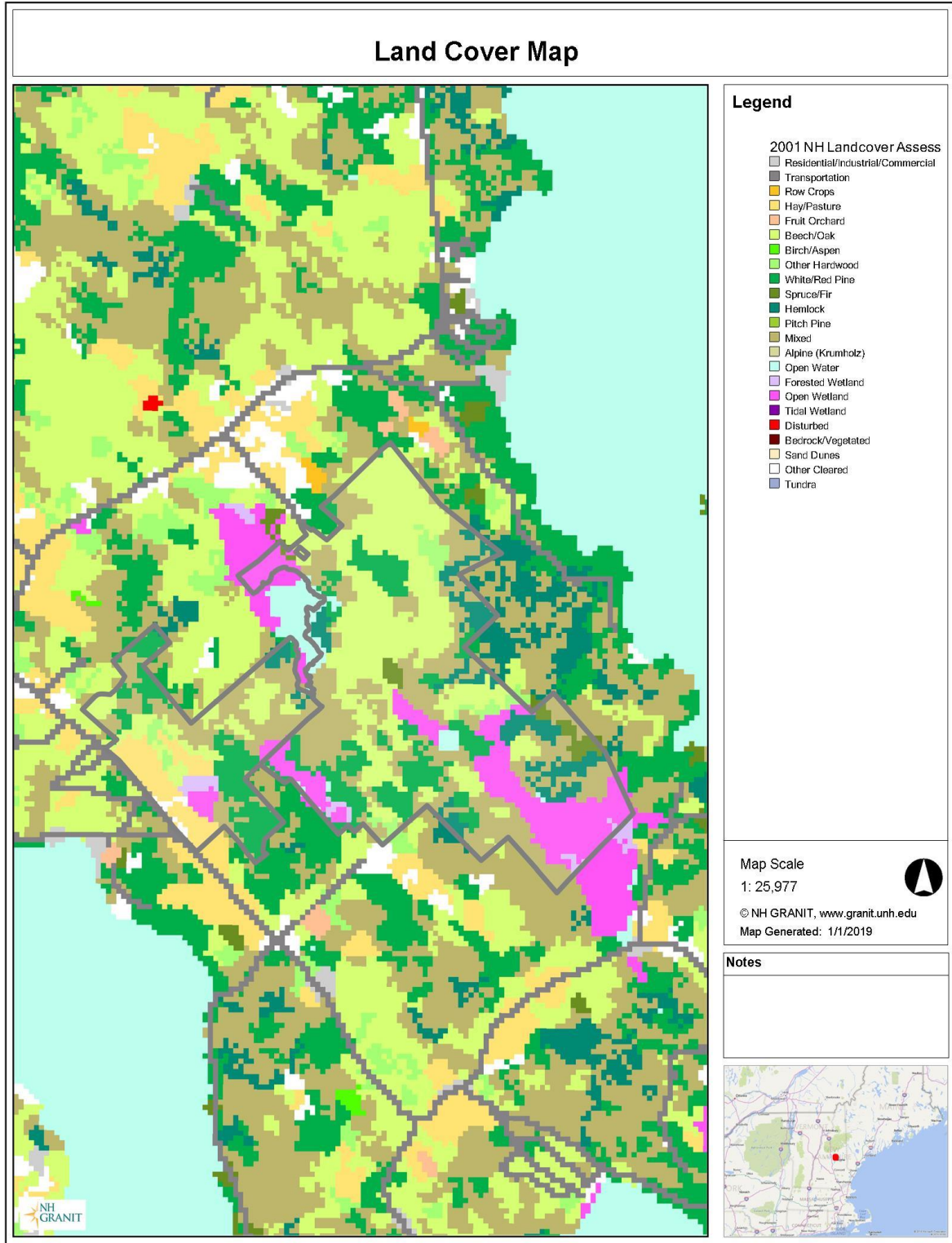
Map B: Recreation Map



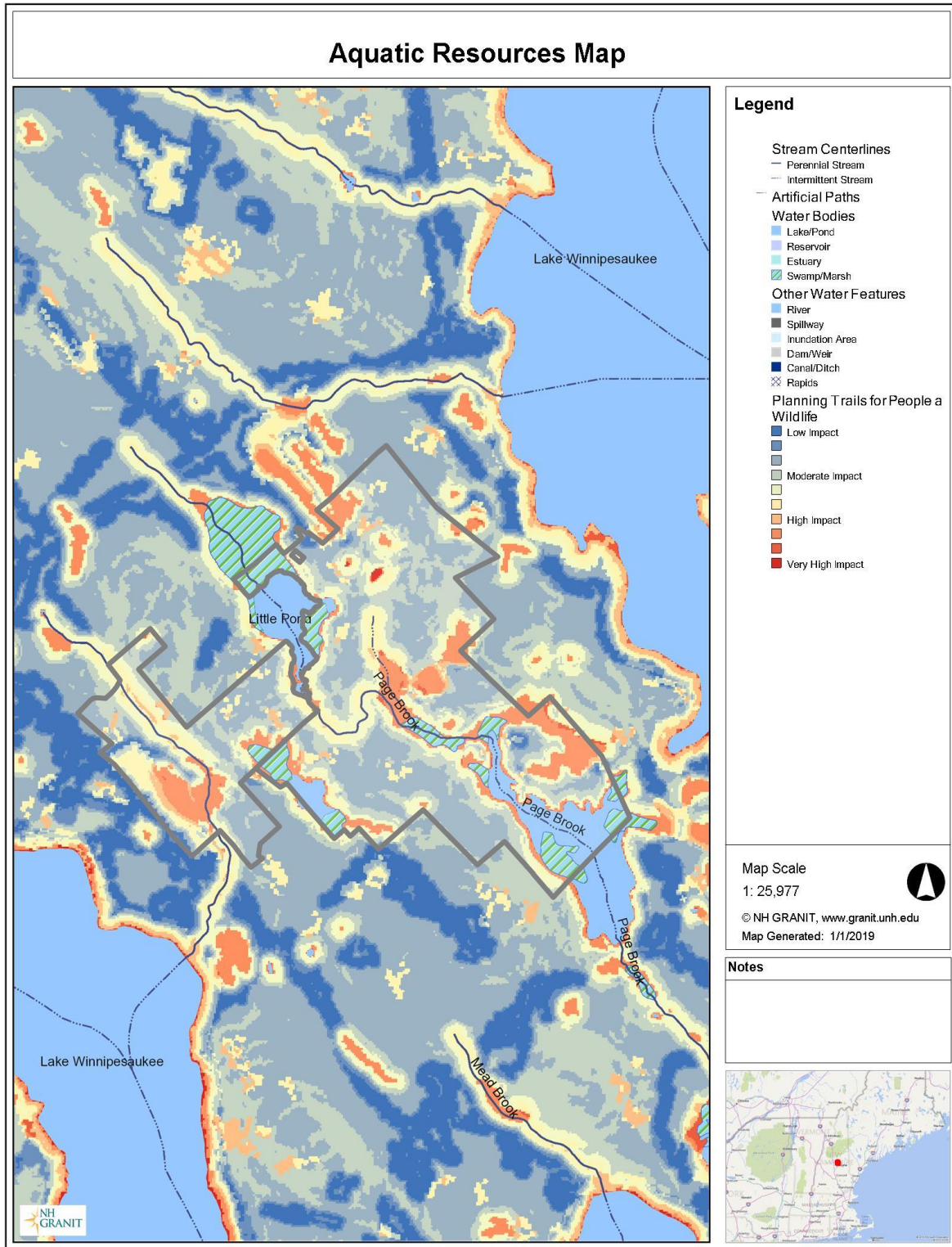
Map C: Soils



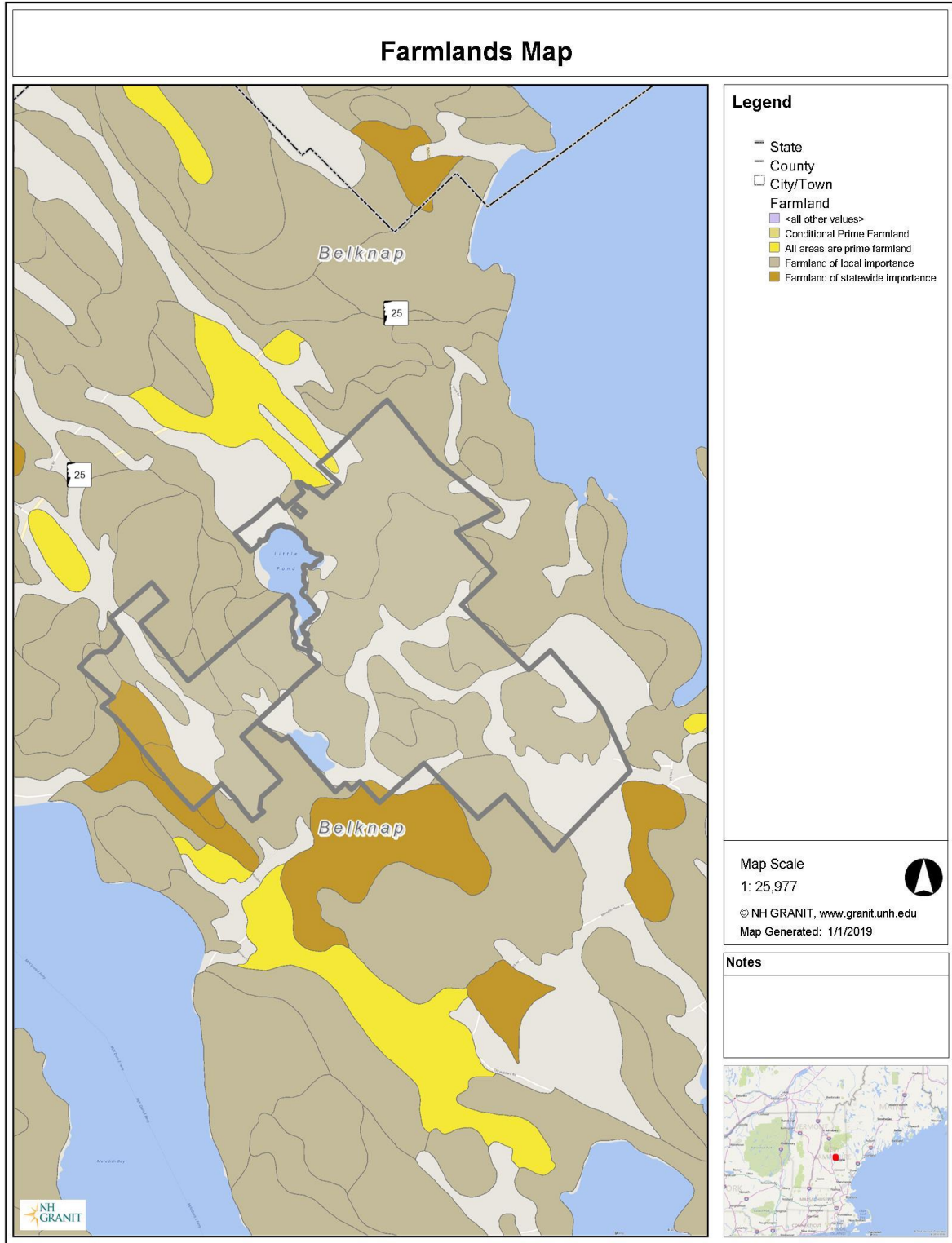
Map D: Land Cover



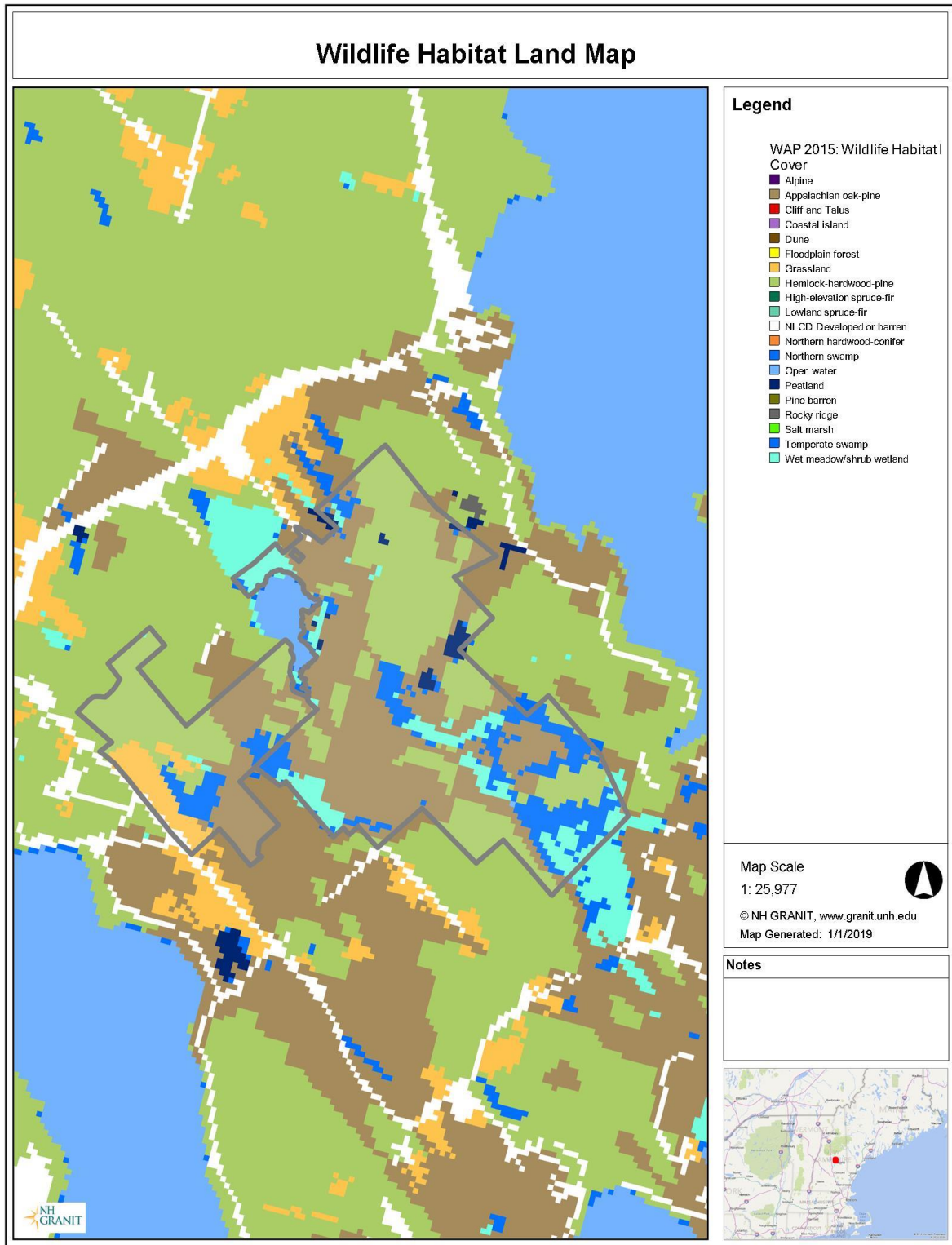
Map E: Aquatic Resources



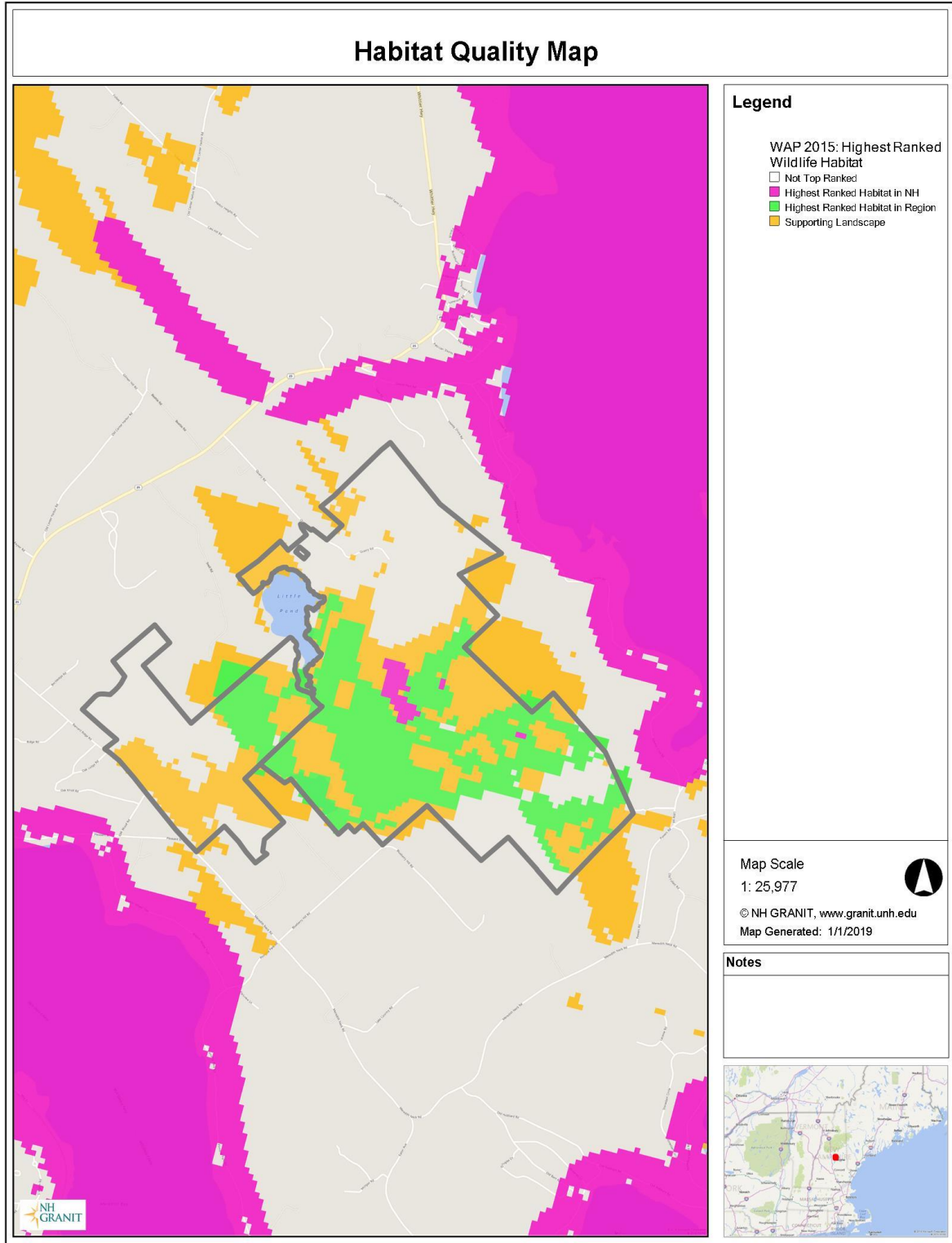
Map F: Farm Lands



Map G: Wildlife Habitat



Map H: Wildlife Habitat Quality



Map I: Wildlife Impact

