STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF FORESTS, PARKS AND RECREATION
DEPARTMENT OF FISH & WILDLIFE

Lowell Lake State Park

Long Range Management Plan Amendment

356.5 Acres
Londonderry, Vermont

Prepared by: Springfield District Stewardship Team

Date: August 7, 2015

Approved by: _____ _____
Michael Snyder, Commissioner, FPR Date

Reviewed by: _____ _____
Louis Porter, Commissioner, F&W Date

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Mission Statements

Vermont Agency of Natural Resources

The mission of the Agency of Natural Resources is "to protect, sustain, and enhance Vermont's natural resources, for the benefit of this and future generations."

Four agency goals address the following:

- To promote the sustainable use of Vermont's natural resources;
- To protect and improve the health of Vermont's people and ecosystems;
- To promote sustainable outdoor recreation; and
- To operate efficiently and effectively to fulfill our mission.

Departments

Vermont Department of Environmental Conservation
Mission Statement

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

Vermont Fish & Wildlife Department
Mission Statement

The mission of the Vermont Fish & Wildlife Department is the conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected.

Vermont Department of Forests, Parks and Recreation
Mission Statement

The mission of the Department of Forests, Parks and Recreation is to practice and encourage high quality stewardship of Vermont's environment by monitoring and maintaining the health, integrity, and diversity of important species, natural communities, and ecological processes; managing forests for sustainable use; providing and promoting opportunities for compatible outdoor recreation; and furnishing related information, education, and services.

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EXECUTIVE SUMMARY

The 356.5-acre Lowell Lake State Park (LLSP) is located in Londonderry, Vermont in the Southern Green Mountains biophysical region, in southeastern Vermont. It is located in a rural area which features a primarily forested, undeveloped landscape. With four ski areas and numerous tourist destinations nearby, the park sees high recreational use year round.

Purpose of Amendment

A General Management Plan for Lowell Lake State Park (LLSP), approved in 1999, was completed before the establishment of ANR's current Long Range Management Plan (LRMP) process. As a result, many of the assessments that are part of the current document, which produce a more complete and thorough understanding of a parcel, were not conducted at that time. This LRMP amendment includes assessments for forest resources with an updated natural communities section and plans for park infrastructure redevelopment. Utilizing these additional assessments with the previous General Management Plan, an updated Land Use Classification was developed to support implementation of management activities to accomplish the following goals and objectives.

Management goals for the LLSP include strategies to:

- Develop and improve recreational opportunities while maintaining and protecting infrastructure, historic sites, water bodies, and shorelines.
- Protect and enhance important wildlife habitats and features.
- Produce a diversity of wood products and create forest age class and habitat diversity through sustainable management and harvest practices.
- Protect and improve the condition of important ecological resources.

Recreational Development

The goals for the developed areas as outlined in the 1999 General Management Plan remain valid. Goals of the plan were developed following extensive public input through the Lowell Lake Steering Committee over the course of three years. Common themes of public input at that time were:

- Rehabilitate buildings for overnight use along with camping in northwest quadrant.
- Make improvements to trails, boat launch, picnic areas, parking lot, and roads.
- Maintain the low use natural character of the property.
- Monitor for over-use and mange uses if damage is occurring.
- Focus on a few specific recreational opportunities while preserving the character of the area and the experience.
- Continue to allow swimming as a use without developing a large beach.

For planning and cost projection purposes, an updated concept has been developed based on 16 new overnight rental units: 12 one-room cabins and 4 two-bedroom cottages with support facilities. A central toilet and shower facility serving the cabins along with an additional small standalone toilet facility would be constructed to serve the cabins. The developed footprint will be as close to the existing area as possible. However, no longer proposed is a series of up to 12

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tent or lean-to campsites. These have been eliminated from the design concept to limit potential noise associated with outdoor campsites and to focus solely on the traditional "sheltered" overnight accommodations. The proposed lodge enhancement includes a commercial-scale kitchen available to cabin guests. The main lodge area would be available for communal meals or social space for all overnight users. All overnight facilities and the lodge would be universally accessible to guests of all physical ability levels via connected walking paths. Several central parking areas located toward the back (western side of the interior road or farthest away from the lake) of the area would be connected to the facilities by a series of ADA-complaint paths and walkways.

> **Lowell Lake –** This scenic 100-acre pond is the focal point for recreational activity on the property. Canoeing, kayaking, fishing, and wildlife viewing are popular activities here. Lowell Lake is large enough to make it an enjoyable location for boaters to spend several hours paddling and exploring. ANR records list the lake area as 109 acres, a watershed area of 1,313 acres and a maximum depth of 22 feet. Water quality is rated in good condition. The lake provides excellent habitat for a warm water fishery and supports a diverse natural flora of aquatic species with more than 30 species of aquatic plants documented.

Under Vermont Water Resource Board rules, motorboats and personal watercraft (jet skis) are prohibited on the lake.

Legal Constraints

Management and Park redevelopment activities may be subject to the Shoreland Protection Act. A portion of the primary hiking trail lays on an easement on private lands through an Act 250 permit on that property (Powder Mill). The "White Lot", which includes a significant portion of the parcel and the developed area, is subject to a Conservation Easement and Grant of Development Rights held by the Vermont Land Trust (VLT) and the Vermont Housing and Conservation Board (VHCB)

Natural Communities

Ten natural communities on the parcel have been identified (Table 1). None are occurrences of statewide significance. Two are considered to be rare and all normally occur in this region.

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Table 1: Natural Communities of Lowell Lake State Park

Natural Communities of Lowell Lake State Park			
Natural Community		**Acres**	**Vermont Distribution**
Wetlands	Beaver Wetland	29	Very Common
	Hemlock-Balsam Fir-Black Ash Seepage Swamp	6	Uncommon
	Red Spruce-Cinnamon Fern Swamp	1.5	Uncommon
	Seep	N/A	Common
	Vernal Pool	N/A	Uncommon
	Spruce-Fir-Tamarack Swamp	10.5	Uncommon
	Poor Fen	3	Rare
	Hemlock-Sphagnum Acidic Basin Swamp	2	Rare
Uplands	Hemlock-Northern Hardwood Forest	~ 304.5	Common
	Hemlock-Red Spruce Forest		Common

Wildlife and Habitat

No critical upland wildlife habitats, such as deer wintering areas or mast stands occur on the property. There are multiple wetlands which provide a variety of habitats beneficial to many mammals, birds, amphibians, and insects.

Five species of rare or uncommon plants and one uncommon invertebrate animal species are known to occur in LLSP (Table 2). Most are associated with wetland or aquatic habitat. In general, maintaining the hydrological and ecological functions of the lake and wetlands will help protect these species.

Table 2: Rare or Uncommon Species of Lowell Lake State Park

Rare or Uncommon Species of Lowell Lake State Park			
Species Name	**Common Name**	**State Rarity Rank***	**Rarity***
Diphasiastrum complanatum	Northern Ground Cedar	S2	Rare
Myriophyllum farwellii	Farwell's Water-Milfoil	S2	Rare
Potamogeton bicupulatus	Snail-Seed Pondweed	S2	Rare
Carex folliculata	Northern Long Sedge	S3	Uncommon
Utricularia purpurea	Eastern Purple Bladderwort	S3	Uncommon
Nehalennia gracilis	Sphagnum Sprite	S3	Uncommon

*For a full explanation of these rarity ranks, visit the Vermont Natural Heritage Information Project website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm

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Timber Resource
Most stands are stocked with pole to small sawtimber size trees. Some stands contain very large white pine and declining or dying balsam fir sawtimber. Tree quality ranges from poor in wetter areas to moderate in pockets of better soils. Tree stocking is high over much of the forest. Regeneration is variable with moderate to high densities of balsam fir and hemlock seedlings in small pockets where the balsam fir has died. Several areas with dense red spruce regeneration are present. Hardwood trees throughout much of the property are poor quality due to species type, site class and high water table.

Recreation
Infrastructure improvements to the park completed in the past 15 years include trail construction, installation of new picnic sites and portable restroom facilities, building repair and maintenance, boat access improvements, and improvements in the main access and parking. Hiking trail improvements include foot bridges, water diversion structures, and trail relocations. Snowmobile (VAST) trail improvements include a gate installation off Lowell Lake Road. In 2010 VAST was issued a Conditional Use Determination from the District Wetlands Ecologist for the construction of five bridges on the existing snowmobile trail to cross wet areas within and adjacent to the class 2 wetland. They were completed that year.

Management Access
Overall, the terrain at LLSP is well suited to management operations. It is relatively flat with rolling hill topography. There are very few steep hillsides but many small water features which will limit management in some areas. However, most portions of the park have excellent access from town roads around the property and an interior access road and skid trail network. Little, if any, additional management road construction is anticipated.

Management Classification
After completion of inventories and assessments, the lands, resources, and facilities held by the Vermont Agency of Natural Resources (ANR) are evaluated and assigned to appropriate Agency Land Management Classification categories based upon knowledge and understanding of resources and appropriate levels of management. This enables land managers to allocate use and management by area minimizing conflicts between competing objectives and facilitating a common understanding of the overall use or type of management to occur in particular areas of LLSP. The three categories as applied to LLSP are Special Management (29%), General Management (59%), and Intensive Management (12%).

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LONG RANGE MANAGEMENT PLAN AMENDMENT
LOWELL LAKE STATE PARK

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I. Introduction

A. Purpose of Amendment

A General Management Plan for Lowell Lake State Park (LLSP), approved in 1999, was completed before the establishment of ANR's current Long Range Management Plan (LRMP) process. As a result, many of the assessments that are part of the current document, which produce a more complete and thorough understanding of a parcel, were not conducted at that time. The general plan focused on the recreation aspect and infrastructure within the developed portions of the park. Very little management was scheduled for areas outside of the park facilities which has restricted stewardship activities with respect to wildlife habitat management, forest management, and recreation trails. In addition, over the past 13 years there have been some changes to the property including building condition and use, land acquisition, legal rights, property uses, and levels of recreational activity. This LRMP amendment includes assessments for forest and park resources with an updated natural communities section and plans for park infrastructure redevelopment. Utilizing these additional assessments concurrent with the previous General Management Plan, an updated Land Use Classification was developed to support implementation of management activities to accomplish the following goals.

B. Purpose of Ownership

As stated in the Grant of Development Rights, Conservation Restrictions, Public Access Easement and Right of Entry Document for the White lot (Appendix E) of Lowell Lake SP, the primary objectives for this portion of LLSP are: "to conserve wildlife habitats and outdoor recreational opportunities" while secondary objectives are "to conserve forestry values and scenic resources."

In general, State Forests and Parks lands are managed by the Vermont Department of Forests, Parks and Recreation to meet a variety of conservation and management goals including:

- Maintenance and enhancement of quality outdoor recreation experiences and infrastructure.
- Protection and enhancement of critical wildlife habitat.
- Protection of unique, fragile, and scenic resources.
- Preservation of historic resources.
- Provision of access to property for public enjoyment.
- Sustainable growth and harvest of forest products to promote wildlife habitat and forest productivity.
- Demonstration of state-of-the-art wildlife habitat, timber management techniques, and techniques to protect water quality in timber harvesting practices so these may find broader application on private lands.

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Figure 1: Base Orthophoto Map

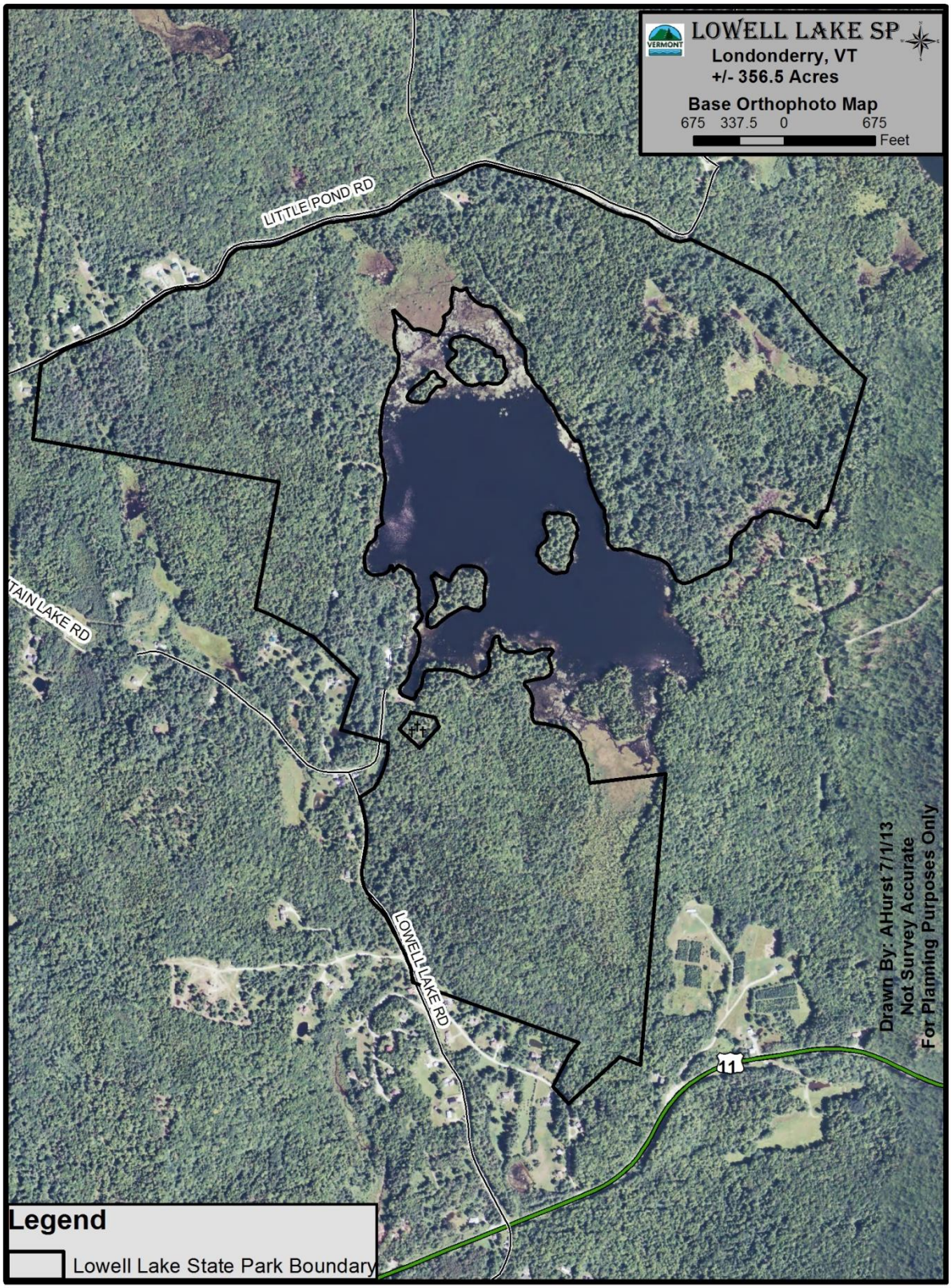
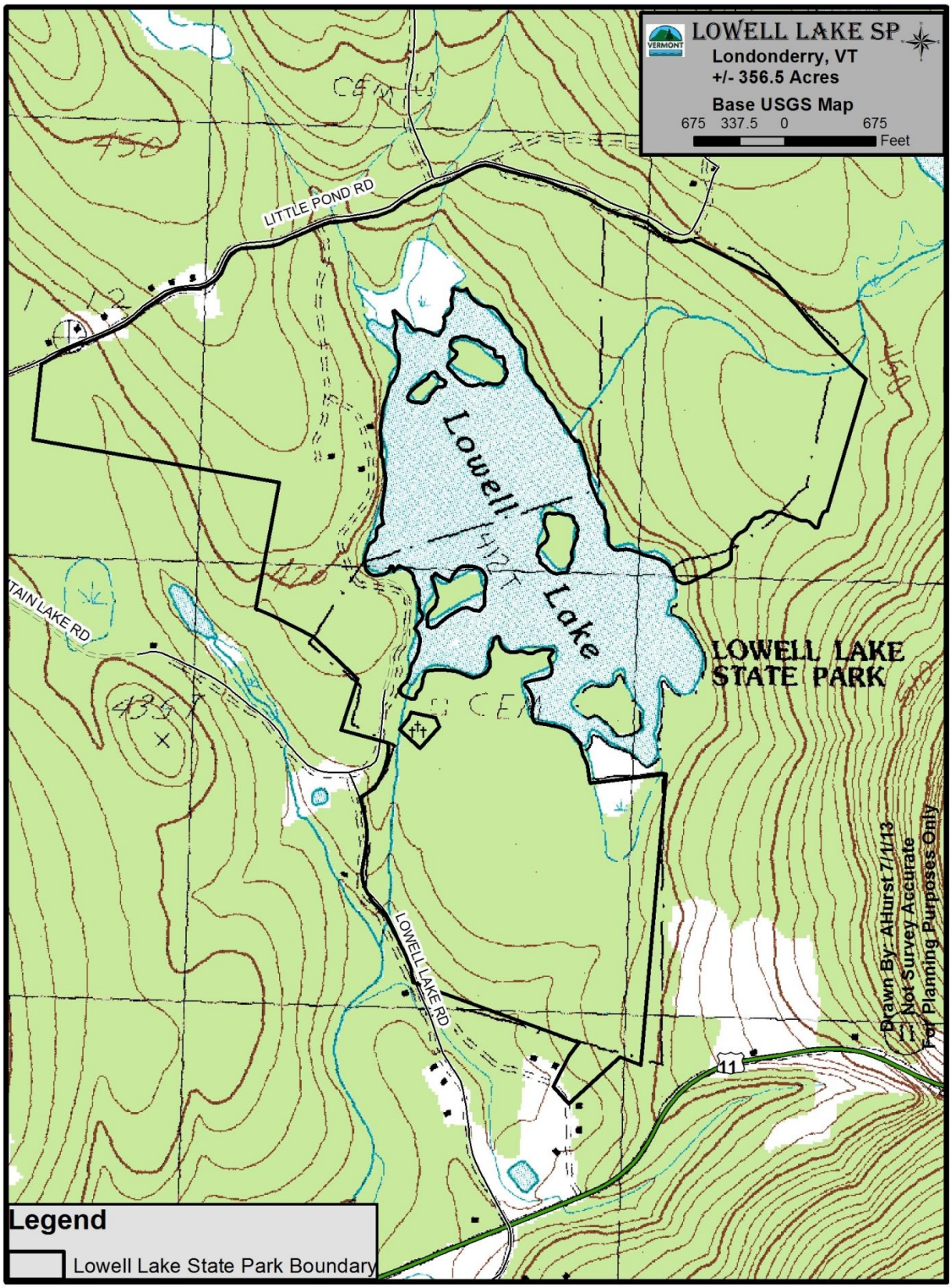


Figure 2: Base USGS Map



II. Resource Assessments

A. Lowell Lake

Lowell Lake is the dominant natural feature on the parcel. Its relatively undeveloped shoreline and scenic views provide a remote feeling experience while being easily accessible from main roads. As of 2014, ANR records list the lake area as 109 acres, a watershed area of 1,313 acres and a maximum depth of 22 feet. Water quality, shoreland, and lake habitat is rated in good condition and invasive plant populations are low. The trophic state (nutrient level) is listed as mesotrophic, moderately high in nutrients.

The lake provides excellent habitat for a warm water fishery. Predominant fish species are yellow perch, pumpkinseed, and largemouth bass. The fish community includes several other common species including shiner species, brown bullhead, chain pickerel, and white sucker. The lake supports a diverse natural flora of aquatic species with more than 30 species of aquatic plants documented.

B. Recreation Resources and Infrastructure Assessment

The goals for the developed areas as outlined in the 1999 General Management Plan remain valid. Goals of the plan were developed following extensive public input through the Lowell Lake Steering Committee over the course of three years. Common themes of public input at that time were:

- Rehabilitate buildings for overnight use along with camping in northwest quadrant.
- Make improvements to trails, boat launch, picnic areas, parking lot, and roads.
- Maintain the low use natural character of the property.
- Monitor for over-use and mange uses if damage is occurring.
- Focus on a few specific recreational opportunities while preserving the character of the area and the experience.
- Continue to allow swimming as a use without developing a large beach.

Because it has been more than 15 years since the goals for managing the park were developed, it is timely to re-evaluate those goals to determine their relevance and practicality today. Development and operational emphasis will focus on the existing day uses of the park (hiking, paddling, fishing, and other dispersed recreation) and overnight use concentrated in the area developed for this use by previous property owners.

Since 1996 the following projects have been completed, totaling more than $120,000 in investments. Dollar figures provided are approximate costs.

- Construct the Lowell Lake Trail, done by VYCC over several years: $15,000
- Create and maintain 4 new picnic sites: $1,000
- Provide portable restroom facilities: $10,000
- Improve boat launching facility with periodic maintenance: $5,000

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- Re-roof and stabilize all buildings while awaiting final planning (1996-97)
- Install new gate at north end of the interior road: $2,500
- Parking lot improvements and maintenance: $15,000
- Access Road improvements and maintenance: $15,000
- Repair and stabilize rotten logs in lodge: $7,500
- Re-roof island cabin (2012): $3,000
- Upgrade finishes, utility systems and complete interior of residence/maintenance building (1996 and 1997 and 2011): $25,000
- Resurfacing of the interior park roadway/multi-use portion of Lowell Lake Trail (2 of 3 phases complete to date; additional $12,000 obtained to complete work in 2014): $22,000

For several reasons, re-starting overnight use at the park remains relevant. There is a large unmet demand for "sheltered" overnight use (cabins and cottages) at other state parks. Vermont State Parks began adding one-room cabins in 2004 to complement the 8 full-service cottages located in several parks throughout the state. Now there are 45 cabins and 10 cottages, which have occupancy rates of 70-95%. The Park Reservation Center frequently hears from potential visitors who wish to rent a cabin, but do not have a preference on location; they simply want a sheltered camping experience. Proximity to water is a common request. As an example, a construction project at Mt. Ascutney State Park to add 5 cabins began the planning stage in 2010. Construction started in the fall of 2013; once the public became aware that cabins were being planned in 2010, they immediately started calling requesting reservations.

Currently, the majority of the day-use oriented goals have been achieved. Swimming continues to be allowed but not in a "developed" swimming area. There is no plan to provide a developed swimming area. Minor enhancements may be made to the area in front of the lodge if necessary for safety reasons.

The largest amount of work still ahead is the rehabilitation of facilities for overnight use in accordance with the public input and goals originally set forth in 1999. Much has changed since then in terms of condition of the existing structures, anticipated needs of the facility, a more comprehensive plan of overnight and day use, much larger annual day use visitation, and construction costs and techniques. To properly rehabilitate or replace structures to serve anticipated needs in accordance with Vermont State Parks' construction standards and meet state and national construction and life safety codes, it is estimated that full implementation of overnight facilities will cost approximately $3 million.

<u>Day Use Infrastructure</u>:

When the original General Management Plan was adopted, it was assumed that no significant day use would occur at LLSP. That was before modern kayaks became popular and the park had wide recognition; additionally the Lowell Lake Trail was not completed. Original visitation estimates predicted that the park would receive at most 1,500 day visits annually. We estimate that the park receives at least 5,000 day visits during the summer months, mostly from recreational boaters and hikers and dog walkers. During the summer of 2013, attendance was counted 3 days per week by the Park Ranger; this amounted to almost 3,000 visits. The parking

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lot is at capacity on nice weather weekends from July through October. This necessitates having the park staff monitor traffic and close the parking lot when it reaches capacity. This is done to protect resources and the visitor experience.

Day use needs include additional improvements to the parking area, a park office at the park entrance, a permanent toilet facility, and full staffing. While there is no set timeline yet, day use fees are expected to be implemented. This is consistent with the operations at all other staffed Vermont State Parks. Fees and discounted pass options will be consistent with the established fee structure for state parks.

Overnight Infrastructure:

The concept of overnight use remains similar to the vision as it was outlined in 1999. A series of overnight cabins are proposed along the western side of the lake in the same area where buildings are now located. The developed footprint will be as close to the existing area as possible. However, there will no longer be a series of up to 12 tent or lean-to campsites. These have been eliminated to limit potential noise associated with outdoor campsites and to focus solely on the traditional "sheltered" overnight accommodations. The central "hub" of the overnight use will be the log lodge building. Historic preservation and engineering assessments are currently underway to review all structures to determine the feasibility and cost/benefit of re-use. The log lodge will be restored and will remain the central focal point for the overnight use area. The existing cabins are being evaluated for structural stability, aesthetic quality, cost and appeal for overnight use. It is possible that some may be removed and replaced with similar structures based on a current design that meets modern building and life safety codes and will fit with the historical character of the setting. It is possible from a cost standpoint, it may be more economical to remove the existing cabins and construct new structures that will be more appealing and more user-friendly to overnight visitors than to rehabilitate and reconstruct the existing structures to meet modern standards and visitor demands. Final overnight unit configurations and locations may change somewhat from the existing unit locations; several of the existing units are located over wet areas or in places that would be very hard to access for people with limited mobility.

For planning and cost projection purposes, a concept has been developed based on 16 new overnight rental units: 12 one-room cabins and 4 two-bedroom cottages with support facilities. This level of build-out has been chosen to represent a reasonable return on investment over the expected life cycle of the structures.

These structures would be similar to those now in service at other state parks; cabins are one-room buildings with power, sleeping space for four and a porch; cottages have power, two bedrooms, sleeping space for six, a bath with shower, kitchen and living area. A central toilet and shower facility serving the cabins along with an additional small standalone toilet facility would be constructed to serve the cabins. Part of the lodge would include a commercial-scale kitchen available to cabin guests. The main lodge area would be available for communal meals or social space for all overnight users. All overnight facilities and the lodge would be universally accessible to guests of all physical ability levels via connected walking paths. Several central parking areas located toward the back (western side of the interior road or farthest away from the

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lake) of the area would be connected to the facilities by a series of ADA-complaint paths and walkways.

The overnight use area at the park presents an excellent opportunity for Vermont State Parks to utilize and demonstrate the latest energy conservation and renewable building techniques throughout an entire complex. The area will incorporate as many of these techniques and products as feasible.

The cottage building on Birch Island presents several unique challenges on its own. Preparing the building for overnight use and meeting life safety and building codes and water, wastewater, and flood proofing regulations will be extremely challenging. Originally, the structure was identified as staff housing; it is now felt that this is not the best option for such a uniquely located structure. Current options for the building include a nature center or a day-use social gathering structure that could be made available for small groups.

It is important to note that this design is conceptual and its purpose is to assist with planning, cost projection, feasibility and return on investment.

Dam Infrastructure:

Water-based recreation resources at Lowell Lake State Park are currently among the most heavily used opportunities. Historical records suggest an impoundment or dam of some type existing at or near the current location since the settlement of the area in the mid-1700s. Lowell Lake has provided many different types of experiences to many generations of people throughout the years. It is the State's intent to continue this legacy for future generations. When the State acquired this parcel in 1979, the dam was considered to be in poor condition. At that time a plan was developed to replace the dam. In 1981 the dam was reconstructed. Dam inspections are performed every five years by the Department of Environmental Conservation's Dam Safety Program. The dam impounds approximately 618 acre/feet (100 acres) of water at normal pool. It is a Class 2 Significant Downstream Hazard dam.

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Figure 3: Infrastructure Photos

Lowell Lake Lodge: front *back*

Typical cabin styles of the 11 cabins on the property

Examples of storage buildings on the property

Ranger's residence/maintenance building on Little Pond Road

Lowell Lake dam and bridge

Cabin on Birch Island

C. Forest Resources

History of Forest Management: Most of the upland forests of Lowell Lake State Park are accessible for management although there are multiple water features to consider. Of the 356 acres, roughly 208 acres are suitable for timber management. Evidence of past timber harvest operations are common throughout. Since State ownership, two timber harvests have been conducted. The first was in 1984 on the eastern side of the lake. The second, in 2006, harvested hazard trees around the buildings and trail on the western side of the lake.

Existing Conditions:

a) *Regeneration/Age Class Distribution/Tree Quality* – Most stands are stocked with pole to small sawtimber size trees. Some stands contain very large white pine and declining/dying balsam fir sawtimber. Tree quality ranges from poor in wetter areas to moderate in pockets of better soils. Tree stocking is high over much of the forest. Regeneration is variable with moderate to high densities of balsam fir and hemlock seedlings in small pockets where balsam fir has died. Several areas with dense red spruce regeneration are present. Hardwood trees throughout much of the park are poor quality due to species type, site class and high water table.

   Tree species composition is well suited to the goals of wildlife habitat management. Older and/or low quality stands lend themselves well to even-aged management. Patch clearcuts (2 to 5 acres) and smaller size group selection (1/10th to 1 acre) will provide early successional habitat and enhance tree species and age diversity. Invasive plant species do not pose a concern for this parcel currently. Future management may need to address this issue if the situation changes.

   Hazard tree removal, either commercial or non-commercial, will continue to be incorporated into forest and trail management in areas with high recreational use.

b) *Soil and Site Conditions* – Timber management potential is good over much of Lowell Lake State Park. Soils are moderately productive for growing trees on most of the property. Productivity is best in pockets where soils are deeper and fertile. Some soils are seasonally saturated and have lower productivity than better drained soils. The best soils for growing trees (Site 1 and 2) occupy 77% of the forest land (Table 1). Primary soils include:

   Mundal Fine Sandy Loam: Very productive soils for deciduous trees such as sugar maple. Parent Material: Extremely to moderately acidic dense basal till, > 60 inches to bedrock.

   Wilmington Very Fine Sandy Loam: Poor loamy soils for northern hardwood. Parent Material: Extremely to moderately acidic dense basal till, > 60 inches to bedrock.

   Worden Loam: Moderately productive loamy soils for northern hardwood. Parent Material: Extremely to moderately acidic dense basal till, > 60 inches to bedrock.
   Houghtonville Fine Sandy Loam: Very productive loamy soils for northern hardwood. Parent Material: Extremely to moderately acidic glacial till, > 60 inches to bedrock.

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Sheepscot Fine Sandy Loam: Very productive for white pine.
Parent Material: Strongly Acidic to neutral gravelly outwash, > 60 inches to bedrock.

Lupton Mucky Peat: Non-productive for northern hardwood.
Parent Material: Strongly Acidic to neutral wet organic material, > 60 inches to bedrock.

Table 1: Site Class Productivity Potential

Site Class	**Potential Productivity** (cubic feet of wood/acre/year)	**Site Index** (height at age 50)		**Acres***
Site Class I	>85 cubic feet	White Pine Northern Hardwoods	70' 60'	156.1
Site Class II	50 to 84 cubic feet	White Pine Northern Hardwoods	60-69' 53-59'	117.7
Site Class III	20 to 49 cubic feet	White Pine Northern Hardwoods	50-59' 45-52'	53.9
Site Class IV	<20 cubic feet	White Pine Northern Hardwoods	50' 45'	28.8

**manageable acres may vary*

c) *Dominant Forest Types* – The most common forest types are Lowland Spruce-Fir Forest and Hemlock Northern Hardwood Forest. There are no areas of early successional forest on the property.

Table 2: Dominant Forest Types

Type	**Major Species**	**Condition**	**Quality**	**Regeneration**
Lowland Spruce/Fir *66 acres**	Balsam Fir Red Spruce Red Maple Hemlock	Pole-size to sawtimber. Moderately stocked to overstocked.	Variable	Good softwood regeneration.
Hemlock-Northern Hardwood Forest *142 acres**	Hemlock Red Maple Yellow Birch White Pine	Pole-size to sawtimber. Moderately stocked to overstocked.	Variable	Mixed, often good as above. Occasional dense pockets NH regeneration.

**manageable acres may vary*

d) *Health/Vigor of Timber Resource* – White pine is a common species at LLSP and is the most productive tree species on the parcel. Most of the forest stands within the park feature large white pine. Forest inventory measurements included several white pine in excess of 50 inches Diameter-Breast-Height (DBH). Eastern hemlock are healthy and of good quality and will be

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a long-term productive species for the park. Although balsam fir is declining and dying, most stands still contain a significant amount of sawlog timber. Another common species is red maple, most are of poor quality, primarily due to poor hardwood site quality. Additional northern hardwood species are present but quality and vigor of these are generally unacceptable in most stands. In some areas of better soils, hardwood species can be relied on for long term productivity. The introduction of invasive exotic species (i.e. hemlock woolly adelgid and Asian longhorned beetle), damaging insects or pathogens (spruce budworm), or weather (ice and wind) events could change health and vigor projections dramatically. State forestry staff routinely monitor for these events.

e) *Access/Operability* – The terrain at LLSP is well suited to harvest operations. It is relatively flat with rolling hill topography. There are few steep hillsides but many small water features which will limit management. Most portions of the park have excellent access from town roads and the interior skid trail network. An existing interior wood road and skid trail network will be the primary means of management access. Additional harvest road and/or skid trail construction will be minimized. Protection of wetlands and seeps will be a priority consideration in harvest access.

Management Unit 1 (West) – A gated park access road capable of accommodating log trucks links Lowell Lake Road to Little Pond Road. This gated access road will be utilized for access to the western portions of the property. The abandoned tennis court has previously been used as a log landing and the primary skid trail network extends from this landing.

Management Unit 2 (North) – Little Pond Road is a class 3 gravel town road that borders this unit. From Little Pond Road, a forest road (Holland Howard Rd) to the northeast; while wet, has been used by FPR and abutters. Both of these roads provide management access and serve as the northern and northeastern boundaries of the property.

Eastern portions of this unit will be accessed from Little Pond Road or the northeast forest road. Access to eastern portions could also be gained by utilizing a gravel road that extends south approximately ½ mile beyond the ranger housing/maintenance building. This road has been used in the past for management activities and now doubles as part of the hiking trail around the lake.

Management Unit 3 (South) – Lowell Lake Road, a gravel class 3 town road serves as the main public access to a large parking lot near the dam. Access for the southern forest unit may be via the VAST snowmobile trail off Lowell Lake Road or through a parcel acquired in 2006 off Old Sawmill Road. Old Sawmill Road is a private road so further research is needed before the State uses it as an access point. It is unknown if utilizing the road over the dam is a viable option for management access to this unit.

f) *Critical Wildlife Habitats* – No critical upland wildlife habitats, such as deer wintering areas or mast stands, have been found on the property. Wetland habitats were not evaluated during this amendment process. If any management activities have the potential to affect wetland habitats, additional research will be conducted at that time.

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D. Natural Communities Assessment

Natural communities at Lowell Lake State Park (LLSP) were mapped using a combination of field work and aerial photograph interpretation. Additional inventory and data are needed to assign all portions of the property to a natural community type, and to determine quality ranks or significance of mapped types. Additional field work will be conducted prior to implementation of management activities. The information presented here should be considered preliminary.

Seven wetland natural community types have been mapped in LLSP (Table 3). In addition to the communities listed below, LLSP also include beaver wetlands, and wetland areas that have not yet been classified to a natural community type. All the wetlands in the park provide significant habitat diversity, and all are potentially sensitive to disturbance from development or land management activities.

Table 3: Natural Communities of Lowell Lake State Park

Natural Community	Vermont Distribution
Hemlock-Balsam Fir-Black Ash Seepage Swamp (6 acres)	Uncommon (S3)
Hemlock-Sphagnum Acidic Basin Swamp (2 acres)	Rare (S2)
Poor Fen (3 acres)	Rare (S2)
Red Spruce-Cinnamon Fern Swamp (1.5 acres)	Uncommon (S3)
Seep (N/A)	Common (S4)
Spruce-Fir-Tamarack Swamp (10.5 acres)	Uncommon (S3)
Vernal Pool (N/A)	Uncommon (S3)
Beaver Wetlands and Additional Wetlands Areas (~32 acres)	

The upland forests of LLSP include a mix of hardwoods and softwoods, and would likely be classified as Hemlock-Northern Hardwood Forest and Hemlock-Red Spruce Forest. Both upland communities are common in Vermont, and based on their disturbance history, size, and landscape context, would not be expected to qualify as examples of statewide significance. It is likely that additional small wetlands exist within areas currently mapped as upland forest.

Rare, Threatened, and Endangered Species

Five species of rare or uncommon plants and one uncommon invertebrate animal species are known to occur in LLSP (Table 4). Most are associated with wetland or aquatic habitat. In general, maintaining the hydrological and ecological integrity of the lake and wetlands will help protect these species. The lone upland species, Northern Ground-Cedar (*Diphasiastrum complanatum*), was collected in 1933 on an unidentified island in the lake. It has not been observed since; if still present, it might be found in the upland surrounding the lake.

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Table 4: Rare Species of Lowell Lake State Park

Scientific Name	Common Name	Group	Rarity	Habitat
Diphasiastrum complanatum	Northern Ground-Cedar	Plant	Rare (S2)	Island, Uplands?
Myriophyllum farwellii	Farwell's Water-Milfoil	Plant	Rare (S2)	Lowell Lake
Potamogeton bicupulatus	Snail-Seed Pondweed	Plant	Rare (S2)	Lowell Lake
Carex folliculata	Northern Long Sedge	Plant	Uncommon (S3)	Forested Wetlands
Utricularia purpurea	Eastern Purple Bladderwort	Plant	Uncommon (S3)	Lowell Lake
Nehalennia gracilis	Sphagnum Sprite	Invertebrate Animal	Uncommon (S3)	Poor Fen

E. <u>Legal Constraints and Acquisitions</u>

Shoreland Protection Act

- Development and/or reconstruction activities within 250 of the mean water level (mwl) of Lowell Lake are subject to this act and may require a Shoreland permit. State park projects have a thorough permit review system in place. Determinations of permit requirement are made in the early stages of project scoping. In addition, vegetation management within 100' (Lakeside Zone) will be managed according to Vegetation Protection Standards found in supporting documents of the Shoreland Protection Act.

Powder Mill Development

- During an expansion of the Powder Mill Development in 2011, a condition of Land Use Act 250 Permit #2W0516-2 subjected the development's shoreline lots to the right of the general public to travel by foot over the Lowell Lake Hiking Trail. Conditions include that the trail shall not exceed six feet in width and will have a ten-foot naturally vegetated buffer on each side.

Barber Lot Donation (1.6 acres - 2002)

- In 2006, FPR received a donation of 1.6 acres from Arthur and Carol Barber. This parcel was adjacent to the south boundary of the property and has approximately 175' of frontage on Old Sawmill Road. This was a residential lot within the subdivision along Old Sawmill Road.
- The Barber Lot is subject to a Declaration of Restrictions associated with the community development on Old Sawmill Road recorded in Book 30 Page 359 & 360.

White Properties (154 acres 1996)

- VHCB Grant of Development Rights and VLT Easement with conservation and park development restrictions, public access easement and rights of entry 1996.

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- Central Vermont Public Service Corporation (CVPS) Utility Line Easement 1/22/1954 b.27 pg. 190.
- CVPS Utility Line Easement 10/21/1948 b.26 pg. 345.
- CVPS Utility and New England Telephone and Telegraph Company (NETT), now Verizon, Line Easement 1/26/1990 b.48 pg. 19.
- CVPS Utility and NETT Line Easement 7/30/1987 b.45 pg. 100.
- VT Fish and Wildlife Access Area Funds were used for acquisition which may result in some restrictions to the property.

Gardner Lands (207 acres - 1979)

- Land and Water Conservation Funds (formerly HCRS and BOR) were approved for use in acquisition of this parcel in 1977 and are subject to Federal funding restrictions.

Holland Howard Road (2003 court ruling)

- The State of Vermont was named as an abutter in the court case of Moodie v. Hurwitz Docket No. 471-10-02 Wmc. The conclusion was in favor of Moodie and granted an "Easement by Necessity" to access his parcel over lands of State of Vermont and Hurwitz along the discontinued roadway.

F. Recreation Assessment

Lowell Lake State Park (LLSP) features 109 acre Lowell Lake. It is one of the larger bodies of water in southern Vermont. LLSP is located on the western side of Windham County within 15 miles of Manchester Village. The park is a popular year-round tourist destination. LLSP is also located close to Stratton, Bromley, Okemo, and Magic Mountain ski resorts which attract skiers during the winter. Most of these areas also offer summer and fall recreation opportunities. LLSP is surrounded by several vacation and residential home developments with houses located directly adjacent to the park boundary. The accessibility of this property to many people and the scarcity of lakes or ponds in this region of Vermont result in a high level of water-based recreational use.

Two very different categories of recreational experiences are available at LLSP. The western shore is characterized by substantial modifications to the property including a parking lot, boat launch, dam, gates, bulletin board, and informational signs, and buildings. This area is heavily used, especially on weekends and holidays. Sights and sounds of people and dogs recreating are readily evident in these areas including on the pond and along the shoreline. Otherwise, the undeveloped shoreline, dead tree snags, islands, and views of surrounding mountains give this pond a remote feel and appearance.

The forested portion of the property surrounding the pond provides visitors with a more remote recreational experience away from crowds in a forested environment. Contact with other users is low; however, evidence of other users is prevalent. Woods roads and skid trails are found in this area. Timber harvesting and wildlife management practices have been and will continue to be part of the overall property management scheme. The bulk of this the forested portion is located within ½ mile of a town road.

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Boat Launch and Parking Area – The boat launch is primarily used for launching boats and parking vehicles engaged in hiking or paddling. Maintenance of this area is conducted by the Vermont Department of Forests, Parks and Recreation during the summer and fall months.

Lowell Lake – This scenic lake is the focal point for recreational activity on the property. Canoeing, kayaking, fishing, and wildlife viewing are popular activities here. Lowell Lake is large enough to make it an enjoyable location for boaters to spend several hours paddling and exploring.

Under Vermont Water Resource Board rules, motorboats and personal watercraft (jet skis) are prohibited on the lake.

Fishing, Hunting, and Trapping – Lowell Lake features largemouth bass, yellow perch, chain pickerel, and brown bullhead fishing opportunities. The woodlands around the pond are popular for deer, ruffed grouse, and snowshoe hare hunting. Ducks and geese are also hunted on the pond and surrounding marshlands. Trapping for muskrat, beaver, and other furbearers also occurs on the property.

Hiking Trail – The Lowell Lake Trail is the one officially designated and maintained hiking trail on the property which circumnavigates the lake. The trail is approximately 3½ miles in length. This trail is signed and blazed and receives a large amount of foot traffic. Hiking trail improvements over the past 15 years include several foot bridges, water diversion structures, and trail relocations.

Snowmobiling – There is one VAST trail in the southern sections of the property. VAST trail improvements in recent years have included a gate installation off Lowell Lake Road and one trail relocation. In 2010, VAST was issued a Conditional Use Determination from the District Wetlands Ecologist for the construction of five bridges on the existing snowmobile trail to cross wet areas within the class 2 wetland and installed the bridges in that year.

Mountain Biking – There are no officially designated trails exclusively for mountain bikes use. The interior graveled service road portion of the Lowell Lake Trail which runs along the western side of the lake is designated as multiple-use which includes biking, hiking, and horseback riding.

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III. Land Use Classification and Management

Vermont ANR lands are managed using four categories of use or types of management to be emphasized on the land. In this section of the plan, the recommended levels of use or types of management will be shown for all the land area in this parcel. This section also describes generally how the land will be managed so that the activities occurring on the land are compatible with the category assigned. The four categories are: (1) *Highly Sensitive Management*; (2) *Special Management*; (3) *General Management*; and (4) *Intensive Management*.

As part of the planning process, the lands, resources, and facilities held by the ANR are evaluated and assigned to the appropriate land management category. Assignment of management categories for Lowell Lake State Park is based on a thorough understanding of the resources identified and the application of over-arching lands management standards. The resources include natural communities, plants, and wildlife as well as recreation, historic, timber, and water resources.

1.0) Highly Sensitive Management– Areas designated as Highly Sensitive Management are described as ***"areas with uncommon or outstanding biological, ecological, geological, scenic, cultural, or historical significance…"*** Acres managed under this category will have no timber management, salvage harvest, or active wildlife habitat management. However, trees and other vegetation may be cut to restore natural community species composition and structure in limited locations; manage specific habitat conditions for rare, threatened, and endangered species; and to maintain safe and enjoyable recreational conditions.

2.0) Special Management – Areas designated as Special Management include areas ***"…where protection and/or enhancement of those resources is an important consideration for management."*** Timber harvesting and wildlife habitat management as well as recreation are considered to be complementary uses within this classification to the extent that they do not impact special features.

3.0) General Management– The General Management category includes areas where ***"dominant uses include vegetation management for timber and wildlife habitat, concentrated trail networks, and dispersed recreation…"*** A primary consideration for management is minimizing conflict between activities. Sensitive resources that occur within these areas may require special attention.

4.0) Intensive Management – The Intensive Management category is characterized by a ***"high level of human activity and high intensity development on/or adjacent to State land."*** Aesthetics and safety are the primary management considerations in these areas. However, more sensitive resources that occur within these areas may require special attention.

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Management Goals, Objectives, and Guidelines for Lowell Lake State Park

Develop and improve non-motorized recreation opportunities while maintaining and protecting infrastructure and historic sites.

a. Continue to maintain infrastructure and a safe environment.
b. Limit the number of day use to a level that will not diminish individual experience.
c. Re-develop overnight area and open campground in this planning period.
d. Minimize impacts of the overnight area on dispersed recreation.
e. Provide a high quality semi-developed day recreation experience.
f. Protect the natural environment in developed areas.

Protect and enhance important wildlife habitats and features.

a. In anticipation of the possible loss of eastern hemlock to the hemlock woolly adelgid, promote other conifer species wherever feasible.
b. Promote the growth of mast-producing trees.
c. Manage riparian areas and borders as riparian management zones in accordance with the Vermont State Lands Riparian Management Guidelines. Practices implemented during management activities will be designed to protect water quality and to protect and enhance habitat for amphibians, reptiles, and mammals near water bodies. Manage travel corridors between seeps and wetlands to maintain or improve conditions for amphibians.
d. Retain large, older trees for dens, snags, and dead and down material recruitment according to guidelines in Vermont's Voluntary Harvesting Guidelines.
e. Manage floodplain areas for habitat and flood flow protection.

Protect and improve the condition of important ecological resources.

a. Habitat for rare, threatened or endangered species will take precedent over habitat for more common species.
b. Monitor for hemlock woolly adelgid, emerald ash borer, and Asian longhorned beetle.
c. Maintain or improve the quality ranking of sensitive natural communities.
d. Protect and enhance wetland function.
e. Protect and enhance water resources including water quality, aquatic habitat, fisheries, and flood storage capacity.

Produce a diversity of wood products and create forest age class and habitat diversity through sustainable management and harvest practices.

a. Produce a sustainable supply of timber products.
b. Utilize all-aged management techniques in special and intensive management land use classifications with additional consideration for aesthetics in public use areas.
c. Practice early successional, even-aged management for wildlife habitat and forest regeneration in general management land use classifications.
d. Demonstrate exemplary wildlife and forest management practices so that practices applied here may find broader application on private lands.

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Land Management Classification on Lowell Lake State Park

1.0 HIGHLY SENSITIVE MANAGEMENT — 0 acres

There are no Highly Sensitive Management areas within Lowell Lake State Park (LLSP).

2.0 SPECIAL MANAGEMENT — 105 acres

Special Management areas represent approximately 105 acres or 29% of LLSP.

Three types have been delineated within the classification of **2.1**:

Upland Beaver Wetlands (26 acres)
This delineation is primarily east of the pond. This area consists of a complex of beaver wetlands. One of these areas is considered to be a Class 2 wetland. This drainage connects Lily Pond with Lowell Lake through a series of wetlands important for flood storage. These wetlands and streambanks within LLSP will be protected to withstand high flows.

Management Conflicts:
A suitable stream crossing area will need to be developed for management activities.

Lake Riparian Zone (63 acres)
This area comprises the riparian management zone (RMZ) as well as the area subject to the Shoreland Protection Act (100' or 250' depending on project type) around the lake and the associated wetlands on the north and south. The General Management Plan described the north area as cattail marsh and the southern area a bog.

Management Conflicts:
The riparian areas adjacent to the lake include portions of the hiking trail. Management of riparian areas will continue to focus on recreational and aesthetic goals in addition to invasive species control if needed. Forest management activities will be limited to visitor safety to include hazard tree removal. Minimizing visual impact from the lake will be an important consideration in all activities. The General Management Plan indicated that several rare, threatened or endangered species have been found along the shoreline. Any management activities, including invasive plant control along the shoreline, will require further assessment prior to commencement.

Upland Saturated Soils (16 acres)
These areas can be found throughout the property as depressions in the landscape that collect water. One of the larger occurrences of this feature is located in the northwest corner of the property. No management activities are scheduled for these areas. State Land RMZ guidelines will be applied as occurrences are found within management areas.

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Management Conflicts:
Additional features may be found during management activities.

SM 2.1 – Special Management (105 Acres; Figure 4 reference 2.)

Management Actions:

- Inventory and control of invasive exotic species.
- Forest management activities to minimize risk to park guests through hazard tree removal.
- Maintenance of recreational infrastructure.
- Ecological inventory to refine Natural Community mapping and important habitat features.

3.0 GENERAL MANAGEMENT — 210 acres

General Management areas represent approximately 210 acres or 59% of LLSP.

These areas of the property are typical woodland for the parcel and region with no unique or sensitive features found. Management will focus on improving the diversity of forest age classes to improve wildlife habitat for a wide suite of species and improving the growth of quality sawtimber through single tree and group selection, crop tree release, and even-aged management techniques. Minimizing visual impact from the lake will be an important consideration in all activities.

Management Conflicts:
Improvement of management access may be needed. Recreation trails within these areas will be protected during or restored following management operations. Any sensitive features found within these areas will be delineated and protected.

GM 3.0 – General Management (210 Acres; Figure 4 reference 3.)
Management Actions:

- Commercial forest management activities at regular intervals.
- Large and small forest openings, release from competition for young softwood saplings, snag and den tree retention and recruitment and the retention of large woody material on the forest floor will be components of habitat enhancement.
- State wildlife biologist will assist in the specific design of habitat improvements in the Annual Stewardship Plan phase.
- Non-commercial forest management activities such as timber stand improvement and apple tree release as needed.
- Maintenance of recreation trails.

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4.0 INTENSIVE MANAGEMENT — 41.5 acres

Intensive Management areas represent approximately 41.5 acres or 12% of LLSP.

This area of the property contains the portions of the property developed for intensive recreation. This includes roads, parking areas, buildings and utilities concentrated on the western side of the lake. Portions of this area are subject to the Shoreland Protection Act (100' or 250' depending on project type).

Currently the area is used for walking, light hiking, and access to the lake for fishing, boating, and swimming. Numerous buildings (Table 5) remaining from the private campground that pre-dates State ownership are distributed through this area (Table 6). The process of structural and historical evaluation of these buildings is in process. Based on staff knowledge of their condition, the following recommendations are anticipated.

Table 5: Building Inventory and Recommendations

Structure	Anticipated Recommendation
12 cabins	TBD (2 likely to be removed)
1 log cabin lodge	Restore
1 garage/game room	Remove
2 pole barns	TBD
1 lumber shed	Remove
2 laundry buildings	Remove
Ranger residence/maintenance shop	Improve energy efficiency

The primary management in this planning period will be the disposal or restoration of buildings as determined by FPR and the revitalization of overnight use through redevelopment of structures and infrastructure (Table 6) to develop a revitalized campground. To complement the day use fees and help make the property financially sustainable, the following level of infrastructure build-out is proposed:

Table 6: Estimated Construction Costs

Structure	Estimated Construction Costs (Class C estimate) $2.835 million
12 1-room cabins	$600,000
4 cottages	$440,000
Lodge rehabilitation	$360,000 (including kitchen and ADA compliant restroom)
Water system	$220,000
Wastewater system	$300,000
Central bath facility	$450,000
Contact station	$ 75,000
Composting toilets (3)	$120,000
Roads and parking lots	$120,000
Island cottage rehab	$150,000

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Management Conflicts:

- Fee use of the area is expected to create some dissatisfaction in the short term. The improved quality of the facilities and opportunities in the park should mitigate this to some extent.
- Minimizing visual impact from the lake, particularly at night, will be a component of project design.
- Interest in the future of the buildings by the public ranges from interest in preserving historic structures to not investing in buildings that are too far gone. The process of overnight redevelopment has started with historic preservation and engineering assessments of all existing buildings. These documents will guide the decision making process to make the best use of existing structures and funds available while respecting the historical character of the property and providing inviting facilities that are user-friendly, easy to maintain, and long-lasting.

IM 4.3 – ***(41.5 Acres; Figure 4 reference 4.)***
Management Actions:

- Continue to maintain infrastructure and a safe environment.
  - Annual hazard tree assessment and removal.
  - Periodic access road and dam maintenance.
- Limit the level of day use to a capacity that will not diminish the individual experience.
  - Close the day use parking area when full.
  - Limit guided trips on the water to non-peak days or times.
  - Implement a fee system.
  - Provide staffing for management.
- Minimize intrusions of the overnight area on dispersed recreation.
  - Screen structures with natural vegetation to limit exposure to water and hiking trail. Create modest views to the lake where feasible.
- Re-develop overnight area and open campground in this planning period.
  - Complete master development plan.
  - Consult with VLT/VHCB to ensure compliance to Grant of Development Rights. Property easement requires VLT approval for any additional structures that are not specifically referenced in easement documents.
  - Build capital funding for LLSP into State Park Division's Capital Budget.
  - Construct/restore facilities.
- Provide a high quality semi-developed day recreation experience.
  - Focus this experience around the former "Lowell Lake Lodge" and dam area.
  - Maintain and monitor use of picnic sites and open/close/move as appropriate.
  - Construct a park visitor entrance station with a composting toilet restroom.
- Protect the natural environment.
  - Work cooperatively with other Departments within ANR to protect wildlife habitat, water quality, shoreline protection, wetlands, etc.
  - Plan all developments, re-developments, maintenance, and management in compliance with applicable federal, state and local laws, rules, regulations, and policies.

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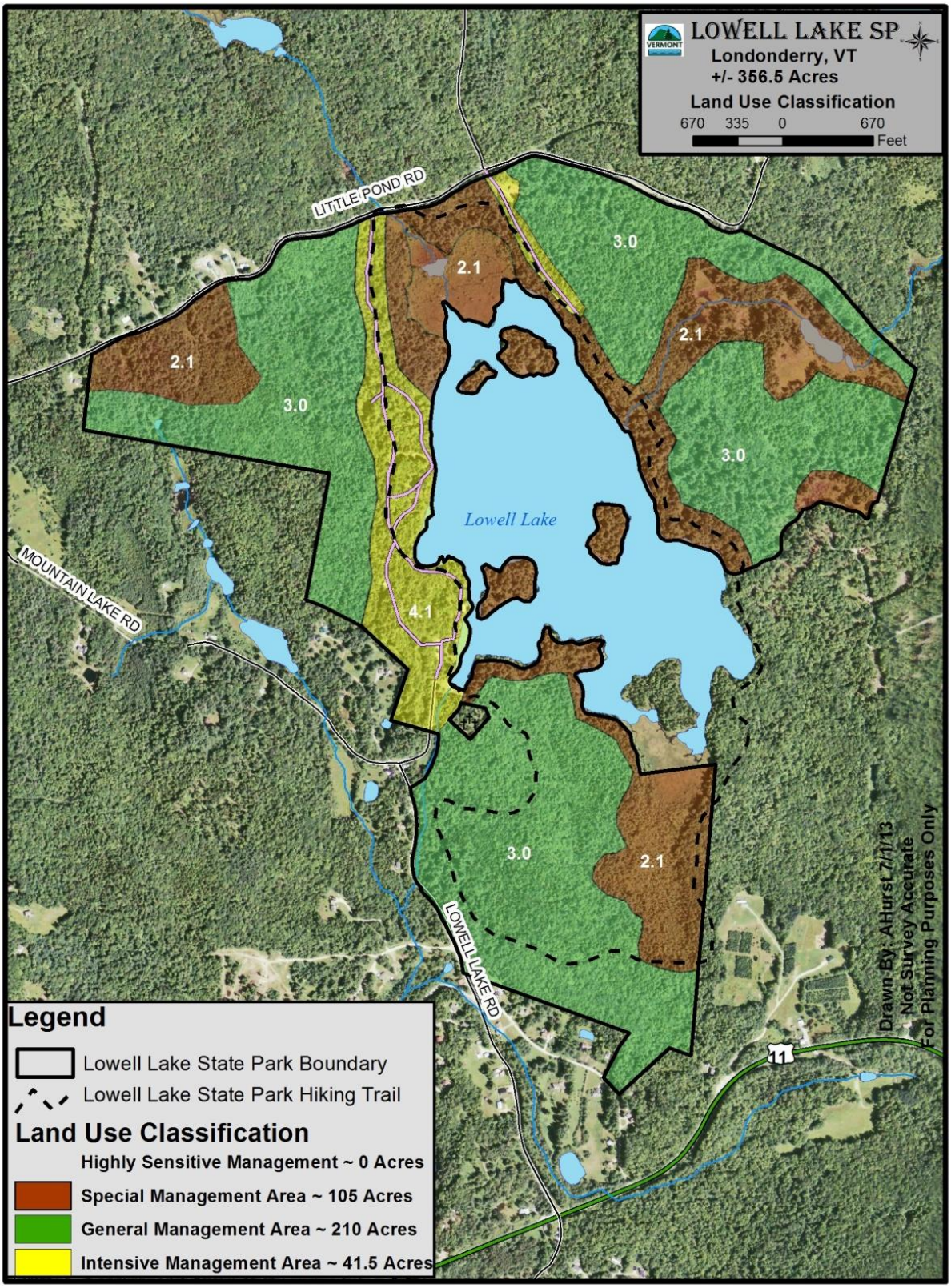
Figure 4: Land Use Classification Map



IV. Vegetative Management

A. Treatment Goals

Protection of historic sites and wetlands, improvement of wildlife habitat conditions for songbirds, small mammals, and game species by diversifying forest age classes, growth and harvest of wood products and high quality sawtimber, and establishment and release of softwood seedling/sapling class.

B. General Treatment Prescription

- *Management Unit #1* – Hemlock Northern Hardwood ~60 acres. The predominant tree species in this Management Unit (MU) are red maple and white pine. Approximately 50% of the stocking is Acceptable Growing Stock (AGS). Many of the larger diameter softwood stems are in decline. Goals include establishing early successional wildlife habitat, recruitment of seedling and sapling softwood to develop softwood cover, retention and recruitment of snags and den trees, and production of high quality sawtimber.

  Management Recommendations: Harvest hardwood Unacceptable Growing Stock (UGS) to favor growth of softwood AGS; hemlock, spruce, and white pine; and to release pockets of softwood regeneration to enhance snowshoe hare habitat. Residual Basal Area (BA) 90 -120 sq. ft. Utilize uneven-aged single tree and group selection (1/4 to 1 acre gaps) harvest techniques and larger even-aged patch cuts designed to release and promote established regeneration. Regenerate approximately ½ of the MU in the next 15 years in two entries. Due to the poor quality and age of the trees, an accelerated harvest schedule is recommended to develop a three age stand over the next 15 years. This will result in approximately 30 acres of early successional habitat created over two harvests.

  Diameter goals: white pine 24", balsam fir 16", hemlock 24". For wildlife consideration three trees >12" DBH will be girdled and retained per treated acre. For aesthetic considerations three tree's >24" DBH will be retained per treated acre in locations popular with park visitors.

- *Management Unit #2* – Hemlock Northern Hardwood ~82 acres. This MU is stocked primarily with hemlock and white pine. Softwood sawtimber tree health and vigor is considerably better in this unit then in other units. Approximately 70% of the stocking is AGS. Goals include establishing early successional wildlife habitat as in unit 1, production of large diameter high quality sawtimber, and maintaining high density pine stands along the shoreline to protect aesthetics.

  Management Recommendations: UGS hemlock and UGS hardwood removal to favor growth of AGS hemlock, spruce and white pine and to release softwood and hardwood regeneration. Residual BA 90-120 sq. ft. Utilize uneven-aged single tree and group selection (1/4 to 1 acre gaps) harvest techniques and larger even-aged patch cuts designed to release and promote established regeneration. Utilize crop tree release for AGS yellow birch and mast producing trees. This area contains some of the highest quality white pine stands on the

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property. Retain white pine stands in a high density condition for aesthetic purposes. A 15-year cutting cycle is recommended for this MU. Diameter goals: white pine 30”, balsam fir 16”, hemlock 24”. For wildlife consideration, three trees > 12” DBH will be girdled and retained per treated acre.

- *Management Unit #3* – Spruce/Fir ~66 acres. This MU is primarily balsam fir and red spruce. Approximately 65% of the stocking is AGS. Goals include establishing both early and late successional wildlife habitat, high quality sawtimber, and maintaining and enhancing trail corridors.

  Management Recommendations: UGS hardwood removal to favor growth of AGS hemlock, spruce, and balsam fir and release pockets of softwood regeneration. Residual BA 130-140 sq. ft. Utilize uneven-aged single tree and group selection (1/4 gaps to 1 acre strips) harvest techniques designed to release and promote established softwood regeneration. To provide an alternative habitat type to the smaller openings recommended for much of the parcel, the use of a shelterwood system is recommended to promote spruce/fir regeneration with a 10-year re-entry cycle for overstory removal in that area. Due to the poor quality and age of the trees, a 10-year cutting cycle is recommended in general for the MU.

  Diameter goals: balsam fir 16”, red spruce 20”, hemlock 24”. For wildlife consideration, 3 trees > 12” DBH will be girdled and retained per treated acre.

Table 7: Implementation Schedule

2015 & 2025	Management Unit #1	Group selection harvest to release softwood regeneration. Target UGS and declining softwood. Even-aged regeneration up to 15 acres each entry.
2015 & 2025	Hazard Tree Reduction	Remove potentially hazard and high risk trees within the intensive use area of the park (LUC 4.1).
2017 & 2032	Management Unit #2	Crop tree release, single tree and group selection. Larger patch-cuts up to 3 acres. Even-aged regeneration not to exceed 10 acres. Target UGS and declining softwood.
2019 & 2029	Management Unit #3	Single tree and group selection. Target UGS and declining softwood. Shelterwood system up to 10 acres.

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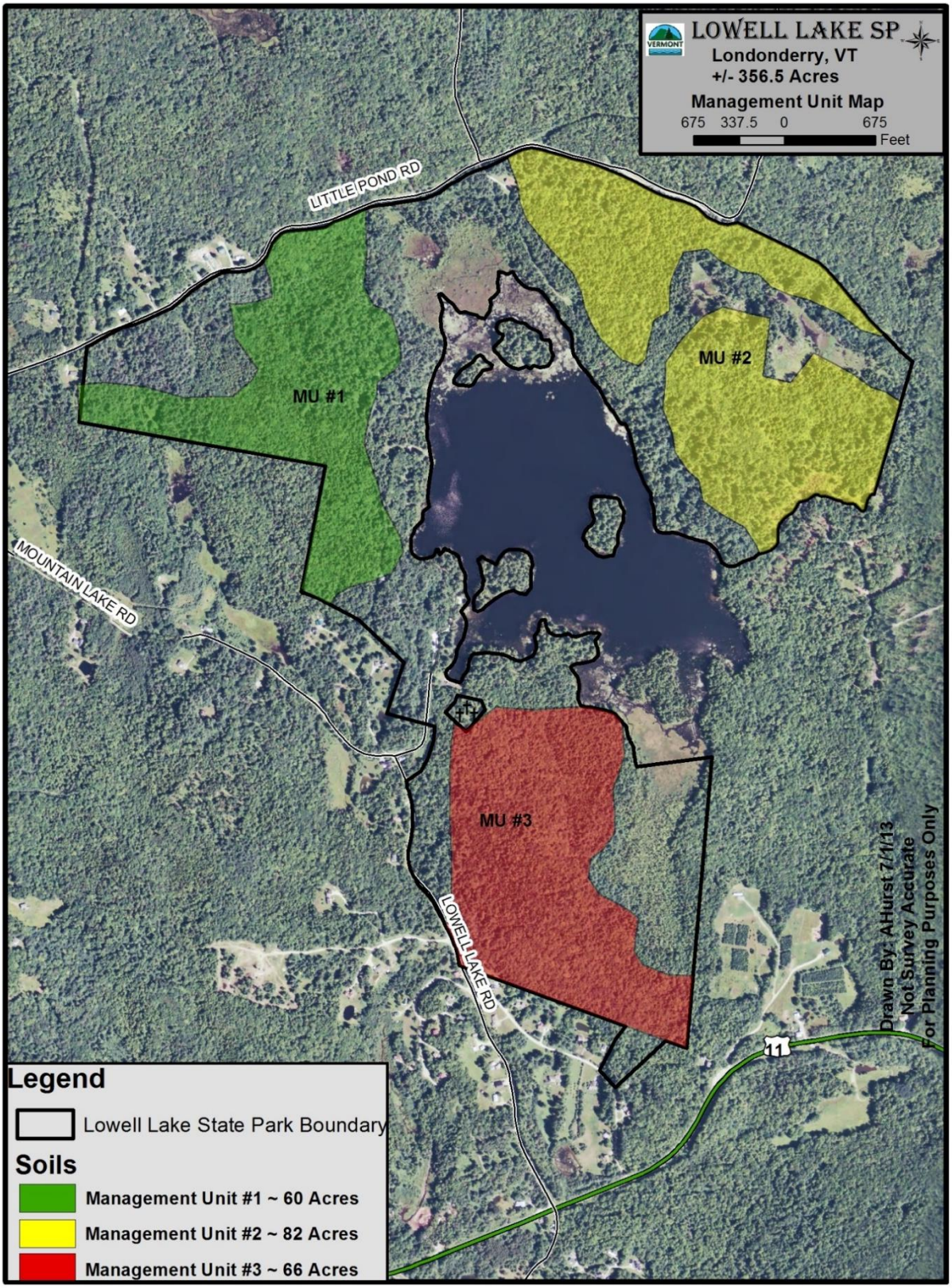
Figure 5: Management Unit Map



Appendices

Appendix A: Natural Communities Map

Appendix B: Stand Data

Appendix C: Stand Map

Appendix D: Soils Map

Appendix E: Additional Resources Map

Appendix F: 2010 Dam Inspection Report

Appendix G: Development and Conservation Easement

Appendix H: Glossary

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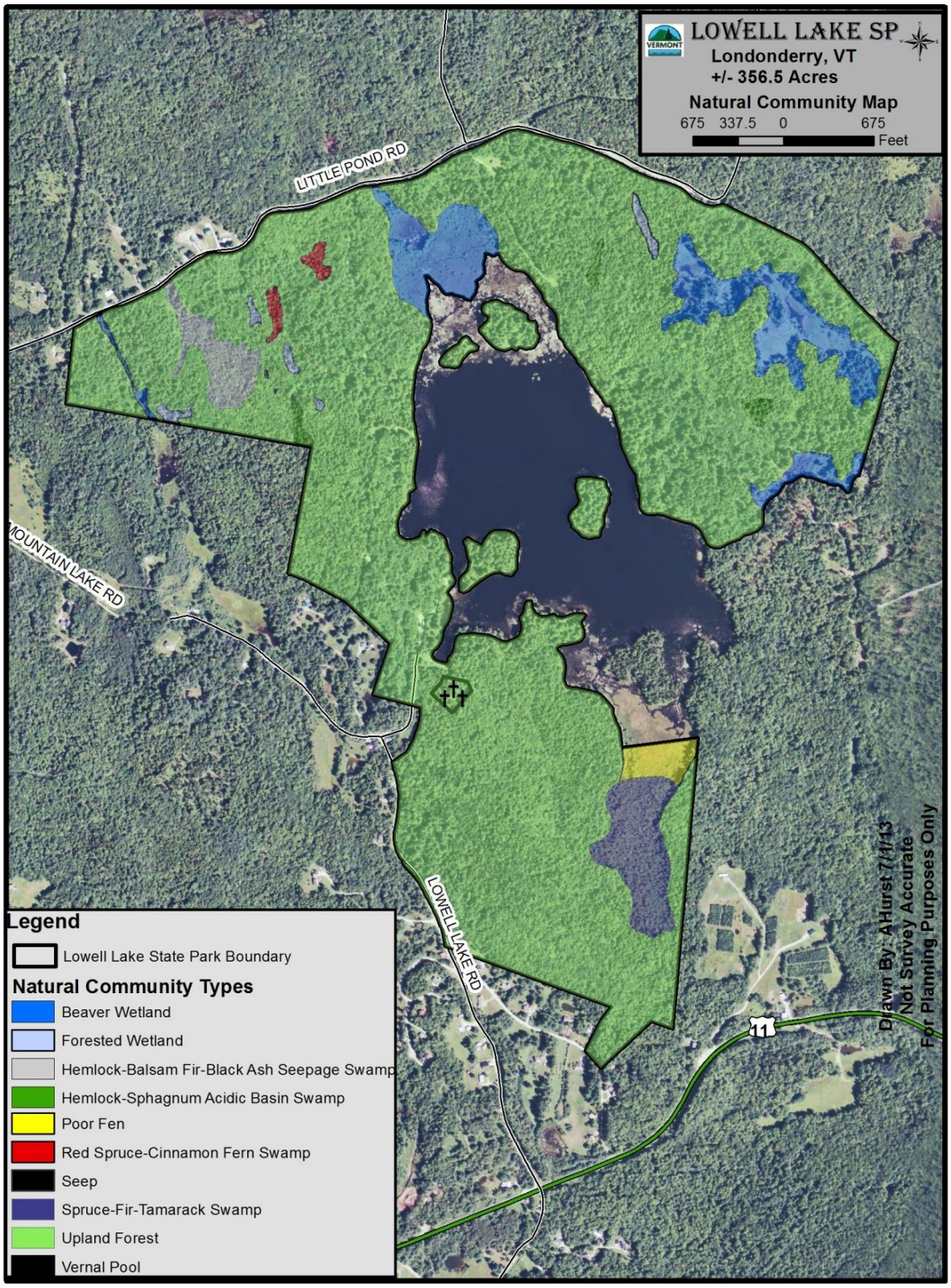
Appendix A: Natural Communities Map



Appendix B: Stand Data* – Lowell Lake State Park

Comp./ Stand	Type/Age	Acres	MSD	BA	AGS	% Species	Regeneration
1	Mixedwood/Sawtimber	60	11.2	190	100	Red Maple 26.5 White Pine 26.5 Hemlock 17	Hemlock and Spruce/ Balsam established
2	Mixedwood/Sawtimber	82	13.7	162	110	Hemlock 40.5 White Pine 21.5	Softwood-Sparse
3	Mixedwood/Pole and Small Sawtimber	66	8.5	168	109	Red Maple 21.5 Balsam Fir 16.4 Hemlock 22 Red Spruce 19.2 White Pine 12.4	Hemlock and Spruce/ Balsam established

*Inventory data collected April 2013 by Aaron Hurst.

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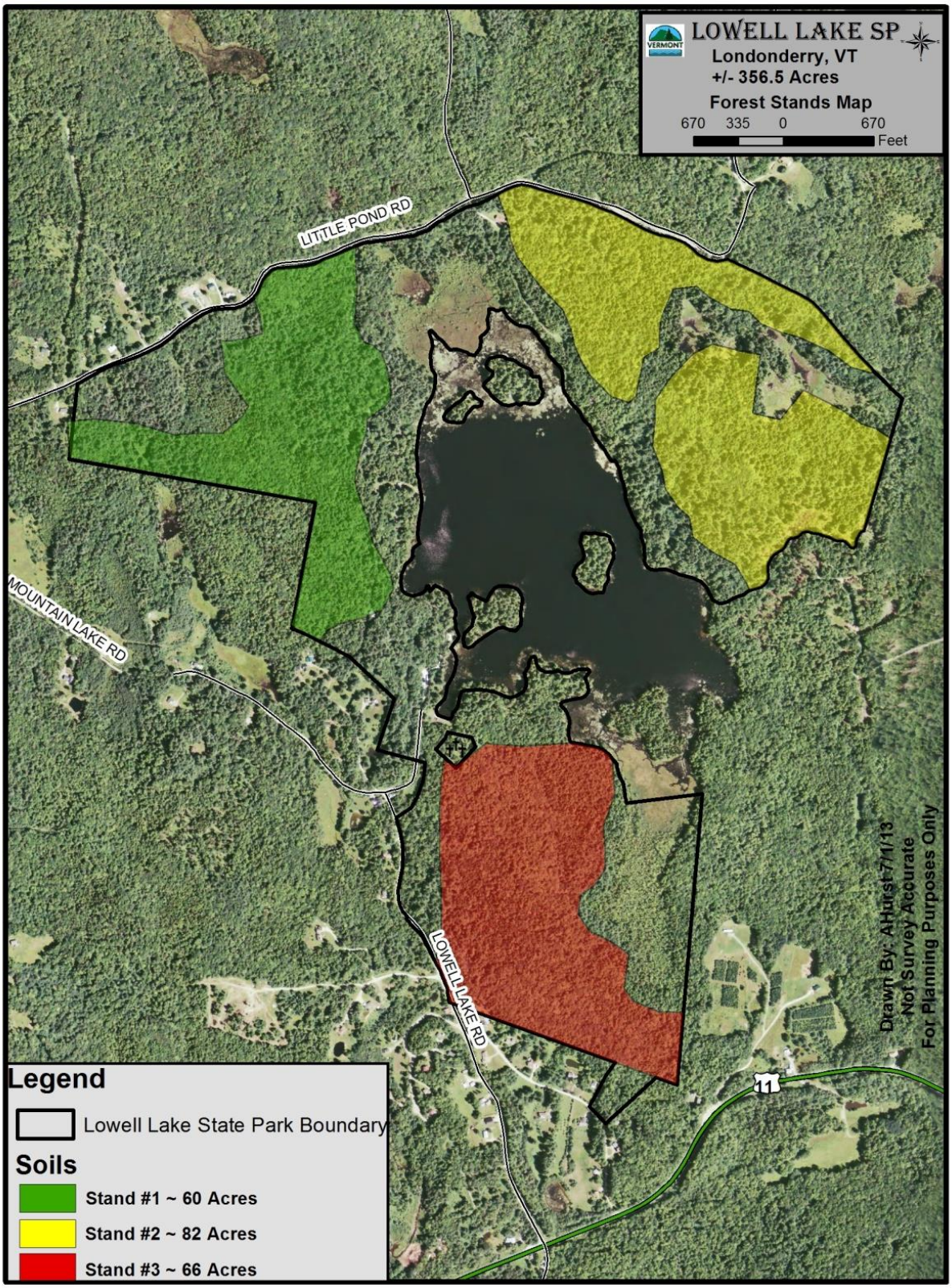
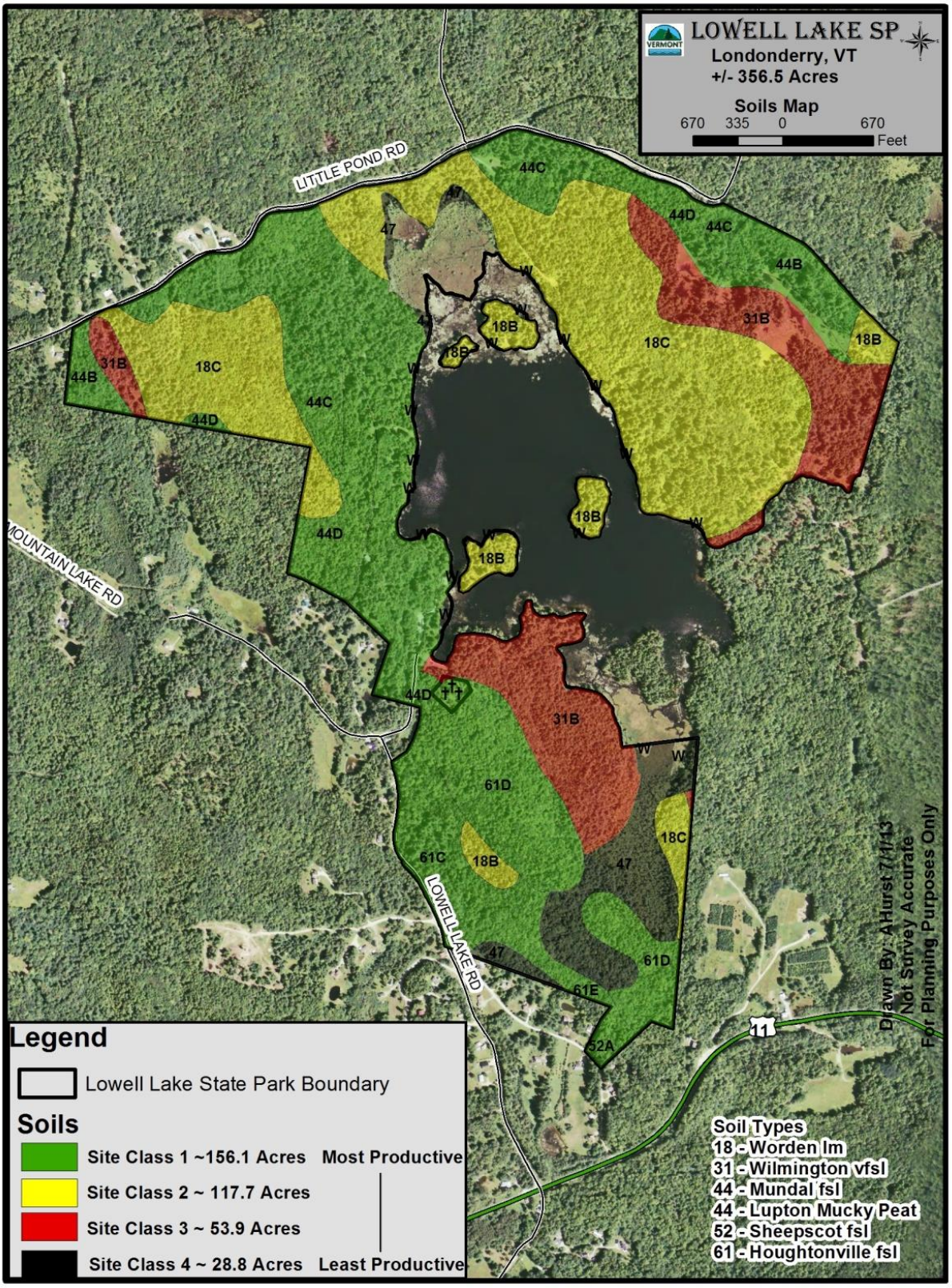
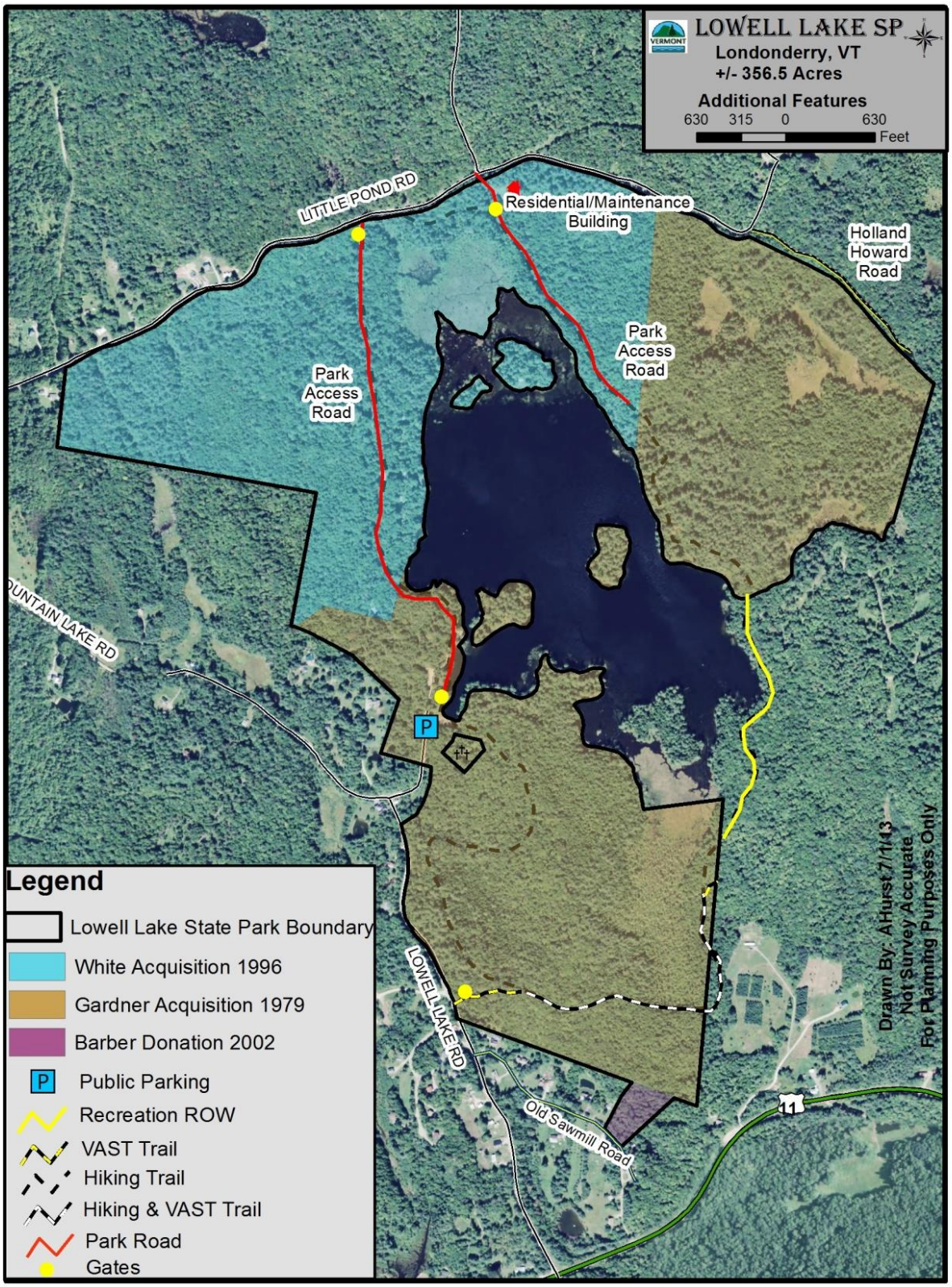
Appendix C: Stand Map



Appendix D: Soils Map



Appendix E: Additional Resources Map



Appendix F: 2010 Dam Inspection Report

VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
Facilities Engineering Division
103 South Main Street, Laundry Bldg. [phone] 802-241-3734
Waterbury, VT 05671-0511 [fax] 802-244-4516

MEMORANDUM

TO: For the Record

FROM: Donald Robisky, Dam Safety Engineer

DATE: August 20, 2010

SUBJECT: Inspection of Lowell Lake Dam, Londonderry.

On August 17, 2010, Don Robisky and Shawn Thompson made a routine inspection of the Lowell Lake Dam in Londonderry, Vermont, State Identification Number 115.02. The inspection was carried out under the provisions of 10 VSA 1105. A number of photographs were taken. The dam is owned by the Vermont Department of Forest, Parks, and Recreation. The dam was last inspected on August 1, 2007. This report updates previous observations and records additional information.

OVERALL CONDITION

The overall condition of the dam is fair.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is a Class 2, "significant hazard" dam based on available mapping and visual inspection.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration, reconstruction or breaching would require prior approval from the Department under provisions of Title 10 of the Vermont Statutes Annotated, Chapter 43.

RECOMMENDATIONS FOR OWNER

1. Remove all of the brush on the downstream slope and abutments especially on the right side to the established large tree line. The minor brush on both upstream abutments and on the edges of the discharge channel should be removed. Cut down the hemlock tree on the left upstream abutment.

2. Monitor the cracking of the concrete where the right training wall meets the principal spillway outlet headwall. Monitor the scour on the training walls and intake structure.

3. Evaluate the condition of the stop logs and replace any rotting logs. Make sure the top is level.

4. Assuming that the bridge was built 20 plus years ago, it should be inspected by a structural engineer, unless a recent inspection was completed. The cover to the low-level outlet should be inspected at the same time. The recommendations of the inspecting engineer should be followed.

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

INSPECTION

The inspection of this dam was conducted on August 17, 2010 at 1400 hours. The weather was sunny and windy with temperatures in the 80's. The ground was dry. The water level in the pond was just below the crest of the emergency spillway. The following was observed:

1. Embankment:

   a) Upstream Slope: The upstream slope was covered with large riprap. The slope was good for line and grade. Both abutments had minor brush. There was one hemlock tree encroaching on the left abutment.

   b) Downstream Slope: The downstream slope was covered in small riprap. It appeared to be good for line and grade. The right side of the slope was overgrown with brush. There was minor brush on the left side.

   c) Crest: The crest of the dam is covered in mowed grass and is a path to the trail on the other side of the dam. It was good for line and grade.

2. Principal Spillway.

   a) Approach Channel: The approach was clear.

   b) Intake Structure: The concrete was in fair condition. Minor scour was noted all around the structure at the water level. The trash rack was clear and in good condition.

   c) Stop Logs: The upper most stop logs appeared to be rotten and were not level. The lower stop logs could not be inspected since they were submerged. The water was flowing under the top stop log.

   d) Cover: The wooden cover was weathered but appeared to be sound.

   e) Outlet Structure: At the corner where the concrete headwall connects with the right emergency spillway training wall major cracking was observed in all directions.

   f) Conduit: the ductile iron pipe was in good condition.

3. Emergency Spillway.

   a) Approach. The approach was clear. No significant debris accumulation was present.

   b) Control Section. The concrete was in fair condition. One lateral crack was observed halfway down the ogee spillway. Minor debris was observed on the concrete. The toe of the ogee had minor erosion but was not undercut. There was rock in this area to prevent erosion.

   c) Training Walls. The training walls appeared to be in as built line and grade. Light pattern cracking was visible. Scour was noted at the base of both training walls on the upstream side at the water level. This was similar to the scour on the principal spillway intake structure.

d) Discharge channel. The channel was lined with large rock. The sides of the channel were covered with brush.

4. Bridge.

a) Bridge: The bridge decking and beams were weathered but appeared to be in fair condition. A structural inspection of the bridge was not completed as part of this inspection.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 2.05 square miles. The pond area at the normal pool is 100 acres with storage of 615 acre-feet. At the dam crest, the pool stores 1475 acre-feet. The peak stage is calculated with reference to the spillway crest elevation, 1350.2 feet and the top of the dam elevation, 1356.9 feet.

Appendix G: Development and Conservation Easement

GRANT OF DEVELOPMENT RIGHTS, CONSERVATION RESTRICTIONS, PUBLIC ACCESS EASEMENT and RIGHT OF ENTRY

KNOW ALL PERSONS BY THESE PRESENTS that, PRESTON A. WHITE as Trustee of the Preston A. White Trust of Engelwood, Florida, PRESTON A. WHITE and JONATHAN BUMP as Trustees of the Joan T. White Trust of Brattleboro, Vermont, ROGER W. WHITE of Londonderry, Vermont, and BETSY J. WHITE of Boulder, Colorado, on behalf of themselves and their respective heirs, administrators, executors, successors and assigns (hereinafter "Grantor"), pursuant to Title 10 V.S.A. Chapters 34 and 155 and in consideration of the payment of Ten Dollars and other valuable consideration paid to their full satisfaction, do freely give, grant, sell, convey and confirm unto the VERMONT LAND TRUST, INC., and the VERMONT HOUSING AND CONSERVATION BOARD, an independent board of the State of Vermont, and their respective successors and assigns (hereinafter "Grantees") tenants in common, forever, the development rights, perpetual conservation easement restrictions, public access easement, and right of -entry (all as more particularly set forth below) in a certain tract of land (hereinafter "Protected Property") situated in the Town of Londonderry, Windham County, State of Vermont, said Protected Property being more particularly described in Schedule A attached hereto and incorporated herein.

The development rights hereby conveyed to the Grantees shall include all development rights except those specifically reserved by the Grantor herein and those reasonably required to carry out the permitted uses of the Protected Property as herein described. The conservation easement and restrictions hereby conveyed to the Grantees consist of covenants on the part of the Grantor to do or refrain from doing, severally and collectively, the various acts set forth below. It is hereby acknowledged that said development rights, conservation easement and restrictions, public access easement and right of entry shall constitute a servitude upon the land and shall run with the land. Grantor reserves said rights and interests in order to conserve the Protected Property's wildlife habitats, non-commercial public recreational opportunities, forestry values, and scenic resources all as more particularly described in Section I, below.

I. Purposes of the Grant and Management Plans.

A. Statement of Purposes

Grantor and Grantees acknowledge that the Purposes of this Grant are as follows (hereafter "Purposes of Grant"):

1) To contribute to the implementation of the policies of the State of Vermont designed to foster the conservation of the state's wildlife habitats, agricultural, forestry, and other natural resources through planning, regulation, land acquisition, and tax incentive programs.

2) To conserve and protect the wildlife habitats, outdoor recreational opportunities, forestry values, and scenic and open space resources associated with the Protected Property for present and future generations.

3) To allow public access to and use of the Protected Property, and particularly to provide public recreational access to Lowell Lake, for present and future generations, provided that such use is compatible with the other Purposes of the Grant as stated in this Section I.

4) These objectives will be advanced by conserving the Protected Property because it possesses the following attributes:

a) magnificent stands of white pine;

b) extensive wetlands in the upland and along the shoreline of Lowell Lake;

c) two plant species *Myriophyllum farwellii* and *Utricularia purpurea* listed as rare on the Vermont Non-game and Natural Heritage Program;

d) trails used for summer and winter recreational uses including hiking, cross country skiing and snowshoeing;

e) comprises all of the remaining undeveloped shoreline of Lowell Lake, a shoreline which is currently 98% undeveloped

f) Lowell Lake itself contains many attributes that will be protected by conservation of the Protected Property including:

- designation as a "Quiet Lake" allowing use only by non-motorized or electric boats

VERMONT LAND TRUST, INC., 8 BAILEY AVENUE, MONTPELIER, VERMONT 05602 (802) 223-5234

- ranked by the Vermont Lake Protection Classification System as "high" for the purposes of protection due to its scenic and natural features (5 attractive islands and extensive wetland vegetation); the presence of rare plant species; and critically low dissolved oxygen in the hypolimnion
- a locally popular warm water fishery of largemouth bass, yellow perch, brown bullhead, chain pickerel, pumpkinseed and small mouth bass that is used year round by boat and ice fishing

Grantor and Grantees further acknowledge that the principal objectives of this instrument are to conserve wildlife habitats and outdoor recreational opportunities, and that the secondary objective is to conserve forestry values and scenic resources described in the foregoing paragraph I(3), as those primary and secondary values exist on the date of this instrument and as they may naturally evolve in the future. The Permitted Uses afforded Grantor under this instrument shall be exercised to accomplish these principal objectives; further, the Permitted Uses shall also be exercised to accomplish the secondary objectives, provided the timing and scope of such uses are compatible with the primary objectives of conserving wildlife habitats and outdoor public recreational opportunities.

B. Management Plans

Grantor will, from time-to-time develop comprehensive Management and Operating Plans for the Protected Property (hereafter "Management Plans"), and shall consult with the Town of Londonderry during the preparation of each Plan. Said Management Plans shall:

1) Be designed to provide reasonable public access to recreational values and opportunities associated with the Protected Property, by drawing on the expertise of recognized outdoor recreation planners; and

2) Be designed to protect the habitat values described in paragraph I(4), above, by drawing on expertise from recognized experts in the field of conservation biology, including consultation with the Vermont Department of Fish and Wildlife (and, specifically, its Non-Game and Natural Heritage Program); and

3) Make every reasonable effort to balance and reconcile these two primary purposes of this Grant; and

4) Be consistent with the Purposes of the Grant as set forth in this Section I.

Prior to their final adoption, Grantor shall provide Grantees with a copy of each such Management Plan. When the provisions of Sections II or III, below, require Grantor to secure Grantees' prior approval for an activity, use or forest management plan, Grantees may rely upon the advice and recommendations of the Vermont Department of Fish and Wildlife or such other wildlife habitat professionals as the Grantees may select to determine whether the proposed activity, use or plan would be detrimental to wildlife or wildlife habitat potential of the Protected Property.

Grantor and Grantees recognize these wildlife habitats, outdoor recreational opportunities, forestry values, and scenic and open space resources of the Protected Property, and share the common purpose of conserving these values by the conveyance of development rights, conservation easement and restrictions, public access easement, and right of re-entry to prevent the use or development of the property for any purpose or in any manner which would conflict with the maintenance of these wildlife habitats, passive outdoor recreational opportunities, forestry values, and scenic and open space resources. Grantees accept such development rights, conservation easement and restrictions, public access easement, and right of re-entry in order to conserve these values for present and future generations.

II. Restricted Uses of Protected Property.

Except as provided in Section III, below, the restrictions hereby imposed upon the Protected Property, and the acts which Grantor shall do or refrain from doing, are as follows:

1. Except as otherwise specifically permitted under this Grant, the Protected Property shall be used for habitat protection, non-commercial recreation, forestry, and open space purposes only. No residential, commercial, industrial, or mining activities shall be permitted, and no building, structure, or appurtenant facility or improvement shall be constructed, created, installed, erected or moved onto the Protected Property, except as specifically permitted under this Grant.

2. Except as otherwise specifically permitted under this Grant, no rights-of-way,

easements of ingress or egress, driveways, roads, or utility lines or easements shall be constructed, developed or maintained into, on, over, under, or across the Protected Property, without the prior written permission of the Grantees. Grantees may grant such permission if they determine, in their sole discretion, that any such improvement would be consistent with the Purposes of this Grant.

3. There shall be no signs, billboards, or outdoor advertising of any kind erected or displayed on the Protected Property; provided, however, that the Grantor may erect and maintain reasonable signs including but not limited to signs indicating the name of the Protected Property and its ownership by Grantor, boundary markers, directional signs, memorial plaques, informational and interpretive signs, and signs limiting access or use (subject to the limitations of Section IV, below). Grantees may erect and maintain signs designating the Protected Property as land under the protection of the Grantees.

4. The placement, collection or storage of trash, human waste, or any other unsightly or offensive material on the Protected Property shall not be permitted except at such locations, if any, and in such a manner as shall be approved in advance in writing by Grantees. Consistent with the Grant and Plan. The temporary storage of trash in receptacles for periodic off-site disposal, shall be permitted without such prior written approval.

5. There shall be no disturbance of the surface, including but not limited to filling, excavation, removal of topsoil, sand, gravel, rocks or minerals, or change of the topography of the land in any manner, except as may be reasonably necessary to carry out the uses permitted on the Protected Property under the terms of this Grant. In no case shall surface mining of subsurface oil, gas, or other minerals be permitted.

6. The Protected Property shall not be subdivided or conveyed in separate parcels without the prior written permission of the Grantees.

7. There shall be no operation of motorized vehicles on the Protected Property except for uses specifically reserved, such as Grantor's maintenance of the Protected Property and public facilities situated thereon, wildlife and forest management, trail grooming and/or maintenance, vehicular access by the public to recreational facilities, and for emergency purposes, and excepting that snowmobiling may be permitted at the discretion of the Grantor. Snowmobile trails may be designated and may cross the Protected Property, provided the location and use of such trail(s) are consistent with the Purposes of this Grant as stated in Section I, above (including the non-motorized recreation goals of paragraph I(4)(d).

8. There shall be no manipulation of natural watercourses, marshes, or other water bodies, nor shall there be activities conducted on the Protected Property which would be detrimental to water purity, or which could alter natural water level or flow, except as reasonably necessary to carry out the uses permitted on the Protected Property under this Grant.

III. Permitted Uses of the Protected Property.

Notwithstanding the foregoing, Grantor shall have the right to make the following uses of the Protected Property:

9. The right to use the Protected Property for all types of non-motorized recreational purposes (including, but not limited to, hunting, trapping, fishing, bird-watching, walking, snowshoeing, cross-country skiing, and swimming) not inconsistent with the Purposes of this Grant as set forth in Section I.

10. The right to use the Protected Property to conduct all activities allowed by the Management Plans, provided such activities are reasonably necessary to carry out the Purposes of this Grant and are not inconsistent with the provisions of this Grant. Provided they are contained within the Management Plans, such activities may include, but shall not be limited to the management of vegetation, wildlife and recreation, the establishment of a launching area for non-motorized boats, and the establishment of a seasonal beach recreation area. This paragraph III(10) shall not be construed to authorize the construction of new structures not otherwise permitted by this Grant.

11. The right to issue special use permits or licenses authorizing the commercial or non-commercial use of the Protected Property for recreational, educational, agricultural, forestry, or research purposes, provided any such permit or license is for uses consistent with the Purposes of the Grant as stated in Section I, above, and provided such permit or license does not authorize any use of or action on the Protected Property otherwise prohibited by Sections II, III or IV of this instrument.

12. The right to conduct maple sugaring operations. Further, the right to harvest timber and other forest products, together with the right to construct and maintain roads necessary for such activities, in accordance with the publication "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont," a Vermont Department of Forests, Parks and Recreation publication dated August 15, 1987 (or such successor standard approved by Grantees) and in accordance with a forest management plan which has been developed in consultation with the Vermont Department of Fish and Wildlife, and which forest management plan shall be a component of the Management Plans described in Section I, above.

13. The right to establish, maintain and use fields, orchards and pastures for agricultural and/or horticultural purposes, and/or for the purpose of maintaining or enhancing wildlife habitat on the Protected Property, provided that the initial forest clearing activity required to establish such fields, orchards and pastures is a component of a forest management plan which is an element of the Management Plan described in paragraph III(12), above.

14. The right to maintain, repair, improve and replace existing trails, roads, and utility lines and systems, together with the right to clear, construct, repair, improve, maintain and replace new trails, roads, access drives, parking areas, and utility lines and systems, provided the location, use and construction of such new facilities are consistent with the Purposes of this Grant as stated in Section I, above, provided said facilities are described by the Management Plan for the Protected Property, and provided all utility systems are designed, installed and maintained in compliance with applicable State and Federal regulations. Use of the Protected Property for non-motorized, mechanized recreation such as mountain biking may be permitted in the discretion of Grantor.

15. The right to construct, maintain, repair and replace additional structures reasonably necessary to support the uses permitted by this Grant (including, for example, a free-standing rest room facility, or a visitors' contact station), provided that Grantor shall secure the written approval of the Grantees prior to commencing construction on any such structures. Said approval shall not be unreasonably withheld or conditioned, provided the number, location, scale, and use of said structures is consistent with the Purposes of this Grant as stated in Section I, above, and with the Management Plan for the Protected Property

16. The right to establish dispersed tent sites and a concentrated camping area for seasonal public recreational use on the Protected Property, provided that Grantor shall secure the written approval of the Grantees prior to establishing said tent sites and/or camping area, which approval shall not be unreasonably withheld or conditioned, provided the number, location, scale, management, and volume of use of said sites and/or camping area is consistent with the Purposes of this Grant as stated in Section I, above, and with the Management Plan for the Protected Property, and provided further that such sites comply with the Vermont Department of Forests, Parks and Recreation rules and regulations governing camping on state lands.

17. The right to maintain, repair, replace or remove the following existing structures:

a) "Main Lodge" building and appurtenant garage and storage buildings, including two existing structures containing laundry facilities;

b) The 11 cabins situated on the west shore of Lowell Lake;

c) The island cabin;

d) The residence and maintenance structure situated on the east side of Lowell Lake.

Further, the right to install, maintain, repair and replace utility services and systems serving said structures, together with the right to use the structures to provide accommodations to members of the public and employees and/or agents of the Grantor assigned to the maintenance of the Protected Property and the operation of public facilities on the Protected Property, provided that the installation of such services and systems, and the use of such structures are consistent with the Management Plans and the Purposes of this Grant as set forth in Section I.

18. The right to charge members of the public reasonable fees for admission to and use of the Protected Property and adjacent lands owned by the State of Vermont.

19. No use shall be made of the Protected Property, and no activity thereon shall be permitted which, in the reasonable opinion of the Grantees, is or may possess the potential to become

inconsistent with the purposes of this Grant as stated in Section I, above. However, activities on or uses of the Protected Property which are not expressly referenced in this Grant and which are consistent with said Purposes may be permitted, in the discretion of the Grantor and with prior written notice to Grantees, provided such activities are also consistent with the Management Plan.

IV. Public Access.

Grantor covenants and agrees that the Protected Property shall be available to the general public for all types of non-motorized dispersed recreational purposes (e.g. hunting, fishing, trapping, bird-watching, walking, snowshoeing, cross-country skiing, boating and swimming) not inconsistent with the Purposes of this Grant as set forth in Section I. Notwithstanding the foregoing, Grantor may limit or restrict public access to the Protected Property to assure compliance with the requirements of this Grant, to protect natural habitats, or to protect the public health or safety (including hunter safety).

In the event Grantor proposes to transfer the Protected Property into the ownership of an individual or entity which does not undertake in writing at the time of transfer to provide recreational opportunities to the general public on the Protected Property, Grantor shall convey to Grantees or their designee, a public access easement. Said easement shall provide reasonable public access to recreational opportunities, shall be consistent with the Purposes of the Grant as set forth in Section I, above, and shall be in a form approved by Grantees.

V. Right of Entry.

Upon the conveyance of the Protected Property to the State of Vermont, Department of Forests, Parks and Recreation, said conveyance shall be subject to a right of entry vested in Grantees Vermont Land Trust, Inc. and Vermont Housing and Conservation Board. Grantor covenants and agrees as follows:

1) Grantor shall use and maintain the Protected Property exclusively for uses permitted under this Grant, consistent with the Purposes of this Grant as set forth in Section I, and shall make the Protected Property available for public access as provided in Section IV hereof.

2) As owner and manager of the Protected Property, Grantor shall periodically inspect the Protected Property to assure Grantor's compliance with the terms and conditions of this Grant and shall, upon request, report the results of the inspections to Grantees.

3) Grantor shall take all reasonable steps to correct any violation of the terms and conditions of this Grant in the event a breach is discovered.

4) Grantor shall not give, grant, sell, convey, transfer, mortgage, pledge or otherwise encumber the Protected Property without the prior written approval of Grantees.

In the event Grantor takes or fails to take any action which could result in a breach or could reasonably be interpreted as expressing an intent to breach the obligations set forth in this Section, Grantees reserve the right of entry for conditions broken or an executory interest, which right, if exercised by Grantees upon such breach of, or intention to breach, the above covenants, shall be exercised by mailing a notice of violation ("Notice") by certified mail to Grantor. Said Notice shall declare that the power of termination has been exercised and shall state the breach which caused the action. Grantor shall have a period of sixty (60) days from the date of its receipt of said notice to correct the breach causing the termination. If in the reasonable opinion of Grantees the breach is not cured within said sixty-day period, the termination shall become final and a copy of the Notice shall be recorded in the Town of Londonderry Land Records. Grantees' rights and remedies under this Section V shall be in addition to the rights and remedies set forth in Section VI, below. No delay or omission by Grantees in the exercise of its rights under this Section V shall impair Grantees' rights under this clause or be construed as a waiver of the right of re-entry.

VI. Enforcement of the Restrictions.

Grantees shall make reasonable efforts from time to time to assure compliance by Grantor with all of the covenants and restrictions herein. In connection with such efforts, Grantees may make periodic inspection of all or any portion of the Protected Property, and for such inspection and enforcement purposes, the Grantees shall have the right of reasonable access to the Protected Property. In the event that a Grantee becomes aware of an event or circumstance of non-compliance with the terms and conditions herein set forth, Grantees shall give notice to Grantor and the other Grantees of

such event or circumstance of non-compliance via certified mail, return receipt requested, and demand corrective action by the Grantor sufficient to abate such event or circumstance of non-compliance and restore the Protected Property to its previous condition. In the event there has been an event or circumstance of non-compliance which is corrected through negotiation and voluntary compliance, Grantor shall, at Grantees' request, reimburse Grantees for all reasonable costs incurred in investigating the non-compliance and in securing its correction.

Failure by the Grantor to cause discontinuance, abatement, or such other corrective action as may be demanded by the Grantee within a reasonable time after receipt of notice and reasonable opportunity to take corrective action shall entitle the Grantee to bring an action in a court of competent jurisdiction to enforce the terms of this Grant and to recover any damages arising from such non-compliance. Such damages, when recovered, may be applied by the Grantee to corrective action on the Protected Property, if necessary. If the court determines that the Grantor has failed to comply with this Agreement, Grantor shall reimburse the Grantee for any reasonable costs of enforcement, including court costs and reasonable attorneys' fees, in addition to any other payments ordered by such court. In the event that a Grantee initiates litigation and the court determines that the Grantor has not failed to comply with this Agreement and that the Grantee has initiated litigation without reasonable cause or in bad faith, then the Grantee(s) who commenced the court proceedings shall reimburse Grantor for any reasonable costs of defending such action, including court costs and reasonable attorneys' fees; provided this clause shall not apply to any Grantee protected by the doctrine of sovereign immunity. The parties to this Grant specifically acknowledge that events and circumstances of non-compliance constitute immediate and irreparable injury, loss, and damage to the Protected Property and accordingly entitle Grantees to such equitable relief, including but not limited to injunctive relief, as the court deems just. The remedies described herein are in addition to, and not in limitation of, any other remedies available to the Grantees at law, in equity, or through administrative proceedings.

No delay or omission by the Grantees in the exercise of any right or remedy upon any breach by Grantor shall impair the Grantees' rights or remedies or be construed as a waiver. Nothing in this enforcement section shall be construed as imposing a liability upon a prior owner of the Protected Property, where the event or circumstance of non-compliance shall have occurred after said prior owner's ownership or control of the Protected Property has terminated.

VII. Miscellaneous Provisions.

1. Where Grantor is required, as a result of this Grant, to obtain the prior written approval of the Grantees before commencing an activity or act, and where the Grantees have designated in writing another organization or entity which shall have the authority to grant such approval, the approval of said designee shall be deemed to be the approval of the Grantees, provided that Grantor has given its written consent to such designation, which consent shall not be unreasonably withheld. Grantor shall reimburse Grantees or Grantees' designee for all extraordinary costs, including staff time, incurred in reviewing the proposed action requiring Grantees' approval; but not to include those costs which are expected and routine in scope. When Grantees have authorized a proposed action requiring approval under this Grant, Grantees shall, upon request, provide Grantor with a written certification in recordable form memorializing said approval.

2. It is hereby agreed that the construction of any buildings, structures or improvements, or any use of the land otherwise permitted under this Grant, shall be in accordance with all applicable ordinances, statutes and regulations of the Town of Londonderry and the State of Vermont.

3. The Grantees shall transfer the development rights, right of first refusal, and conservation easement and restrictions conveyed by Grantor herein only to a State agency, municipality, or qualified organization, as defined in Chapter 34 or Chapter 155 Title 10 V.S.A., in accordance with the laws of the State of Vermont and the regulations established by the Internal Revenue Service governing such transfers.

4. In the event the development rights or conservation restrictions conveyed to the Grantees herein are extinguished by eminent domain or other legal proceedings, Grantees shall be entitled to any proceeds which pertain to the extinguishment of Grantees' rights and interests. Any proceeds from extinguishment shall be allocated between Grantor and Grantees using a ratio based upon the relative value of the development rights and conservation restrictions, and the value of the fee interest in the Protected Property, as determined by a qualified appraisal performed at the direction of either the Grantor or Grantees in the year of this conveyance. Grantees shall use any such proceeds to preserve undeveloped and open space land in order to protect the aesthetic, cultural, educational, scientific, and natural resources of the state through non-regulatory means.

5. In any deed or lease conveying an interest in all or part of the Protected Property, Grantor shall make reference to the conservation easement, restrictions, and obligations described herein and shall indicate that said easement and restrictions are binding upon all successors in interest in the Protected Property in perpetuity. Grantor shall also notify the Grantees of the name(s) and address(es) of Grantor's successor(s) in interest.

6. Grantees shall be entitled to rerecord this Grant, or to record a notice making reference to the existence of this Grant, in the Town of Londonderry Land Records as may be necessary to satisfy the requirements of the Record Marketable Title Act, 27 V.S.A., Chapter 5, Subchapter 7, including 27 V.S.A. §§603 and 605.

7. While title is herein conveyed to Grantees as tenants in common, the rights and interests described in this Grant, including enforcement of the conservation easement and restrictions, may be exercised by the Grantees collectively, or by any single Grantee individually, provided that court enforcement action by a single Grantee shall foreclose action on the same issue(s) by the other Grantees who shall be bound by the final determination.

8. The term "Grantor" shall include the successors and assigns of the original Grantor, Preston White as Trustee of the Preston A. White Trust, Preston White and Jonathan Bump as Trustees of the Joan T. White Trust, Roger W. White and Betsy J. White. Upon the transfer of fee title to the Protected Property by said original Grantor to the State of Vermont subject to the terms of this Grant, the term "Grantor" shall, following said conveyance, denote the State of Vermont, its successors and assigns as to the Protected Property or any portion thereof. The original Grantor shall, after said transfer to the State, have no liability or obligation whatever under this Grant, excepting as to title warranties contained herein. The term "Grantees" shall include the respective successors and assigns of the original Grantees, Vermont Land Trust, Inc. and Vermont Housing and Conservation Board.

INVALIDATION of any provision hereof shall not affect any other provision of this Grant.

TO HAVE AND TO HOLD said granted development rights, right of first refusal, and conservation easement and restrictions, with all the privileges and appurtenances thereof, to the said Grantees, VERMONT LAND TRUST, INC. and VERMONT HOUSING AND CONSERVATION BOARD, their respective successors and assigns, to their own use and behoof forever, and the said Grantor, PRESTON A. WHITE as Trustee of the Preston A. White Trust, PRESTON A. WHITE and JONATHAN BUMP as Trustees of the Joan T. White Trust, ROGER W. WHITE, and BETSY J. WHITE, for themselves, and for their respective heirs, administrators, executors, successors and assigns, do covenant with the said Grantees, their successors and assigns, that until the ensealing of these presents, they are the sole owner of the premises, and have good right and title to convey the same in the manner aforesaid, that the premises are free from every encumbrance, except easements and use restrictions of record as set forth in Schedule B attached hereto and incorporated herein, and they hereby engage to warrant and defend the same against all lawful claims whatever; PROVIDED, HOWEVER, that title to lands lying below the surface of Lowell Lake is conveyed with Quit-Claim covenants only.

IN WITNESS WHEREOF, JONATHAN BUMP as Trustee of the Joan T. White Trust, sets his hand and seal this 11th day of October, 1996.

Signed, sealed and delivered
In The Presence Of:

Witness to JB

Witness to JB

GRANTOR
Joan T. White Trust

Jonathan Bump, Trustee Tu

STATE OF VERMONT
Windham COUNTY, ss.

At Brattleboro this 11th day of October, 1996, JONATHAN BUMP as Trustee of the Joan T. White Trust, personally appeared and he acknowledged this instrument, by him sealed and subscribed, to be his free act and deed, before me.

Jacqueline C. Bump
Notary Public
My commission expires: 2-10-99

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IN WITNESS WHEREOF, PRESTON A. WHITE as Trustee of the Joan T. White Trust, sets his hand and seal this 9 day of October, 1996.

Signed, Sealed and delivered
In the Presence Of:

GRANTOR
Joan T. White Trust

Suzanne Myers
Witness to PAW

Preston A. White
Preston A. White, Trustee

Colleen Moore
Witness to PAW

STATE OF Florida
Charlotte COUNTY, ss.

At Englewood, this 9th day of October, 1996, PRESTON A. WHITE as Trustee of the Joan T. Trust, personally appeared and he acknowledged this instrument, by him sealed and subscribed, to be his free act and deed, before me.

Suzanne Myers
Notary Public
My commission expires:

SUZANNE MYERS
MY COMMISSION # CC277049 EXPIRES
April 15, 1997
BONDED THRU TROY FAIN INSURANCE, INC.

IN WITNESS WHEREOF, PRESTON A. WHITE as Trustee of the Preston A. White Trust, sets his hand and seal this 9 day of October, 1996.

Signed, sealed and delivered
In The Presence Of:

GRANTOR
Preston A. White Trust

Suzanne Myers
Witness to PAW

Preston A. White
Preston A. White, Trustee

Colleen Moore
Witness to PAW

STATE OF Florida
Charlotte COUNTY, ss.

At Englewood, this 9 day of October, 1996, PRESTON A. WHITE as Trustee of the Preston A. White Trust, personally appeared and he acknowledged this instrument, by him sealed and subscribed, to be his free act and deed, before me.

Suzanne Myers
Notary Public
My commission expires:

SUZANNE MYERS
MY COMMISSION # CC277049 EXPIRES
April 15, 1997
BONDED THRU TROY FAIN INSURANCE, INC.

IN WITNESS WHEREOF, ROGER W. WHITE sets his hand and seal this 10th day of October, 1996.

Signed, sealed and delivered
In The Presence Of:

GRANTOR

Witness to RWW

Roger W. White

Witness to RWW

STATE OF MA
SUFFOLK COUNTY, ss.

At Boston, this 10th day of October, 1996, ROGER W. WHITE, personally appeared and he acknowledged this instrument, by him sealed and subscribed, to be his free act and deed, before me.

Notary Public
My commission

IN WITNESS WHEREOF, BETSY J. WHITE sets her hand and seal this 9th day of October, 1996.

Signed, sealed and delivered
In The Presence Of:

GRANTOR

Milroc Hinderman
Witness to BJW

Betsy J. White
Betsy J. White

Witness to BJW

STATE OF Colorado
Boulder COUNTY, ss.

At 1:50pm, this 9th day of October, 1996, BETSY J. WHITE, personally appeared and she acknowledged this instrument, by her sealed and subscribed, to be her free act and deed, before me.

Notary Public
My commission expires 12-26-99

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Approved by the VERMONT HOUSING AND CONSERVATION BOARD:

Date

By:
Its Duly Authorized Agent

==========

Approved by the VERMONT HOUSING AND CONSERVATION BOARD:

10/09/96
Date

By: Lawrence W. Miller
Its Duly Authorized Agent

Schedule A

Grant of Development Rights, Conservation Restrictions, Public Access Easement and Right of Entry

Parcel One

Beginning at an iron pin at lands of the State of Vermont which point marks the southern-most corner of the within described premises;

thence North 43° 39′ 12" West, 326.62 feet along lands formerly of George W. Albro, Sr., to an iron pin for a corner;

thence turning and running on lands formerly of said Albro the following courses and distances: South 71° 21′ 05" West, 225.27 feet to a point at two - 24" Cherry trees; thence North 22° 12′ East, 1,066 feet along lands formerly claimed by Preston White and now or formerly by Ruth Stevenson to a point for a corner; thence North 67° 56′ West, 1,577 feet to a tree at a stone wall corner and lands now or formerly of Mountain Lake Farm;

thence running along a stone wall and lands of said Mountain Lake Farm and lands now or formerly of one Gibbs the following courses and distances: North 61° 45′ 38" West, 104.40 feet; North 67° 40′ 50" West, 158.24 feet; North 9° 17′ 38 East, 103.12 feet; north 14° 18′ 42" East, 397.43 to a stone wall corner in the right of way limit of the Londonderry Town Highway known as the Simonsville Road;

thence turning and running in the right of way limit of Simonsville Road, in part along stone walls, the following courses and distances; North 66° 08′ 03" East, 157.74 feet; North 79° 24′ 03" East, 125.43 feet; North 84° 49′ 32" East, 139.09 feet; North 72° 05′ 10" East, 118.49 feet; North 68° 39′ 51" East, 149.70 feet; North 65° 41′ 44" East, 399.27 feet; North 82° 12′ 58" East, 43.17 feet; North 87° 18′ 39" East, 88.05 feet; South 86° 22′ 26" East, 84.53 feet; North 82° 00′ 30" East, 113.66 feet; North 51° 06′ 34" East, 122.83 feet; North 47° 56′ 00" West, 4.87 feet; North 42° 04′ 00 East, 131.21 feet; thence on a curve to the right having a length of 130.29 feet; thence running South 82° 01′ 00" East, 110.0 feet; thence on a curve to the left having a length of 230.75 feet; thence running North 75° 57′ 00" East, 196.00 feet; thence on a curve to the right having a length of 176.66 feet to a point at the other lands of Preston A. White;

thence South 2° 10′ West, 508 feet on lands of Roger White and Betsy J. White to a point, and continuing South 35° 25′ East, 525 feet to a point near the shore of Lowell Lake;

thence proceeding southerly 1,830 feet, more or less, along the shoreline of Lowell Lake to a stone wall at lands now or formerly of the State of Vermont, Department of Forests and Parks;

thence continuing on said Forests and Parks lands South 43° 09′ West, 632 feet to the point and place of beginning.

Containing by estimation 92.9 acres, be the same more or less.

The premises are conveyed with a right of way 50 feet in width, running from the Lowell Lake Road, so-called, across lands now or formerly of the State of Vermont to a point near the southern-most corner of the premises, which right of way is 50 feet in width and the centerline is more particularly described as follows: Beginning at a point in the centerline of Lowell Lake Road; thence running North 17° 08′ West, 98.30 feet to a point; thence on a curve to the left having a radius of 319.29 feet an arc distance of 99.19 feet to a point; thence running North 34° 56′ West, 629.5 feet to a point at the premises described herein.

The foregoing description is based upon a survey entitled "A Portion of the Property of Preston A. White" by Dufresne-Henry Engineering Corporation dated July 10, 1981, to be recorded in the Londonderry Land Records.

Being all and the same premises acquired by Preston A. White by virtue of a Decree of Foreclosure of the Windham Superior Court in the matter of Preston A. White vs. Paul and Cynthia Tirsbier, Docket No. S331-92, Londonderry Land Records.

The premises are subject to the following:

(1) Utility easement from Joseph R. Gardner and Preston A. White to Central Vermont Public Service Corporation dated January 22, 1954 and recorded at Book 27, Page 190.

Parcel Two

Beginning at an iron pin in the southerly right-of-way limit of Simonsville Road, so-called, which point marks the northwesterly corner of the premises herein described, and the northeast corner of premises of Preston A. White and Jonathan Bump, Trustees.

thence proceeding on said right-of-way limit North 84° 03′ 43" East, 1,151.02 feet to a point;

thence continuing on said right of way limit the following courses and distances: South 66° 31′ 44" East, 228.10 feet to an iron pin; South 55° 26′ 50" East, 594.56 feet to an iron pin; South 48° 00′ 00" East, 353.76 feet to an iron pin;

thence turning and running on lands of the State of Vermont South 21° 08′ 50" West, 2,105.86 feet to an iron pin at the shoreline of Lowell Lake;

thence running northerly and northwesterly on the shoreline of Lowell Lake 1689.93 feet more or less to an iron pin;

thence running N 38° 25′ 22" W 171.07 feet to a point;

thence N 67° 23′ 14" West 957.21 feet to a point at lands of Preston W. White and Jonathan Bump, Trustees, the preceding three courses being on parcel three described below.

thence running on lands of said Trustees North 07° 20′ 15" East, 382.00 feet to the point and place of beginning.

Containing by estimation 52 acres, be the same more or less, including the marsh land contained within the above described parcel.

Reference may be had to a plan entitled 'Subdivision Map Prepared for Preston A. White', by Ericksen, Dern, Lattuga Associates, Inc., dated November 20, 1987 as revised to September 19, 1990, to be recorded.

Subject to an easement for access to the islands, and dwelling thereon, over a right of way 50 feet in width centered on the centerline of the existing roadway, together with access from said roadway to the shoreline over a piece of land lying opposite to the island retained by the Grantors and described as follows: beginning at an iron pin in the southerly limit of the right of way;

thence proceeding South 25° 13′ 24" East, 199.94 feet to an iron pin;

thence turning and running South 61° 17′ 36" West, 58.83 feet to an iron pin at the shoreline of Lowell Lake;

thence turning and running on said shoreline North 19° 26′ 56"

West, 203.99 feet to an iron pin; thence turning and running North 63° 56′ 21" East, 38.20 feet to the point and place of beginning.

Parcel Three

Being two islands lying near the northerly end of Lowell Lake, containing 2.3 acres and .5 acres respectively, with dwelling and improvements thereon.

Also conveying herewith all of the Grantors' interest in Lowell Lake and the lands thereunder.

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SCHEDULE B
EASEMENTS AND USE RESTRICTIONS

The Protected Property is subject to the following easements and use restrictions of record:

1. Rights of the public and others entitled thereto to use that portion of the Protected Property lying within the boundaries of roads maintained by one or more of the town, state or federal jurisdictions for all purposes commonly used for roads in the State of Vermont.

2. Rights of the public to use waterways and bodies of water as implied by the Public Trust Doctrine.

3. Utility Line Easement in favor of Central Vermont Public service Corporation and New England Telephone & Telegraph Company dated July 30, 1987, recorded in Book 45 at Page 100 of the Londonderry Land Records.

4. Utility Line Easement in favor of Central Vermont Public Service Corporation and New England Telephone & Telegraph Company dated January 26, 1990, recorded in Book 48 at Page 19 of the Londonderry Land Records.

5. Utility Line Easement in favor of Central Vermont Public Service Corporation dated October 21, 1948, recorded in Book 26 at Page 3457 of the Londonderry Land Records.

6. Utility Line Easement in favor of Central Vermont Public Service Corporation dated January 22, 1954, recorded in Book 27 at Page 190 of the Londonderry land Records.

Appendix H: Glossary

The following is a series of key words and their definitions used in the development of Long Range Management Plans for Vermont Agency of Natural Resource lands.

Acceptable Management Practices (AMPs). In this plan, a series of erosion control measures for timber harvesting operations, as identified in state statutes. The AMPs are the proper method for the control and dispersal of water collecting on logging roads, skid trails, and log landings to minimize erosion and reduce sediment and temperature changes in streams.

Acceptable Growing Stock (AGS). AGS trees exhibit form and appearance that suggests they will maintain and/or improve their quality and can be expected to contribute significantly to future timber crops in the form of vigorous high quality stems. They contain or may potentially produce high or medium quality sawlogs.

Age Class. One of the intervals, commonly 10 to 20 years, into which the age range of forest trees are divided for classification or use. Also pertains to the trees included in such an interval. For example, trees ranging in age from 21 to 40 years fall into a 30-year age class; 30 designates the midpoint of the 20-year interval from 21 to 40 years.

All-aged (Uneven-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Basal area. A measure of the density of trees on an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) expressed in square feet per acre.

Best management practices. A practice or combination of practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

Biodiversity. The variety of plants and animals, their genetic variability, their interrelationships, and the biological and physical systems, communities, and landscapes in which they exist.

Biophysical region. A region with shared characteristics of climate, geology, soils, and natural vegetation. There are currently eight biophysical regions recognized in Vermont.

Block. A land management planning unit.

Browse. The part of leaf and twig growth of shrubs, vines, and trees available for animal consumption.

Canopy. The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Capability. The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management

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intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils, and geology as well as the application of management practices such as silvicultural protection from fire, insects, and disease.

Cleaning (Weeding). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Clearcutting. A cut which removes all trees from a designated area at one time, for the purpose of creating a new, even-aged stand.

Commercial forest land. Land declared suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation.

Conservation. The careful protection, planned management, and use of natural resources to prevent their depletion, destruction, or waste.

Conservation easement. Acquisition of some rights on a parcel of land designed to keep the property undeveloped in perpetuity.

Cover. Vegetation which provides concealment and protection to wild animals.

Cull Tree. Tree that does not meet regional merchantability standards because of excessive unsound cull. May include noncommercial tree species.

Cultural operation. The manipulation of vegetation to control stand composition or structure, such as site improvement, forest tree improvement, increased regeneration, increased growth, or measures to control insects or disease. Examples of methods used are timber stand improvement, cleaning or weeding, release, and site preparation.

DBH (diameter at breast height). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Deer wintering area. Forest area with at least 70 percent conifer that provides suitable, stable habitat to meet deer needs during the winter.

Den tree. A live tree at least 15 inches DBH (diameter at breast height) containing a natural cavity used by wildlife for nesting, brood rearing, hibernating, daily or seasonal shelter, and escape from predators.

Developed (or intensive) recreation. Activities associated with man-made structures and facilities that result in concentrated use of an area. Examples are campgrounds and ski areas.

Diameter at breast height (DBH). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Dispersed recreation. Outdoor recreation activities requiring few, if any, support facilities.

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Down woody material (DWM). DWM is also referred to as coarse woody debris, woody material, and down woody debris. DWM is comprised of woody material left in the woods from harvested trees as well as portions or whole trees that die and fall naturally.

Ecological processes. The relationships between living organisms and their environment. Among these processes are natural disturbances such as periodic fire, flooding, or beaver activity; natural stresses such as disease or insects; catastrophic weather-related events such as severe storms or lightning strikes; or more subtle ongoing processes such as succession, hydrology, and nutrient cycling.

Ecological reserve. An area of land managed primarily for long-term conservation of biodiversity.

Ecosystem. A complex array of organisms, their natural environment, the interactions between them, the home of all living things, including humans, and the ecological processes that sustain the system.

Ecosystem management. The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity, uses, products, and services over the long-term.

Endangered species. A species listed on the current state or Federal endangered species list (VSA Title 10, chapter 123). Endangered species are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

Even-aged system. Timber management that produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, seed tree (seed cut) method, and shelterwood method.

Forest health. Condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity.

Forest type. A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined and named after the one or more dominant species of trees, such as the spruce-fir and the birch-beech-maple types.

Forestry. The art and science of growing and managing forests and forest lands for the continuing use of their resources.

Fragmentation. Division of a large forested area into smaller patches separated by areas converted to a different land use.

Game species. Animals habitually hunted for food, particular products, sport, or trophies.

Gap. An opening in the forest canopy caused by the death or harvest of one or several overstory trees.

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Geographic Information Systems. A computer-based means of mapping lands and resources and communicating values associated with them (GIS).

Green certification. A process, sponsored by several international organizations, that promotes sustainable forest management practices, providing a marketplace identify for forest products certified to have been grown and manufactured in a sustainable manner.

Group Selection. The removal of small groups of trees to meet a predetermined goal of size, distribution, and species.

Habitat. A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

Hardwood. A broad leaved, flowering tree, as distinguished from a conifer. Trees belonging to the botanical group of angiospermae.

Healthy ecosystem. An ecosystem in which structure and functions allow the maintenance of the desired conditions of biological diversity, biotic integrity, and ecological processes over time.

Heritage Sites. Sites identified by the Vermont Nongame and Natural Heritage Program of the Department of Fish and Wildlife, which have rare, threatened, or endangered species of plants or animals. Heritage sites are identified using a common standards-based methodology, which provides a scientific and universally applicable set of procedures for identifying, inventorying, and mapping these species.

Intensive (or developed) recreation. Outdoor recreation activities requiring major structures and facilities.

Interior dependent species. Those wildlife species that depend on large unbroken tracts of forest land for breeding and long term survival. The term is also often used in conjunction with neotropical migratory bird species requiring large patches of fairly homogeneous habitat for population viability**.**

Intermediate treatment. Any treatment or tending designed to enhance growth, quality vigor, and composition of the stand after its establishment or regeneration and prior to the final harvest.

Invasive Exotic (Non-native). A species that is 1) non-native (or alien) to the ecoregion or watershed under consideration and 2) whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Land conservation. The acquisition or protection through easements of land for wildlife habitat, developed state parks, and working forests.

Landscape. A heterogeneous area of land containing groups of natural communities and clusters of interacting ecosystems. These can be of widely varying scales but normally include a range of elevations, bedrock, and soils.

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Mast. The fruit (including nuts) of such plants as oaks, beech, hickories, dogwood, blueberry, and grape, used for food by certain wildlife species.

Motorized use. Land uses requiring or largely dependent on motor vehicles and roads.

Multiple-use forestry. Any practice of forestry fulfilling two or more objectives of management, more particularly in forest utilization (e.g. production of both wood products and deer browse).

Multiple-use management. An onsite management strategy that encourages a complementary mix of several uses on a parcel of land or water within a larger geographic area.

Native (species). A plant or animal indigenous to a particular locality.

Natural Area. Limited areas of land, designated by Vermont statute, which have retained their wilderness character, although not necessarily completely natural and undisturbed, or have rare or vanishing species of plant or animal life or similar features of interest which are worthy of preservation for the use of present and future residents of the state. They may include unique ecological, geological, scenic, and contemplative recreational areas on state lands.

Natural community. An assemblage of plants and animals that is found recurring across the landscape under similar environmental conditions, where natural processes, rather than human disturbances, prevail.

Nongame species. Animal species that are not hunted, fished, or trapped in this state. This classification is determined by the state legislature.

Northern hardwood. Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, white birch, black cherry, red spruce, and hemlock.

Old growth forest. A forest stand in which natural processes and succession have occurred over a long period of time relatively undisturbed by human intervention.

Outdoor recreation. Leisure time activities that occur outdoors or utilize an outdoor area or facility.

Overstory. That portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer.

Patch Clearcut (Patch-cut). Under an even-aged method, a modification of the clearcutting method where patches (groups) are clearcut in an individual stand boundary in two or more entries. Under a two-aged method, varying numbers of reserve trees are not harvested in the patches (groups), to attain goals other than regeneration.

Pole. A tree of a size between a sapling and a mature tree.

Pole timber. As used in timber survey, a size class definition; trees 5.0 to 8.9 inches (varies by species) at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

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Regeneration. Seedlings or saplings existing in a stand. Regeneration may be artificial (direct seeding or planting) or natural (natural seeding, coppice, or root suckers).

Regeneration treatment (harvest cut). Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.

The four basic methods used to regenerate a forest are clearcutting, seed-tree, shelterwood, and selection (group selection or single tree selection).

Regeneration methods. Timber management practices employed to either regenerate a new stand (regeneration cutting) or to improve the composition and increase the growth of the existing forest (intermediate treatment).

Regulated Hunting/Fishing/Trapping. The harvest of wildlife under regulations stipulating setting of seasons, time frame of lawful harvest, open and closed zones, methods of take, bag limits, possession limits, and reporting or tagging of species.

Release (release operation). The freeing of well-established cover trees, usually large seedlings or saplings, from closely surrounding growth.

Removal cut. The final cut of the shelterwood system that removes the remaining mature trees, completely releasing the young stand. An even-aged stand results.

Riparian Area. "*The word "riparian" means of or pertaining to the bank of a river or lake. Riparian areas are ecosystems comprised of streams, rivers, lakes, wetlands, and floodplains that form a complex and interrelated hydrologic system. They extend up and down streams and along lakeshores from the bottom of the water table to the top of the vegetation canopy, and include all land that is directly affected by surface water. Riparian areas are unique in their high biological diversity. They are "characterized by frequent disturbances related to inundation, transport of sediments, and the abrasive and erosive forces of water and ice movement that, in turn, create habitat complexity and variability…resulting in ecologically diverse communities"* (Verry, E.S., J.W. Hornbeck, and C.A. Dolloff (eds). 2000. Riparian management in forests of the continental Eastern United States. Lewis Publishers, Boca Raton, FL. 402p.)

Riparian Management Zone (RMZ). The width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian management zones are typically areas of minimal disturbance, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian area from the impact of these land uses.

Salvage Cutting. The removal of dead, dying, and damaged trees after a natural disaster such as fire, insect or disease attack, or wind or ice storm to utilize the wood before it rots.

Sanitation cutting. The removal of dead, damaged, or susceptible trees to improve stand health by stopping or reducing the spread of insects or disease.

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Sapling. As used in timber surveys, a size class definition. A usually young tree larger than seedling but smaller than pole, often 1.0 to 4.9 inches at DBH.

Sawlog or Sawtimber. A log or tree that is large enough (usually > than 10 or12 inches DBH) to be sawn into lumber. Minimum log length is typically 8 feet.

Seedling. A very young plant that grew from a seed.

Seed-Tree (Seed Cut) method. The removal of most of the trees in one cut, leaving a few scattered trees of desired species to serve as a seed source to reforest the area.

Shelterwood method. A series of two or three cuttings which open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

Silvicultural systems. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

Single tree selection method. Individual trees of all size classes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration.

Site Preparation. Hand or mechanical manipulation of a site, designed to enhance the success of regeneration.

Site Quality. A broad reference of the potential of forest lands to grow wood. Site class identifies the potential growth more specifically in merchantable cubic feet/acre/year.

Snag. Includes standing dead or partially dead trees that are at least 6 inches in diameter at breast height (DBH) and 20 feet tall.

Softwood. A coniferous tree. Softwood trees belong to the botanical group gymnospermae, including balsam fir, red spruce, and hemlock.

Stand improvement. An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven-aged stands.

Stewardship. Caring for land and associated resources with consideration to future generations.

Stocking. A description of the number of trees, basal area, or volume per acre in the forest stand compared with a desired level for balanced health and growth. Most often used in comparative expressions, such as well-stocked, poorly stocked, or overstocked.

Sustainability. The production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.

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Sustained yield. The yield that a forest can produce continuously at a given intensity of management.

Thinning. Removing some of the trees in a dense immature stand primarily to improve the growth rate and form of the remaining trees and enhance forest health.

Threatened species. A species listed on the state or Federal threatened species list. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Timber lands. Properties that are managed primarily for the maximum production of forest products.

Timber Stand Improvement. Activities conducted in young stands of timber to improve growth rate and form of the remaining trees.

Traditional uses. Those uses of the forest that have characterized the general area in the recent past and present, including an integrated mix of timber and forest products harvesting, outdoor recreation, and recreation camps or residences.

Unacceptable Growing Stock (UGS). UGS trees are high risk and are expected to decline before harvest. UGS trees are of poor form and/or low quality and cannot reasonably be expected to improve. They have the potential to produce only low quality logs or pulp-type products.

Uneven-aged (All-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Watershed. The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

Weeding (cleaning). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Wilderness. Areas having pristine and natural characteristics, typically roadless and often with some limits on uses. (This is not the federal definition of wilderness.)

Wildlife habitat. Lands supplying a critical habitat need for any species of wildlife, especially that which requires specific treatment and is of limited acreage.

Working forest. Land primarily used for forestry purposes but also available for recreation, usually where both managed land and land not presently being managed is present.

Working landscape. A landscape dominated by land used for agricultural and/or forestry purposes.

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