

State of Vermont  
Agency of Natural Resources  
Department of Forests, Parks and Recreation

# Long Range Management Plan CAMP PLYMOUTH STATE PARK



Prepared by: Springfield Stewardship Team

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Approved:

  
Jonathan L. Wood, Commissioner, FP&R

4/5/04  
Date

Approved:

  
Elizabeth McLain, Secretary, ANR

4/6/04  
Date

## II. Overview of Lands Management by the Vermont Agency of Natural Resources

### *Purposes of Land Ownership*

On behalf of the State of Vermont, the Agency of Natural Resources manages state-owned land for a variety of purposes, ranging from the protection of important natural resources to public uses of the land in appropriate places.

*Natural resources* include, but are not limited to, the following: biodiversity, wildlife habitat, natural communities, water bodies, wetlands, undeveloped land, scenery, and aesthetic values.

*Public uses* include, but are not limited to, the following: recreation, access to state lands or waters, environment-related businesses, flood control, education, research, and sustainable use of renewable resources such as hunting, fishing, trapping, and forest management.

### *Outcome of Long-Range Management Plans*

The Vermont Agency of Natural Resources manages state lands in a sustainable manner by considering all aspects of the ecosystem and all uses of the natural resources.

(Agency Strategic Plan 2001-2005)

The agency has a mandate to serve as the principal land steward for properties owned or managed by its three departments — Environmental Conservation; Fish and Wildlife; and Forests, Parks and Recreation.

The development of long-range management plans (LRMP) for agency lands represents a key step in providing responsible stewardship of these valued public assets. Each LRMP identifies areas where different uses are to be allowed and describes how these uses will be managed to ensure protection of natural resources. The following over-arching management standards further both agency and department missions and are applied to the development of long-range management plans for all ANR lands:

**Biological Diversity:** Agency lands are managed to both maintain and enhance the variety and abundance of plants, animals and other life forms at scales ranging from local to regional.

**Ecosystem Health:** Agency lands are managed to ensure ecosystem functions, health, and sustainability. Threats and stresses are monitored, evaluated, and reported regularly.

**Legal Constraints:** Agency lands are managed in accordance with the purposes for which they were acquired. Many agency lands were purchased with federal funds that require management to be directed for specific purposes. These requirements and other

legal restrictions, such as conservation easements, are supported in all planning and management activities.

**Natural Resource Science:** The foundation for management decisions on agency land consists of comprehensive ecological assessments as developed and documented in long-range management plans.

**Wildlife Management:** Wildlife management activities are directed at protecting and enhancing wildlife habitat for species needing to be conserved as well as those of public interest and utilization.

**Recreational Uses and Needs:** Agency lands are managed to create, maintain, and enhance sustainable recreational uses. Permitted or allowed activities are dependent upon site capabilities and public need. Wildlife management areas continue to give priority to wildlife dependent activities.

**Sustainable Forestry:** Agency lands are managed to ensure forest health and sustainability. Vegetation management and utilization strategies based on natural communities and appropriate silvicultural guidelines ensure that trees, forests, and forest ecosystems remain healthy.

**Public Involvement:** State lands are a public resource. The public is involved in all aspects of decision-making on state lands, including acquisition, policy development, management planning, and the implementation of policies, plans, and regulations. In developing long-range plans, the agency considers interests outlined in local, regional, and state plans, including town plans, regional plans, watershed plans, and species recovery and management plans, and works to resolve conflicts between plans as may be appropriate or necessary.

**Historical/Cultural and Scenic Values:** Agency lands are managed to be sensitive to historical, cultural, and scenic values. Due to protection under state law and federal regulations, sites of archaeological or historical significance are equal in status to any other legal constraints applicable to the lands.

**Best Management Practices:** Lands under agency management serve as exemplary stewardship models for the public and private sectors in Vermont. Whenever possible, best management practices that are utilized are visible and easy to understand.

**Regional Availability of Resources and Activities:** Because every parcel of agency land cannot accommodate all the uses that the public might want, the agency works to ensure that the following uses are made available on a regional basis: sustainable forest harvest; sustainable recreational activities; wildlife-oriented activities; protection of biodiversity and natural communities; and activities that reflect historical and cultural values.

# Mission Statements Which Have Guided the Development of This Plan

## *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." (Agency Strategic Plan, 2001-2005)

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.

## *Department Mission Statements*

### **Vermont Department of Environmental Conservation Mission Statement — 2001-2005**

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

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### **Vermont Department of Fish and Wildlife Mission Statement — 2001-2005**

The mission of the Vermont Fish and 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.

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### **Vermont Department of Forests, Parks and Recreation Mission Statement — 2001-2005**

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.

## **II. Parcel Description**

### **A. Location/Size Information with Maps**

Camp Plymouth State Park is a popular recreation area of 295 acres located on the eastern shore of Echo Lake within the Town of Plymouth, Vermont. The park is located just over one mile from Route 100 with access provided by Scout Camp Road (Town Highway #42), a paved town road that bisects the property. Approximately 45 acres border the lake on the west side of TH #42 and 250 acres lies on the eastern side of the road. Most visitation to the park occurs in the lakeside day use area that features a beach, playground, picnic area, and boat rentals.

Additional recreation occurs in the remaining undeveloped regions of the park that abuts the 7,788-acre Arthur Davis Wildlife Management Area owned by the Vermont Fish & Wildlife Department.

Vermont is divided into eight biophysical regions based on areas of similar climate, geology, topography, soils, natural communities, and land use history. Camp Plymouth State Park is located within the Southern Green Mountain biophysical region which contains a combination of high peaks and high plateau. This region is characterized by cool temperatures, heavy precipitation, and metamorphic bedrock that is generally acidic.

- Locator-Biophysical Region Map
- Area base map

### **B. Natural Resource Highlights**

Echo Lake and Buffalo Brook are the two dominant natural features associated with the park. Echo Lake is approximately 96 acres in size and is the middle lake in a chain of three lakes connected by the Black River along the Plymouth-Ludlow town line. Camp Plymouth State Park contains approximately 3,300 feet of shoreline on Echo Lake. Buffalo Brook forms a large portion of the park's northern boundary and then flows through the center of the park where, over the course of many centuries, it has carved out a small ravine before emptying into Echo Lake. The lower section of Buffalo Brook frequently overflows its banks during spring runoff and floods the area near the lake. Elevations within Camp Plymouth State Park range from 1061 feet above sea level at the surface of Echo Lake to approximately 1800 feet on a midslope hillside at the southeast boundary corner.

Of the 80 upland and wetland natural community types recognized in Vermont, 10 have been identified as being present on the property. Commonly found natural communities such as Northern Hardwood Forest, Hemlock-Northern Hardwood Forest, Hemlock-Red Spruce Forest, and Red Spruce-Northern Hardwood Forest cover most of the land area of Camp Plymouth State Park. One rare natural community was found within the park – a 20-acre example of a Sugar Maple-Ostrich Fern Riverine Floodplain Forest located along the lower end of Buffalo Brook and along the shore of Echo Lake. Three rare aquatic

plants, water milfoil, Farwell's milfoil, and straight-leaf pondweed have been found in Echo Lake but not in the area adjacent to the park. Several vernal pools and seeps have also been identified.

Approximately 75 acres of Hemlock or mixed Hemlock-Northern Hardwood Forest within the park have been mapped by the Vermont Fish & Wildlife Department as deer wintering habitat.

# **Biophysical Regions of Vermont w/Locator Map**

# Base Map

This acreage represents a small portion of a large mapped wintering area the bulk of which is located on private land. The Fish & Wildlife Department has mapped wetland areas along the lower reaches of Buffalo Brook and along the lake shore.

### C. **Land Use History/Historic Resources Highlights**

During the mid 1800s, a farm was located where the park's day use area currently is, and eventually most of the park land located on the west side of Scout Camp Road and lands with suitable slopes on the east side were cleared for agricultural use. Stonewalls and cellar holes are evidence of such a past. An old town cemetery with head stones dating back to the early 1800s is located within the park along Scout Camp Road.

Extensive gold mining operations were conducted along the banks of Buffalo Brook (also known as Gold Brook) starting in approximately 1855 and continuing until the early 1900s. Evidence of the mining operations can still be seen along the brook. The property was used as a summer camp for girls from 1925 until 1927, and then as a summer camp for the Boy Scouts of America between 1927 and 1983. In 1984 the property was purchased by the State of Vermont for use as a state park.

### D. **Recreation Resources Highlights**

A very popular day use area is located within the developed section of Camp Plymouth State Park along the shores of Echo Lake. This day use area includes a contact station, ranger's quarters, beach, boat rentals, concession stand, playground, and several pavilions. A group camping area containing six lean-tos, a horse paddock area, and four rental cottages are also located here. The day use area is open from late May until Labor Day weekend.

The Echo Lake Vista Trail provides hikers with a scenic view of the lake and park from the steep ridge located east of the lake. It is a moderately difficult climb of approximately 0.5 mile to the vista. The trail then drops down the backside of the ridge and crosses Buffalo Brook before returning to the park on an old town road. Total loop distance of this trail is 1.5 miles.

The property offers good deer and grouse hunting. Fishing opportunities are available in both Echo Lake and Buffalo Brook. The lake supports populations of smallmouth and largemouth bass, chain pickerel, rock bass, yellow perch, and rainbow smelt. Yearling rainbow, brown and lake trout are stocked annually. Echo Lake is popular with both open-water and ice fisherman. Buffalo Brook has wild brook trout. Hand panning for gold is allowed in Buffalo Brook under the guidelines governing this activity.

### E. **Timber Resources Highlights**

Camp Plymouth State Park is almost completely forested with only 21 acres of the park maintained as open lawn or grassy area. Approximately 120 acres of the 274 acres of forestland is considered appropriate for timber harvesting. The forest was divided into ten

stands representing six forest types during a FOREX inventory completed in 2001. Most of the stands are considered even-aged and well stocked with sawtimber.

Northern hardwood stands, primarily Sugar Maple-Beech-Yellow Birch, cover approximately 40% of the forested acreage. Eastern Hemlock and Hemlock-Hardwood stands grow on the steep banks along Buffalo Brook and provide critical deer wintering habitat. A 10-acre Red Oak stand located on the ridge to the east of Scout Camp Road provides an important mast area for wildlife.

The soils on Camp Plymouth State Park are quite variable, ranging from very deep, well-drained lake stands, to shallow glacial tills over bedrock, to poorly drained, deep alluvial soils. Site productivity ranges from poor to high. Portions of the property are very steep and access for logging equipment is difficult.

#### **F. Acquisition History**

Camp Plymouth State Park was established in 1984 when the State of Vermont purchased the 295-acre former boy scout camp from the Ottauquechee Land Trust (now the Vermont Land Trust) with matching Land and Water Conservation funds. The land trust had purchased the property from the Green Mountain Council of the Boy Scouts of America, Inc. in 1983 to save it from private development. It was understood that the Vermont Department of Forests, Parks & Recreation would later purchase the property and develop it as a state park. The creation of the park was largely due to the cooperation and foresight of the Ottauquechee Land Trust, local concerned citizens, and the Boy Scouts of America. In May 1984, an agreement was reached between the State and the land trust that allowed the State to begin work on the park facilities so that the park could open as soon as possible. On June 30, 1984, Camp Plymouth State Park officially opened to the public. The property deed was transferred to the State on July 2, 1984.

#### **G. Legal Constraints, Funding Issues**

The following legal constraints apply to Camp Plymouth State Park.

- Original purchase funded with matching Land and Water Conservation funds.
- Right of access for the Town of Plymouth to the Pollard cemetery.
- 50' wide easement to CVPS for electric transmission line right-of-way.

#### **H. Purpose for Ownership**

The primary purpose for which the State acquired this property was for the operation of a state park to provide water-based recreational opportunities for the public in southeastern Vermont. Other natural and historic resources will be managed and protected under management standards and strategies for Agency of Natural Resources lands as articulated in Section I of this plan.

## I. Relationship to the Region

This Long Range Management Plan for Camp Plymouth State Park is consistent with the policies within the Regional Plan adopted by the Two Rivers-Ottawaquechee Regional Planning Commission on May 26, 1999.

The Plymouth Town Plan was adopted by the Plymouth Selectboard on July 24, 2000. One objective of the plan is to “*protect the town’s environmentally sensitive areas such as the lakes, rivers, streams, ponds, marshes, floodplains, slopes, and forests...*” The plan includes Echo Lake on its list of favorite **Scenic Areas** within town, and recommends preserving the scenic character of this area. The plan also lists Plymouth’s gold mining sites and cemeteries as important **Historic Resources** worthy of protection. The State of Vermont currently owns more than one-third of the land in the Town of Plymouth. The town plan opposes State acquisition of additional land in Plymouth.

Camp Plymouth State Park abuts the 7,788-acre Arthur Davis Wildlife Management Area (ADWMA) located in the towns of Plymouth and Reading. ADWMA is heavily used for outdoor activities such as hunting, fishing, trapping, and snowmobiling. Over 7,000 acres of Coolidge State Forest, including the Coolidge State Park campground, is also located within the Town of Plymouth.

## J. Future Acquisition/Disposition

At this time there are no plans to acquire new lands within or adjacent to the park. There are no inholdings contained within the park. Any future acquisition opportunities near Camp Plymouth State Park will require consultation with both the Town of Plymouth and the Two Rivers-Ottawaquechee Regional Planning Commission.

### **III. Public Input**

The public involvement process for Camp Plymouth State Park began in March of 2003 when the Springfield District Stewardship Team established a website containing information about the parcel and how the public could participate in the planning process.

On June 17, 2003 an advertised public input meeting to discuss all aspects of management on Camp Plymouth State Park was held between 6:00 and 8:00 p.m. at the picnic shelter within Camp Plymouth State Park. The meeting was conducted as an “open house” during which the district staff presented management strategies, displayed maps, and explained resource findings. There was no formal presentation, the public was encouraged to visit the eight stations and talk directly with the staff.

A total of 25 people attended the meeting. Comment sheets consisting of eight focus questions on management strategies were available for attendees to fill out. Three easels were positioned around the room for people to write comments on. A 30-day public comment period followed the meeting with people encouraged to respond by postcard, letter, or by e-mail directly to district staff.

A total of 135 letters of invitation were mailed to abutting landowners, town officials, local legislators, and numerous organizations. Notices advertising the meeting were posted at appropriate locations around the area. In addition, a news release describing the meeting was sent to four local newspapers and was printed by at least two of them.

ANR personnel assisting in the public meeting were: Tim Morton (welcome), Linda Henzel (planning process explanation), Aaron Hurst (cultural and historic), Nate McKeen (recreation), Jay Maciejowski (land classification system), Forrest Hammond (wildlife), Leif Richardson (natural communities), and Rick White (timber/wildlife management & ATVs/roads). Five comments were recorded during the meeting. One comment was received by telephone before the meeting. Two additional sets of comments were received after the meeting, one by mail and one by e-mail.

After the 30-day public comment period, the comments were reviewed by the Springfield District Stewardship Team. The decision to or not to incorporate these comments into the draft plan is explored in the responses to public comments which is located in the Appendix.

The draft of the long-range management plan for Camp Plymouth State Park was completed in mid October of 2003. On October 29, 2003, notices were mailed to everyone on the 6/17/03 public meeting mailing list and to all public meeting attendees informing them that copies of the draft plan were available for review at the Town Clerk’s office in Plymouth, VT, the VT Dept. of FP&R office in Springfield, VT, and on the Department’s website. Comments were accepted until January 8, 2004. One comment was received during this time period and it is addressed in the Public Input section of the Appendix.

## IV. Resource Analyses

### A. Ecological Assessment

The Camp Plymouth State Park ecological assessment was conducted using an updated version of the Department's Forest Examination protocol. It incorporates a methodology known as the coarse filter/fine filter assessment for protection of biodiversity as first developed by The Nature Conservancy. This approach first identifies examples of all natural community types at their natural scale of occurrence with the assumption that this will in turn protect most species. The life histories and distributions of many species are not known, especially for organisms such as fungi, bryophytes, and invertebrates. By conserving examples of natural communities that represent the full known biological variation of each community across the community's distribution range, it is hypothesized that the majority of the species for a region (both known and unknown) will be protected. This "coarse filter" approach must be implemented along with a "fine filter" that addresses specific populations of rare species, critical habitats, or other sites that are otherwise left unprotected through the coarse filter process.

#### 1) Coarse Filter Assessment

Biophysical Region and Climate – Vermont can be divided into eight regions that share features of climate, topography, geology, human history, and natural communities. Camp Plymouth State Park is located squarely in the Southern Green Mountains biophysical region, which includes the mountainous central part of the state from the border with Massachusetts north to the towns of Chittenden, Stockbridge, and Bethel (see Location map). Like the Northern Green Mountains, this region is part of the Appalachian Mountain system that stretches across much of the eastern side of North America. As in the mountains to the north, this area is characterized by relatively low temperatures, high levels of precipitation, and a short growing season. The land is generally high and frequently steep, though there are some large high-elevation plateaus. The metamorphic bedrock is acidic here, but is much older than rocks found in the Northern Green Mountains. Glacial till covers much of the region, and deep glacial and river sediments may be present in the valleys in the form of kame terraces.

The lands of Camp Plymouth State Park are characteristic of others in the biophysical region. Bedrock is acidic, glacial till is abundant in the hills, and deep glacial sediments are present around Echo Lake.

Bedrock and Surficial Geology and Soils – The majority (82%) of the bedrock at Camp Plymouth State Park is acidic quartz and schist of the Pinney Hollow and Hoosac Formations; while these rocks have similar characteristics to those that are most typical of the Southern Green Mountains, they are not as old. Where this rock is exposed in cliffs and outcrops, as at the Echo Lake Lookout, Temperate Acidic Outcrop natural communities may be found (see below). A narrow band (covering 6% of the park) of more calcium-rich bedrock runs north-south under the terrace where the ranger station, lawns, and pine plantation are found. Known as the Plymouth member of the Hoosac Formation, this dolomitic quartzite is buried beneath deep glacial sediments and is thus

unlikely to influence the ecology of the state park. A band of slightly calcium-rich metamorphic greenstone, also of the Pinney Hollow Formation, runs north-south through the high elevation portions of the state park, and covers 12% of the land base. This rock may contribute calcium and other plant nutrients to the soil, creating conditions where more enriched Northern Hardwood Forests and high quality sawtimber may occur.

The USDA NRCS Soil Survey has mapped 14 soil types at Camp Plymouth State Park (see Soil Types Map). The most common soil types (covering 75% of the land base) at Camp Plymouth State Park are glacial tills. Found everywhere but on the terrace around Echo Lake, these are classified as Lyman, Berkshire, and Tunbridge soils of various slopes and degrees of rockiness. A variety of sandy loam soil types were deposited as kame terrace around Echo Lake by receding glaciers. These are classified as Adams loamy fine sand, Berkshire and Monadnock fine sandy loam, Colton fine sandy loam, Ninigret fine sandy loam, Raynam silt loam, and Rumney fine sandy loam; all are considered statewide prime agricultural soils by the USDA NRCS Soil Survey. At the mouth of Buffalo Brook, silty and sandy alluvial soils continue to be deposited annually. These sediments are interbedded with partially decomposed organic soils in the floodplain forest natural community described below. Soils are locally mucky (high in organic matter) around Echo Lake, in Seeps, and in the Vernal Pool.

Hydrology/Streams/Rivers/Ponds – Camp Plymouth State Park is in the Black River Headwaters Watershed, a 25,000-acre hydrologic unit in the towns of Plymouth, Reading, Shrewsbury, Mount Holly, and Ludlow, and including all streams flowing into the Black River above its confluence with Branch Brook. Two prominent hydrologic features of this park are Buffalo Brook and Echo Lake. The lower 1.6 miles of the brook lie within the limits of the park; this reach is classified as a third order stream. Further upstream and beyond the park boundary there is another 1.4 miles of stream. Buffalo Brook is joined by Reading Pond Brook near the northeast corner of the park. The latter stream is fed by outflow from Reading Pond. The steep, shady ravines along Buffalo Brook allow for the creation of forested natural communities dominated by Eastern Hemlock (*Tsuga canadensis*), and its floodplain sustains a wetland forest type that is rare in the state. Echo Lake is a 96-acre natural lake bordered along its northeast shoreline by the park. Seep natural communities also occur in the park where groundwater rises close to the surface (see below). At least two vernal pools formed by spring runoff captured in bedrock depressions have been identified.

Natural Community Types – A natural community is composed of an interacting assemblage of organisms, and the physical context – geology, hydrology, climate, natural disturbance regime, etc. – in which they occur. The 80 upland and wetland natural community types described in Vermont repeat across the landscape in patches of various sizes. When two or more unconnected patches occur near each other, they often function as a unit: elevation, hydrology, and geology are similar, organisms move back and forth between the patches, and natural disturbances effect them similarly. Natural community patches of this sort are considered to be a single occurrence of the natural community type. Thus, an occurrence of a natural community type may be composed of one to many patches of polygons.

Twelve occurrences of 10 upland and wetland natural community types have been identified and mapped on the 295-acre Camp Plymouth State Park (see Natural Communities Map). A total of 22 natural community and one park lawn polygons were mapped. Two aquatic natural communities have also been identified within the park. Natural communities were identified through aerial photograph interpretation, digital soils maps interpretation, and collection of global positioning system (GPS) data on the ground. A Geographic Information System (GIS) map of natural communities occur at very small scales (e.g., less than ¼ acre); this mapping effort is probably incomplete. Natural community mapping is an iterative process, and our knowledge improves with each mapping effort. Thus, the map presented here should not be viewed as a final statement on community distribution at Camp Plymouth State Park; instead, it should be treated as a first attempt at describing natural communities in this area. Land managers should keep in mind that additional examples of small natural communities (e.g., Vernal Pools and outcrops) probably occur at Camp Plymouth State Park. As subsequent inventories and site visits are conducted, this map will be improved.

What follows is a description of all natural community types identified at Camp Plymouth State Park. For each community type, the unique identifying numbers of all polygons on the map are given. If more than one polygon constitutes a natural community occurrence, this information is given. A quality rank (A through D) for each natural community occurrence is given. Quality ranks are objectively assigned on the basis of occurrence size, quality, and landscape context. An A-ranked occurrence is of high quality in comparison with other occurrences of its natural community in the state, while a D-ranked example is of comparatively low quality. Detailed descriptions of these natural communities may be found in *Wetland, Woodland, Wildland: A guide to the Natural Communities of Vermont*, by Eric Sorenson and Elizabeth Thompson. Information may also be found in the glossary (Appendix G).

a. **Red Spruce-Northern Hardwood Forest**

Polygon 11

A 55-acre, C-ranked example of this natural community blankets the slopes and summit of an unnamed 1600' hill to the south and east of Buffalo Brook. This forest occurs on moderately well drained, very rocky glacial till soils of the Tunbridge-Lyman complex. The tree canopy ranges from 50 to 60' in height, and is dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), white pine (*Pinus strobes*), and eastern hemlock (*Tsuga canadensis*). Understory herbs are similar to those found in adjacent Northern Hardwood Forest (see below), and include drooping woodreed (*Cinna latifolia*), starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), Christmas fern (*Polystichum acrostichoides*), and wild oats (*Uvularia sessilifolia*). On a west-facing rocky outcrop at the summit of this hill, red spruce forms a near pure stand, and understory growth is very sparse. Red Spruce-Northern Forests are common in Vermont.

b. **Northern Hardwood Forest**

Polygons 6, 7, 8, 9, 10

One C-ranked occurrence of Northern Hardwood Forest, composed of five separate polygons, covers 114 acres of the state park.. This very common forest type occurs

on a variety of soils here, including rocky glacial tills and fine sandy loams. The forest canopy is dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). Other trees occasionally seen in the canopy include paper birch (*Betula papyrifera*), eastern hemlock (*Tsuga canadensis*), white ash (*Fraxinus americana*), and basswood (*Tilia americana*). The tall shrub layer is composed of regenerating trees of these species, plus striped maple (*Acer pensylvanicum*). Herbs present include Christmas fern (*Polystichum acrostichoides*), wild sarsaparilla (*Aralia nudicaulis*), blue-stemmed goldenrod (*Solidago caesia*), and sweet cicely (*Osmorhiza claytonii*). Most Northern Hardwood Forest stands on the parcel are in a mid-successional stage, having been harvested at least once in the last century. Consequently, in some places there are fewer large dead snag trees and less coarse woody debris on the forest floor than one would see in older Northern Hardwood Forests. One polygon (number 9) mapped as this community type is a white pine (*Pinus strobus*) plantation. Advanced regeneration includes a slightly different assemblage of tree species, including white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), red oak (*Quercus rubra*), bitternut hickory (*Carya cordifornis*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*). The combination, and the deep fine sandy loam soils on which it occurs, suggests that over time a natural community with more

## Natural Communities Map

southern affinities (such as Mesic Maple-Ash-Hickory-Oak Forest) may become established on the site. More data are necessary to determine whether this polygon is truly a Northern Hardwood Forest.

c. **Mesic Red Oak-Northern Hardwood Forest**

Polygon 5

Approximately five acres of this community occurs on state land, which extends onto private land to the northwest. This community is located on very steep (60-70%) southwest-facing slopes above Echo Lake. Soils are of the Lyman-Rock Outcrop Complex, and are shallow and very well drained. Ledy bedrock outcrops, cobbles, and boulders are common. Red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and red maple (*Acer rubrum*) dominated the 50-60' canopy; hophornbeam (*Ostrya virginiana*), quaking aspen (*Populus tremuloides*), and paper birch (*Betula papyrifera*) are also present. The shrub layer is moderately sparse, and features striped maple (*Acer pensylvanicum*), maple-leaved viburnum (*Viburnum acerifolium*), witch hazel (*Hamamelis virginiana*), and bush honeysuckle (*Diervilla lonicera*). Herbs present include goldenrod (*Solidago* species), wintergreen (*Gaultheria procumbens*), whorled aster (*Aster acuminatus*), and lance-leaved wild licorice (*Galium lanceolatum*). This community's D quality rank is explained primarily by the small size of the portion protected by state ownership.

d. **Hemlock-Red Spruce Forest**

#### Polygon 4

A 35-acre, C ranked occurrence of this community is found on north and northwest facing slopes of Buffalo Brook. Soils are somewhat well-drained glacial tills, and range from 10 to more than 60 inches in depth. Hemlock accounts for more than 50% of the shady canopy of this forest, with red spruce (*Picea rubens*), making up at least 30%. Red oak (*Quercus rubra*) is common, and American beech (*Fagus grandifolia*) and red maple (*Acer rubrum*) are present. Widely separated striped maple *Acer pensylvanicum* and low bush blueberry (*Vaccinium* species) make up the sparse shrub layer. Herbs are also sparse, and include bracken fern (*Pteridium aquilinum*), ground cedar (*Lycopodium* species), starflower (*Trientalis borealis*), drooping woodreed (*Cinna latifolia*), and hairy woods grass (*Brachyeletrum erectum*). It is unclear why red spruce is so abundant here, as the site seems well suited to establishment of Hemlock Forest. It is possible that land use history plays a role in the current canopy composition, and that over time red spruce will become less abundant here. At the same time, the two conifers may continue to share dominance of the canopy over long periods of time.

#### e. **Hemlock-Northern Hardwood Forest**

##### Polygons 2,3

Hemlock-Northern Hardwood Forest covers 51 acres of the state park. Most of this community is found on the steep slopes of the Buffalo Brook drainage; one small polygon is also found on steep west-facing slopes above Echo Lake. Soils are similar to those found under Hemlock-Red Spruce Forests, but are on average shallower, with depth to bedrock generally less than 40 inches. Soils are somewhat well drained in the Buffalo Brook area, and excessively well drained in the smaller polygon near Echo Lake. Hemlock (*Tsuga canadensis*) is the most common tree in the canopy. Other common canopy species are paper birch (*Betula papyrifera*), red maple (*Acer rubrum*), black birch (*Betula lenta*), American beech (*Fagus grandifolia*), red oak (*Quercus rubra*), and red spruce (*Picea rubens*). A relatively sparse shrub layer includes witch hazel (*Hamamelis virginiana*), maple-leaved viburnum (*Viburnum acerifolium*), American fly honeysuckle (*Lonicera canadensis*), and lowbush blueberry (*Vaccinium* species). The sparse herb layer consists of plants characteristic of both dry and northern places, including Canada mayflower (*Maianthemum canadense*), bluebead lily (*Clintonia borealis*), bunchberry (*Cornus canadensis*), partridgeberry (*Mitchella repens*), pink ladyslipper (*Cypripedium acaule*), poverty grass (*Danthonia spicata*), bracken fern (*Pteridium aquilinum*), and silverrod (*Solidago bicolor*). This is a C-ranked occurrence of a very common natural community.

#### f. **Dry Oak Forest**

##### Polygon 1

An unusual example of Dry Oak Forest covers 14 acres of the state park along the narrow, steep-sided ridgeline that separates upper Buffalo Brook from Echo Lake (the community extends onto private land, and may be as much as 30 acres in size). Dry Oak Forests are uncommon in Vermont, and this occurrence is of moderate quality (C rank). The glacial till derived soils are rocky and extremely droughty, and are seldom deeper than 10 inches. The canopy is 30' tall, and cover ranges

from 30 to 65%. The canopy is dominated by stunted red oak (*Quercus rubra*) and red maple (*Acer rubrum*), and red spruce (*Picea rubens*) is abundant in places. Less common canopy trees are white pine (*Pinus strobus*), American beech (*Fagus grandifolia*), and hophornbeam (*Ostrya virginiana*). Shrub species are occasionally encountered, including witch hazel (*Hamamelis virginiana*), serviceberry (*Amelanchier* species), striped maple (*Acer pensylvanicum*), and lowbush blueberry (*Vaccinium* species). Regenerating 5 to 15' tall clumps of red spruce are present in the understory. The herb layer is quite dense for such a dry natural community; it includes bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), trailing arbutus (*Epigaea repens*), Canada mayflower (*Maianthemum canadense*), partridgeberry (*Mitchella repens*), bunchberry (*Cornus canadensis*), twinflower (*Linnaea borealis*), wild sarsaparilla (*Aralia nudicaulis*), poverty grass (*Danthonia spicata*), silverrod (*Solidago bicolor*), and hairgrass (*Deschampsia flexuosa*).

The dry Oak Forest at Camp Plymouth State Park is unlike most other Vermont examples in a number of ways. The canopy is shorter and more open than many examples, suggesting more extreme (dry) growing conditions, yet it is unlike a Dry Oak Woodland, a vegetation type of dry knobs and slopes that is often found adjacent to the more mesic Dry Oak Forest. Red spruce is common in the shrub and canopy layers, which is normally not the case with this natural community type. In addition, the herb layer here includes a number of species normally found in wet or dry forests of the boreal zone to the north (bunchberry and twinflower in particular). Another similar Dry Oak Forest occurs six miles away in Cavendish, at Knapp Pond Brook Wildlife Management Area, at about the same elevation (1400'). Also in the greater Black River watershed, this forest contains significant amounts of red spruce, especially in the subcanopy and shrub layers. These examples indicate that at the upper elevation limit of its range, Dry Oak Forests can include more northern species such as red spruce and bunchberry.

g. **Temperate Acidic Outcrop**

Polygon 19

A sparsely vegetated acidic outcrop community is found at the Echo Lake Vista. The community is approximately 0.2 acre, only half of which is on state land. Most of the area is open rock face, with shallow, dry soil forming only in crevices in the bedrock. The outcrop is in near to full sun; both natural processes (windthrow) and people have removed trees from the surrounding Dry Oak Forest. A sparse assemblage of herbs is found here, including hairgrass (*Deschampsia flexuosa*), poverty grass (*Danthonia spicata*), wild sarsaparilla (*Aralia nudicaulis*), marginal woodfern (*Dryopteris marginalis*), lichens, and a sedge (*Carex* species; section Ovaes). Temperate Acidic Outcrops are common in Vermont; this is a B-ranked occurrence.

h. **Sugar Maple-Ostrich Fern Riverine Floodplain Forest**

Polygons 17, 18

A 17-acre example of this community is found where Buffalo Brook flows into Echo Lake. Another three acres occur on the north side of the Buffalo Brook

floodplain; the two polygons have slightly different soils, flooding regime, and vegetation, but are considered a single natural community occurrence. Soils at the mouth of the brook are mostly Runey fine sandy loams, which consist of deep, mineral rich alluvium deposited during annual flooding episodes. Lenses of organic material can be found where new layers of alluvium buried existing vegetation. Soils in the smaller polygon are fine sandy and silty lacustrine (lake) deposits that receive regular flooding only from smaller streams and from marginal fluctuation of the lake level. Sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), black willow (*Salix nigra*), American elm (*Ulmus americana*), and butternut (*Juglans cinera*) dominate the 65' canopy of the community at the mouth of the brook. Shrubs are common in places, including speckled alder (*Alnus rugosa*), arrowwood (*Viburnum dentatum*), hawthorn (*Crataegus* species), red raspberry (*Rubus idaeus*), and black raspberry (*R. allegheniensis*). The herb layer is dense, tall, diverse, and robust. Most common species are ostrich fern (*Matteuccia struthiopteris*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), virgin's bower (*Clematis virginiana*), false solomon's seal (*Smilacina racemosa*), spotted touch-me-not (*Impatiens capensis*), and tall meadow rue (*Thalictrum pubescens*). Some other species present are swollen sedge (*Carex intrumenscens*), slender mannagrass (*Glyceria melicaria*), riverbank wild-rye (*Elmus riparius*), Canada lily (*Lilium canadense*), goldenrods (*Solidago* species), and asters (*Aster* species).

The smaller, lakeside part of the occurrence is less diverse, and less densely vegetated. Balsam poplar (*Populus balsamifera*) and big tooth aspen (*Populus grandidentata*) are common in the canopy, and the understory is almost entirely dominated by ferns, especially ostrich fern. This small forest shows characteristics of both Sugar Maple-Ostrich Fern Riverine Floodplain Forests and Lakeside Floodplain Forests, a community thought to be restricted to the shores of Lake Champlain and Memphremagog. It is distinct from the main part of the occurrence in that it experiences little annual flooding; due to its slightly concave topography, water may pool here during wetter parts of the year.

This is a rare natural community statewide; and is ranked S2 by the Vermont Nongame and Natural Heritage Program. The occurrence at Camp Plymouth is of moderate to good quality, as reflected by its B/C ranking.

i. **Seep**

Polygons 12, 13, 14, 15, 16

Five seeps were mapped on the property; four of these are close together, and are treated as a single community occurrence (B ranked). They are found on moderately steep (5-10°) slopes in the Northern Hardwood Forest, and have a largely closed canopy of hardwood tree species. Wetland plants are common here, including three-seeded sedge (*Carex trisperma*), slender mannagrass (*Glyceria melicaria*), Canada mannagrass (*Glyceria canadensis*), jewelweed (*Impatiens* species), joe-pye weed (*Eupatorium maculatum*), sensitive fern (*Onoclea sensibilis*), and marsh bedstraw (*Galium palustre*), Pennywort (*Hydrocotyle americana*), a species very typical of seeps, is found here. Seeps are among the first

areas of a forest to green up in spring, and as such may be important feeding sites for wildlife. Other large seeps may exist at Camp Plymouth and should be noted if they are found.

j. **Vernal Pool**

Polygons 20, 21

Two vernal pools were found on the property – one near the summit of the unnamed peak on the property (quality rank of B/C), the other near the northwest corner (quality rank of C). The former was dry when surveyed in September, but likely floods each spring, and during other periods of high precipitation. The upper soil layer (4” deep) is composed of somewhat mucky organic material, under which is more than 12” of extremely compact gray, silty clay. Wetland vegetation surrounds the pool, but many areas of unvegetated muck are present in the middle. The pool contains some coarse woody debris, as well as some less desirable logging slash. Plants encountered here include marsh fern (*Thelypteris palustris*), mild waterpepper (*Polygonum hydropiper*), inflated sedge (*Carex intumescens*), three-seeded sedge (*Carex trisperma*), brush (*Scirpus* species), colt’s foot (*Tussilago farfara*), and peat moss (*Sphagnum* species). These pools likely host a variety of amphibians during their breeding seasons. Other vernal pools may occur at Camp Plymouth State Park and should be recorded if they are found.

k. **Streams**

Buffalo and Reading brooks are the only permanent streams located within the confines of the park. Buffalo Brook is a 3<sup>rd</sup> order stream with a total length of about 2.9 miles and begins at an elevation of 1,680 feet. About 1.6 miles of Buffalo Brook is located within the park. Reading Brook is a 2<sup>nd</sup> order stream originating at Reading Pond (elevation 1,755 feet) and flows a distance of 2.2 miles before merging with Buffalo Brook. Both streams have a combined drainage area of 5.8 square miles. From Reading Pond to Echo Lake the change in elevation is 694 feet.

Most of Buffalo Brook, with exception of 200 feet of stream nearest to the lake, is composed of a series of riffles and pools and has a substrate dominated by cobbles followed in decreasing order of significance by gravels, ledge, and equally represented boulder and sand components. These physical features are characteristic of the small, high gradient, cold headwater stream natural community type (The Nature Conservancy and Vermont Biodiversity Project 1998). Below this reach the channel gradient is lower, and the stream bottom is primarily sand and silts. This segment of Buffalo Brook may be best described as a coldwater-warmwater transitional community type given its physical characteristics and proximity to the lake.

Fish population sampling done in June 2001 determined the community to be comprised of two fish species, brook trout (*Salvelinus fontinalis*) and slimy sculpin (*Cottus cognatus*), which are biologically characteristic of the small, high elevation, cold headwater stream community. Other species observed during the 2001 survey included common shiner *Luxilis cornutus*), sucker (*Catostomus* species), and

pumpkinseed (*Lepomis gibbosus*). The latter species in total were represented by only five individuals which suggests they may have moved upstream from the lake or are characteristic of the coldwater-warmwater transitional community.

The following table presents estimates of brook trout and slimy sculpin population densities sampled at four locations on Buffalo Brook within the small, high elevation, cold headwater stream community. Site 1 is at the bridge on Camp Plymouth Road; the other sites are located consecutively upstream and spaced approximately equidistant from one another. All sites are in the state park. Fish samples were collected by electrofishing. Trout population estimates are based on the multiple removal method. Sculpin populations represent single samples collected at each site expanded to provide minimum density estimates. YOY refers to young-of-year fish.

Fish species	Size class, mm	Numbers of fish/mile by sampling site			
		1	2	3	4
Brook trout	YOY	47	76	23	57
	≤151	118	190	57	141
	152-252	36	58	17	42
	Total	213	343	103	254
Slimy sculpin		556	440	480	579

1. **Lake**

Echo Lake has a surface area of 96 acres and a maximum depth of about 91 feet. Because a portion of the lake provides deep, well oxygenated, cold temperature habitat, it is able to support a diverse fish community comprised of both warm- and coldwater species. Some common fishes occurring in Echo Lake and constituting an assemblage indicative of the mesotrophic-eutrophic lake natural community type (The Nature Conservancy and Vermont Biodiversity Project 1998) include golden shiner (*Notemigonus crysoleucas*), fallfish (*Semotilus corporalis*), white sucker (*Catostomus commersoni*), brown bullhead (*Ameiurus nebulosus*), chain pickerel (*Esox niger*), rock bass (*Ambloplites rupestris*), pumpkinseed (*Lepomis gibbosus*), Smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*). Coldwater species present include rainbow smelt (*Osmerus mordax*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and lake trout (*Salvelinus namaycush*). All species of trout exist in the lake as stocked populations; natural reproduction, if it occurs at all, is not adequate to maintain these populations.

2) **Fine Filter Assessment**

Rare, Threatened, and Endangered Species – There are no rare, threatened, and endangered species known from this parcel of land, although probably some rare birds, including the bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) are rare visitors to the lake. Three rare aquatic plants have been found in Echo Lake but not in the area adjacent to Camp Plymouth State Park. The Department of Environmental

Conservation Lakes and Ponds Section located Farwell's water-milfoil (*Myriophyllum farwellii*) at the south end of Echo Lake in 1993. This plant is considered rare (S2) in Vermont with 14 populations known statewide. In 1985, the program also found two rare plants at the north end of Echo Lake near the inlet of the Black River. They are water milfoil (*Myriophyllum alterniflorum*) and straight-leaf pondweed (*Potamogeton strictifolius*), both rare (S2) with 17 and 18 populations known statewide, respectively.

Critical Wildlife Habitats – Three critical wildlife habitats – *deer wintering areas, vernal pools, and wetlands* – were located and mapped on Camp Plymouth State Park (see Wildlife Resources Map). Bear production area is mapped as covering approximately 140 acres.

Wildlife – A wide variety of wildlife is found on this forest which probably includes all species typically found in the southern Green Mountains. Lists of all bird, reptile, amphibian, and mammal species observed by three foresters and two biologists while gathering data for this report are found in Appendix D. Camp Plymouth State Park and its immediate environs (10 square miles) is 90% forested.

- a. **Bear** – in Vermont, bear are distributed along the length of the Green Mountain Range and in the remote areas of northeastern Vermont. This area functions as core bear habitat which supports the bulk of Vermont's population of cub-producing females. Good bear habitat includes a mixture of mature hardwoods and softwoods, concentrations of mature bear-scarred beech and oak, abandoned farmlands, small forest openings, forested wetlands, and mountain terrain. This parcel is on the eastern edge of the core bear range (see Wildlife Resources map) and is within a bear management area that extends south of US Route 4 to Route 131 and between US Routes 100 and 106. Camp Plymouth, although relatively small in size, is important as it is part of a larger block of contiguous bear habitat that includes the Arthur Davis Wildlife Management Area and portions of the Coolidge State Forest. This area of public land contains the majority of quality bear habitat within the management area. Beech and oak are relatively minor components in this forest, but the oak concentrated on the northeastern edge of property could function as concentrated fall feeding habitat for bear.
- b. **Deer** – White-tailed deer is an extremely adaptable species found in all Vermont towns, but are more abundant in southern and central regions. The summer home range of deer is approximately 640 acres. There is a considerable amount of data available discussing summer and winter range which this document is not prepared to discuss. The Vermont Fish & Wildlife Department has divided the state into management units based on elevation and biophysical regions. The parcel is located in Deer Management Unit (DMU) M1. A portion of this parcel is mapped as critical deer wintering area (DWA), but much of the DWA is in poor condition and could be improved through a series of small patch cuts. These should be designed to produce thick softwood regeneration within the DWA for thermal winter cover, as well as areas of early successional hardwood browse along the perimeter of the wintering area.

- c. **Turkey** – A forest bird that prefers mature hardwood stands of mast-producing trees such as beech, oak, hickory, cherry, hophornbeam, and white ash. Hickories and hophornbeam are not a common component of Camp Plymouth, but the oak, cherry, and beech are found and are important for the turkeys in the area. Ferns and sedges, another winter mast source, are common along the wetlands and streams.

# **Wildlife Resources Map**

- d. **Grouse (Partridge)** – An upland bird closely associated with early successional tree species such as aspens and birches. Superior grouse habitat contains three critical age classes of forest (0-10, 10-25, and 25+ years) all located within a 10 to 15 acre area. There is very limited aspen on this parcel. The red oaks and apple trees are also important for grouse. The apple trees, found adjacent to the recreation area, are an important food species for grouse as well as several other wildlife species. These trees should be maintained by preventing faster growing trees from overtopping them and blocking off the sunlight they require for survival.
- e. **Amphibians and Reptiles** – Camp Plymouth supports diverse amphibian and reptile communities due to the diversity of habitats found here. During site visits in 2002 and 2003, twelve species were documented. The most common were spring peepers, red-spotted newts, wood frogs, and eastern American toads. Surprisingly, few amphibians were observed along the waterline of Echo Lake, and only three species of reptiles were found overall.
- f. **Small Mammals** – A species list of mammals was created based on direct observations and from tracks and other sign. No attempt was made to inventory bat species through mist netting or acoustical recordings, and live traps and snaptraps were not used in the collection of other small mammals. The 21 species of mammals recorded is most likely only a small portion of species actually occurring at Camp Plymouth.
- g. **Birds** – Two biologists, one an accomplished birder and the other a novice, conducted inventories of birds during six trips to Camp Plymouth during different seasons of the year. Sixty-three species were documented. Additional bird species undoubtedly pass through the property during spring and fall migration. In consideration of the large number of people that visit the park each year and the diverse species of birds observed within its different natural communities, it is recommended that a birding trail be developed for the public.
- h. **Fish** – Echo Lake supports a diverse fish community. At least 11 species exist as naturally-reproducing populations in the lake: rainbow smelt, golden shiner, fallfish, white sucker, brown bullhead, chain pickerel, rock bass, pumpkinseed, smallmouth and largemouth bass, and yellow perch. Three other species (rainbow, brown, and lake trout) occur almost, if not entirely, because of the annual stocking of yearling fish by the Fish & Wildlife Department to supplement recreational fishing opportunities. Rainbow smelt is an important forage fish for trout, especially lake trout, and reportedly used to spawn in Buffalo Brook. The status of the late winter-early spring smelt run in this brook is unknown at this time. Only seven of the 11 species are native to the Connecticut River drainage and hence to Echo Lake: golden shiner, fallfish, white sucker, brown bullhead, chain

pickerel, pumpkinseed, and yellow perch. Buffalo Brook supports a simple fish community of which brook trout and slimy sculpin are the most abundant species.

### 3) **Other Quality of Habitat Concerns**

- a. **Non-native Species** – Exotic species can pose a threat to biodiversity and natural community health. They can also affect silviculture and other management considerations. The floodplain forests at Camp Plymouth State Park contain at least two non-native plants, self-heal (*Prunella vulgaris*), and common nightshade (*Solanum dulcamara*), colt's foot (*Tussilago farfara*), an invader of wet and/or alluvial habitats in Vermont, was found in one vernal pool. None of these plants are present in concentrations great enough to be doing significant harm to native species at this time. Land managers should monitor these natural communities periodically to look for problem invasive species.

Although Eurasian milfoil (*Myriophyllum spicatum*) has not been found in Echo Lake, its presence has been confirmed in nearby Lake Rescue. Because Eurasian milfoil is so easily transported on boats and trailers, the potential for its introduction to Echo Lake is of major concern. The VT Water Quality Division Lakes and Ponds Section periodically conducts milfoil surveys and anticipates doing another survey of Echo Lake in the near future.

- b. **Core Forest** – Although much of the lands surrounding Camp Plymouth are forested, adjacent roads and developments fragment core forest habitat that are important for the survival of black bears, bobcat, fisher, moose, and many species of migratory songbirds. Assuming a 300-foot zone of impact along roads and openings, fragmentation results in increased cowbird populations. The western portion of Camp Plymouth functions as core forest.
- c. **Wildlife Movement Corridors** – No wildlife movement corridors have been identified on, or adjacent to, the Camp Plymouth property.

### B. **Historic Resource Assessment**

The following section provides anecdotal information based upon readily available town records, publications, and our own files.

#### Precontact

In an Archeological Reconnaissance of Camp Plymouth State Park prepared in 1987, archeologist Doug Frink reports that ethno-historical sources locate a major Indian trail between the Lake Champlain and Connecticut River valleys in the vicinity of Amherst and Echo Lakes. Although there are no known Native American sites located within Camp Plymouth State Park, Frink expects that prehistoric site locations could be located primarily around the mouth of Buffalo Brook and along the shores of Echo Lake. A preliminary archeological survey conducted by the University of Vermont in 1985 to evaluate the sensitivity of several areas planned for development within the park revealed no evidence of prehistoric sites.

### Crown Point Military Road

The British Colonial Army constructed the Crown Point Military Road through Plymouth between 1759 and 1760, following in large part the old Indian trail mentioned previously. This roadway was constructed for the transport of troops and supplies between Fort #4 in Charlestown, NH and Crown Point on Lake Champlain during the campaign against the French in Canada. It was also frequently used for transporting troops and supplies for the colonial army during the Revolutionary War.

From 1760 on, the Crown Point Road functioned as a major artery for settlers from the lower New England colonies heading for the Champlain Valley of Vermont. In the area of Camp Plymouth State Park, the Crown Point Road crossed the Black River above Lake Amherst and followed a route similar to the present location of Scout Camp Road (TH #42) down the east side of Amherst and Echo Lakes. According to archeologist Doug Frink, significant archeological sites related to this road are not expected to occur within the park because travelers most likely did not camp or stay overnight in the park as there were preferred camp locations on either side of the property.

### European Settlement

The Town of Plymouth was chartered in 1761, but the Town's initial growth was slow due to its isolated nature and steep terrain. Early settlers cleared land to established small diversified farms and built small mills along Plymouth's many waterways. Records indicate that the Camp Plymouth property was settled in 1795.

Much of the land in Camp Plymouth State Park, with the exception of the steepest terrain, was cleared for agricultural purposes in the early- to mid-1800s. Plymouth's population peaked in the 1840s at 1,497 (almost four times what it was in 2000) with many farmers specializing in sheep farming.

### Pollard Farm House and Barn

In the mid 1800s the property was owned by Amos Pollard, a dairy and sheep farmer who constructed a large farmhouse and barn near Echo Lake north of Buffalo Brook. Although Pollard moved to a new residence sometime before 1869, the house and barn appear to have remained in continual use until recent times.

The farmhouse was used extensively by the boy scouts for camp operations after they acquired the property in 1927. The house was remodeled and used as the dining hall for the scouts between 1930 and 1961 when the new dining hall was built. The house was also used as a residence for the camp director and at various times served as the location for the camp trading post, health office, and camp office. The barn was used by the scouts for handicraft classes, rainy day activities, and storage. The barn collapsed in 1957 from heavy snow load.

The connecting building between the barn and the farmhouse and the large porch on the farmhouse were all gone before the State acquired the property. What was left of the farmhouse was destroyed by fire in 1985, and both cellar holes were then filled in to grade.

This site has been registered with the State of Vermont Division of Historic Preservation (VT-WN-105) because there appeared to be little disturbance to the archeologically-sensitive areas adjacent to these structures. This site is labeled on the Historic Resources Map as the Homestead.

### Gold Rush

Gold was discovered in the Town of Plymouth in the 1850s starting a Vermont gold rush. Buffalo Brook, also known locally as Gold Brook, was the location of what was probably

the largest of Plymouth's gold mining enterprises. Starting about 1855, Amos Pollard sold mining claims along Buffalo Brook to gold prospectors.

# Historic Resources Map

Typical operations at that time involved constructing a log dam and a sluice in the brook and then washing gravel from the brook banks and bottom through the sluice to find the heavier gold. One sluice constructed by prospector Virgil Woodcock was reported to be over 0.5 mile long with a 20-foot drop.

In 1860, a local newspaper reported that there were seven prospecting companies at work on Buffalo Brook. In 1883, a group of investors formed the Rooks Mining Company to search for gold in the hills above Buffalo Brook. A mine shaft was dug nearly 300 feet into the hillside and a crushing mill constructed. A boarding house was also built to provide housing for the mine superintendent and all the employees. In 1884, company directors decided to expand operations at the mine, and the machinery was removed in preparation for installing larger machinery. However, the expansion plans were never carried out, and the mine remained inactive. In 1887, the mine and property were put up at a bankruptcy sale in Ludlow. Henry Fox, the former mining superintendent, bought the claim and continued to live there and search for gold almost until the day he died, May 2, 1919.

The mine shaft and an old building foundation are still visible today and are located on privately-owned land along Buffalo Brook. Very little evidence of the old gold mining operation has been observed on state land other than what appear to be tailings – mounds of waste soil and rock left along the banks of Buffalo Brook.

### Camping

Between 1925 and 1927, the property was utilized as an exclusive privately-owned girls summer camp known as “Plymouth Vermont Camp, Inc.”. The Boy Scouts of America, Inc. purchased the property in 1927, named it “Camp Plymouth”, and used it as a summer camp until 1983. The first 50 years of boy scout use of the park is summarized in the publication entitled, “*A History of Camp Plymouth, B.S.A., Plymouth, VT: 1927-1977*” written by E. Morse in 1978.

The boy scout camp contained a waterfront area, a rifle and archery range, a trading post, dining hall, health lodge, office, ranger’s house, cabins for staff housing, and camping areas some of which included lean-tos. The camp outdoor chapel was located on a knoll on the east side of TH #42 near the cemetery. (The current Echo Lake Hiking Trail goes through the former chapel site.)

Two of the main buildings of the former boy scout camp, the dining hall, and the camp office building, are still used by the park although they were modified to meet park standards. Mr. Morse states that the dining hall was constructed in 1960 to 1961. Two other small buildings from the boy scout camp were extensively renovated by Parks and are now used as rental cabins located on the east side of Scout Camp Road.

According to Mr. Morse, the camp area was flooded by Buffalo Brook three times during its 50-year history – in 1927, 1973, and 1976 with the most serious damage suffered in 1973. With the approval of the Soil Conservation Service, work was conducted to

improve the channel and build up the banks of Buffalo Brook after the 1973 and 1976 floods.

### Cellar Hole

One old cellar hole has been found within the park property. It is located on the eastern side of TH #42 high on the hillside in a stand of white pine, a tree species that commonly seeds into abandoned fields. It is a very small, stone-lined cellar hole with 100-year old trees growing out of it. There is also what appears to be a stone foundation for a barn or outbuilding close by. The Beers atlas map of 1869 shows no residences or roads in this area.

### Cemetery

A town cemetery containing headstones dating back to the early 1800s is located within the park along Scout Camp Road. The land was given to the town by Moses Pollard as a replacement for Kingdom Cemetery, an older town cemetery where the ground was so rocky that it was very difficult to dig graves. The first burial occurred in the Pollard Cemetery in 1817 and the last in 1954. There are approximately 150 graves in this cemetery. Amos Pollard, one of the area's early settlers, was buried here in 1874. The cemetery is marked on the plan maps with a cross symbol.

### State Ownership

The Parks Division began work on improving the facilities within Camp Plymouth State Park in May of 1984. Initial work included construction of a parking lot, pump house, and contact station. As agreed when the State purchased the property, the Department of Forests, Parks & Recreation established the Camp Plymouth Steering Committee in 1984 to provide guidance regarding the development of the park. The committee consisted of representatives from the Plymouth Selectboard, Ottauquechee Land Trust, Ottauquechee-Two Rivers Regional Planning Commission, Boy Scouts, and Department of Forests, Parks & Recreation that met three times between 1984 and 1985. A summary of the work completed within the park day-use area during the first several years of operation can be found on pages 11 and 12 of the first Long Range Management Plan for Camp Plymouth State Park approved in 1989.

## **C. Recreational Assessment**

Recreation Overview – Camp Plymouth State Park is located on the western side of Windsor County within a 45-minute drive of the population centers of Rutland, Springfield, and White River Junction. In addition, the Ludlow Lakes area surrounding Camp Plymouth State Park is a very popular summer destination spot for tourists looking to enjoy the mountains, trails, lakes, and recreational facilities available in this section of Vermont. Camp Plymouth State Park is within a day's drive for more than 30 million people in southern New England and the mid-Atlantic states.

Two very different categories of recreational experiences are available at Camp Plymouth State Park. The day-use and group camping areas are characterized by substantial modifications to the property including a developed beach, buildings, parking lot, and playground. These are all supervised by park attendants and heavily used by people on holidays and weekends during the summer. Sights and sounds of people recreating are readily evident including activities on Echo Lake such as power boating and water skiing.

A recreational experience in a less developed environment with fewer people is found within the forested portion of the park located on the east side of Scout Camp Road. This area is characterized by a natural appearing setting with woods roads and maintained hiking trails but no buildings or large crowds. Contact with other users may be low to moderate on the old town road along Buffalo Brook but low on trails and away from roads. Although interaction between users is low, evidence of other users is prevalent. This area is located within ½ mile of a paved town road and the day use area. Signing is used to restrict unauthorized activities.

Developed Day Use and Overnight Area – The picturesque setting, general layout, and variety of facilities and activities available have made this one of Vermont’s most popular day-use parks. The park is intensively visited in July and August when children are on summer break. Visitors come daily to swim, picnic, use the playground, and rent boats.

The two open picnic shelters and the indoor pavilion are ideal facilities for any group function including weddings, company picnics, and reunions. An average in excess of 44,000 people visit the park annually.

With ample parking, large lawns, shaded picnic spots, and variety of recreational opportunities, the park can accommodate hundreds of visitors without feeling overcrowded.

The group camping area is ideal for scouts and other groups looking for a rustic experience. This area is relatively under-utilized. In recent years this area has also been opened up to campers with horses. Horseback riding is not appropriate for Camp Plymouth State Park, however some areas of adjacent lands are suitable. With the potential development and mapping of a trail system into the adjacent Arthur Davis WMA and Coolidge State Forest, camping with horses could become more popular at the park.

In 1999 two additional cottages were constructed bringing the total to four at the park. The cottages are quite popular and are rented by the week from mid-June to Labor Day. In May, September, and October, the cottages are rented for two nights or more. Currently the park is entering its third season of keeping the cottages available until Columbus Day Weekend and the park facilities available for group functions. This is a trial period and in future years the park may or may not stay open for these limited uses after Labor Day. This will depend on the level of demand and available staffing.

An infrastructure assessment of Vermont State Parks done in 1998 included Camp Plymouth State Park. Some standard repairs and improvements related to items such as re-roofing, adding tile to surfaces, improving ventilation, adding and replacing skylights, new doors, and painting or vanishing were recommended. However the general layout and condition of the facilities were found to be in good condition.

Hiking Trails – Camp Plymouth State Park contains one hiking trail, the Echo Lake Vista Trail, which offers a scenic view of Echo Lake and Okemo Mountain. This popular trail

was constructed in 1988 by a Vermont Youth Conservation Corps crew (VYCC) under the supervision of a state lands forester. Permission for the trail to cross through the Pollard Cemetery was granted by the Plymouth Cemetery Commission. Rated as moderate in degree of hiking difficulty, this trail joins with an old class 4 town road to form a 1.5-mile hiking loop. This trail is considered in very good condition, it is well blazed and signed with no significant erosion problems.

The Echo Lake Vista Trail starts on the old town road across from the park entrance and crosses through the town cemetery on the way to the vista overlooking the lake. Distance to the vista is approximately 0.5 mile with a vertical climb of over 300 feet. The trail then drops down the backside of the ridge, switches back to cross Buffalo Brook at a ford crossing and then connects back to the old road. Crossing at this ford can be difficult during periods of high water. A high

# Recreational Opportunities Map

# Recreation Map

water trail that avoids the brook crossing was roughed in by a VYCC crew in 1989. The trail then follows the old town road back to the park.

Hunting and Fishing – Hunting activity primarily centers around deer season; however turkey, gray squirrels, and ruffed grouse are also hunted on the property. Buffalo Brook provides opportunities for native brook trout fishing, and Echo Lake features small and largemouth bass, perch, pickerel, smelt, and trout fishing.

Other Activities – Horseback riders and mountain bikers use the old town road that starts opposite the day use area entrance and cuts through the park following the course of Buffalo Brook. Most of the horseback riders are associated with tour groups.

There are no officially designated snowmobile trails within Camp Plymouth State Park. However, some snowmobile activity occurs on the old town road that parallels Buffalo Brook. This road is also used by ATVs and 4WD vehicles to access the Reading Pond area within Arthur Davis Wildlife Management Area. According to Town of Plymouth officials, this is a town road and as such, does not fall under the control of the Department of Forests, Parks & Recreation. The issues of the official classification and allowed uses of this road need to be resolved with the town because of erosion damage to the road and water quality concerns associated with its numerous ford crossings.

Although not encouraged, hand panning for gold is a popular recreational activity along Buffalo Brook. Dredging or sluicing for gold is not allowed on state land.

## **D. Timber Resource Assessment**

### History of Timber Management

The current status of the timber resources at Camp Plymouth State Park are partly the result of past land use management practices that occurred before and since State ownership.

Many of the areas within the park with moderate slopes were cleared of vegetation, most likely for pasturing, during the mid-1800s. Areas with steeper terrain may have been clearcut for lumber but not likely used for pasture. The residual white pine remaining in these areas indicates that most of these cleared lands were abandoned between 100 and 150 years ago resulting in relatively even-aged stands in many areas. It is most likely that no or very limited timber management activities occurred on this property between the early 1900s and the 1950s due to the noncommercial size of the trees during that time.

Records indicate that forest management activities under the direction of the Windsor County Forester occurred on the lands that are now Camp Plymouth State Park in the 1950s when the property was owned by the Boy Scouts of America. Additional timber cutting occurred in the mid 1970s administered by the Resource Conservation & Development (RC&D) Forester. These sales were most likely a combination of thinning

and individual tree selection cuts with a large part of the volume made up of white pine, red spruce, and white birch.

Since coming into State ownership in 1984, two timber sales have been conducted on this property. The first sale was a thinning in an even-aged white pine stand. The second sale was primarily a thinning in an even-aged northern hardwood stand located adjacent to a deer wintering area. One goal of this second sale was to improve the deer wintering area by creating additional hardwood browse. To help achieve this goal, hardwood trees were removed along the edge of the hemlock stand, and a one-acre patch cut and a four-acre overwood removal were laid out and cut in hardwood stands adjacent to the deer wintering area. These two sales contained a total volume of 101 MBF of sawtimber and 279 cords of pulpwood with a stumpage value of \$7,150. Both sales were cut by local loggers.

The terrain of Camp Plymouth State Park provides difficult access for logging equipment and severely restricts opportunities for timber management. Steep slopes and brook crossings are the primary access limitations.

### Current Status of Timber Resources

The Camp Plymouth State Park timber resource assessment was conducted using an updated version of the Forest Examination (FOREX) protocol developed by the Vermont Department of Forests, Parks & Recreation as a tool to inventory and evaluate Vermont State Lands. The new FOREX protocol consists of two surveys where data can be collected simultaneously. One survey involves the statistical inventory and analysis of the timber resources and the other documents the site data necessary to determine the natural community classification in a given area which was used in the assessment of the ecological resources in the Ecological Assessment section.

This section provides a general overview of the timber resources within Camp Plymouth State Park based upon the information derived from the FOREX inventory completed in 2001.

The property was divided into 10 stands representing six forest types (see Forest Stands map).

### Sugar Maple-Beech-Yellow-Birch

The Sugar Maple-Beech-Yellow Birch stands makes up approximately 40% of the forested acreage found at Camp Plymouth State Park. The soils are primarily glacial tills over bedrock and range in site productivity from poor to high. Most of these stands contain a high percentage of sugar maple (up to 60%) with lesser amounts of beech, white ash, red maple, and red oak. Portions of stand #2 were blown over in a severe wind storm several years ago. Scattered bear-scarred beech in these stands indicate their use by bear for feeding. Since 1984, approximately 40% of these stands have been thinned through logging operations.

### Red Maple-Paper Birch-Red Spruce

This forest type is found on approximately 18% of the park's forested acreage. The soils in this area consist of a Tunbridge-Lyman complex and tend to be very shallow to bedrock and low in productivity. The white birch is in decline due to its age and will

eventually die off as the stand moves toward the natural community Red Spruce-Northern Hardwood Forest. The hardwood in this stand is of poor quality and predominately pole sized.

# Forest Stands Map

### Eastern Hemlock and Hemlock-Yellow Birch

The northern sections of the Eastern Hemlock stand (#5) and the Hemlock-Yellow Birch stand (#10) provide the bulk of the critical deer wintering habitat found within the park. These two stands are considered overstocked and account for approximately 29% of the park's forested acreage. The bulk of the soils are poor quality being shallow to bedrock and very steep. Portions of these stands are considered non-commercial.

### Northern Red Oak

A 10-acre Red Oak stand (#9) is an important mast area providing acorns for wildlife such as deer, bear, and turkey. This pole-sized stand is located on a very steep and ledgy ridge with poor quality soils.

### Eastern White Pine

Two small areas of white pine totaling four acres in size have been mapped on the property. Both areas are in transition to the surrounding forest type, Northern Hardwood in one area and Red Spruce-Northern Hardwood in the other. The pine is of good quality having undergone at least one thinning.

### Non-Commercial

This area includes the day-use park area and most of the very steep and ledgy ridge located to the east of the Scouts Camp Road. The ridge contains a mixture of hemlock and oak and is part of the critical deer wintering habitat and important mast area.

### Current Value of Timber Resources

The timber resources found at Camp Plymouth State Park offer a number of natural resources and economic benefits. The continuous forest cover on the steep slopes help protect the water quality of Buffalo Brook and Echo Lake by preventing soil erosion and reducing water pollution. The forest provides important wildlife habitat such as mast areas and deer wintering areas. The forest cover on Camp Plymouth State Park contributes greatly to the scenic beauty of the Echo Lake region.

## Forest Stand Information

### *Management Unit: Camp Plymouth State Park Forex Inventory Summary, 2001*

Stand	Acres	MSD	BA/A* Total	Acc. BA/A	Unacc. / BA/A	Cull BA/A	Site	Timber Type	Species % BA	Recommended Treatment	Access
1	21	11.8	100 70	57	13	30	1	25	be-20 pw-17 ms-10	selection; remove pine, crop tree release	wet areas, power pole guide wire in skid road
2	40	12.4	103 94	73	8	22	1	25	ms-48 by-14 be-14	individual and group selection, patch cuts along hemlock stand	difficult access – steep slopes along brook
3	50	9.9	102 93	66	8	27	3	35	mr-20 ms-16 sr-14	patch cuts, thinning	difficult access – steep slopes along brook
4	15	11.4	103 97	80	7	17	3	25	ms-58 aw-23	patch cuts, crop tree release	difficult access
5	57	12.8	161 127	131	16	14	1	23	he-51 pw-9 sr-8	none	steep along brook
6	14	10.4	133 101	110	12	12	1	25	ms-19 be-15 or-15	crop tree release	difficult access – steep slopes along brook
7	4	14.4	125 125	90	10	25	2	21	pw-56 mr-24	thinning	difficult access
8	4	5.8	65 65	50		15	1	25	ms-46 aw-15	none	difficult access
9	10	7.9	93 80	75	15	3	4	55	or-35 mr-23	none	steep and ledgy
10	22	12.6	115 95	82	8	25	3	24	he-38 by-13	none	brook crossing

\* total basal area  
dominant-codominant

## E. **Special Constraints**

Constraints from original deed to State of Vermont:

1. A 50' wide utility easement conveyed to Central Vermont Public Service Corporation for power line right-of-way.
2. Rights of access along an old road to back side of cemetery conveyed to Town of Plymouth.

Camp Plymouth State Park was purchased with matching Land and Water Conservation Funds. Created by Congress in 1964, the Land and Conservation Fund (LWCF) provides money to federal, state, and local governments to purchase water and wetlands for the benefit of all Americans. The fund receives money mostly from fees paid by companies drilling offshore for oil and gas. Other funding sources include the sale of surplus federal real estate and taxes on motor fuel. In Vermont, LWCF dollars have been primarily used to protect recreational opportunities, but they also provide other benefits including clean water, wildlife habitat, scenic vistas, and protect archeological and historic sites.

## **Legal Constraints Map**

## V. Management Strategies and Actions

### A. Land Use Categories

Four levels of land use have been identified for the lands managed by the ANR. These land use categories indicate where different levels of use will be emphasized on the land. In this section of the plan, the recommended levels of use 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; (2) Unique or Special Use; (3) General Use; and (4) Intensive Use.

As part of the planning process, the lands, resources, and facilities held by the Agency of Natural Resources are evaluated and assigned to the appropriate land use category. Assignment of land use areas for Camp Plymouth State Park is based on a thorough understanding of the resources available and the application of the over-arching lands management standards presented in the introduction section of the plan. The resources include natural communities, plants, and wildlife as well as recreation, historic, timber, and water resources. The 11 lands management standards or principles include maintaining biodiversity, enhancing recreational use and wildlife habitat, and involving the public as well as implementing legal constraints wherever they are applicable.

#### *Definitions of Land Use Categories (Classification)*

- 1) **Highly Sensitive Area** – An area with uncommon or outstanding biological, ecological, geological, scenic, cultural, or historic significance where those values are preserved and protected. Human activities and uses should be minimal and may be regulated to protect the exceptional features on the landscape.
- 2) **Unique and Special Use Area** – An area with unique or special resources where management objectives consider protection and/or enhancement of those resources. These areas do not need to have the same level of protection given to highly sensitive areas and, in some cases, may be intensively managed for specific purposes. There may be some evidence of timber harvesting, wildlife management, roads, and recreational activities; however, those activities should be compatible with and should not detract from the primary objective of protection and/or enhancement of the unique or special resources.
- 3) **General Use Area** – An area where multiple land uses occur but the dominant uses may be sustainable timber harvesting, wildlife habitat management, dispersed recreation or other general land uses. Where one use such as recreation dominates, for example, vegetation will be managed as a secondary use so long as it can be conducted in a way that does not conflict with the dominant use or other lands categorized as more sensitive that may be adjacent to it.

- 4) **Intensive Use Area** – An area that is easily accessible and characterized by a level of human activity and high intensity development on or adjacent to state land. Vegetative management will be directed toward aesthetic and safety considerations. Other resources may be managed but in a compatible way with the dominant use.

## B. Management Strategies By Land Use Classification

### 1) **Highly Sensitive Areas**

- 1.7) **Buffalo Brook Ravine and Wooded Buffer Area – 4 acres (map reference 1.7).** This scenic area consists of hemlock and white pine trees growing on steep slopes that border an approximately 1000' long section of Buffalo Brook where the water has carved out a ravine. On the west side of Buffalo Brook, the buffer extends to the class four town road. There are no known historic sites within this area, however it may contain evidence of past gold mining operations such as tailing piles.
- a) Ecological – Existing natural community types and habitats will not be disturbed. No vegetative manipulation is planned for this area.
  - b) Historic – There will be no disturbance to historic or archeological features.
  - c) Recreation – This area is being protected for its high scenic values. Non-motorized recreational activities such as hiking, snowshoeing, hunting, fishing, trapping, and cross-country skiing are allowed within this area.
  - d) Utilization – No commercial timber harvesting activities or vegetative manipulation for wildlife will occur in this area.

### 2) **Unique and Special Areas**

- 2.1) **Sugar Maple-Ostrich Fern Riverine Floodplain Forest – 20 acres (map reference 2.10).** A natural community characteristic of floodplains associated with higher energy, high gradient rivers, primarily in areas of calcareous bedrock or surficial geology. Intact examples of this community type are rare in Vermont (S2 ranking).
- a) Ecological – This area is ecologically sensitive. Maintenance and enhancement of this natural community type will be the primary management goal. Forest health conditions will be monitored and invasive exotic plants will be removed.
  - b) Historic – This area has been identified as an archeologically sensitive area because it may contain pre-contact site locations. No disturbance will be allowed to cultural features within this area.
  - c) Recreation – Dispersed non-motorized recreational activities such as hiking, snowshoeing, hunting, fishing, and cross-country skiing are allowed. There currently are no designated trails within this area, and no trails would be established without prior consultation with the

Vermont Division for Historic Preservation. Any future recreational uses will be closely monitored to minimize impacts to the area.

# **Land Use Classifications Map**

- d) Utilization – No timber harvesting activities will occur within this area. Regulated hunting, fishing, and trapping are allowed.

**2.2) Critical Deer Wintering and Mast Area – 85 acres (map reference 2.2)**

– The critical deer wintering areas represent the largest and most widespread critical habitat element on Camp Plymouth State Park. This area also includes a 10-acre stand of mast producing red oak.

- a) Ecological – The critical deer wintering areas are located in the hemlock and hemlock-hardwood community types which are common in Vermont. The goal of forest management activities planned within this area would be to improve and preserve the shelter conditions provided by the deer wintering area. In areas adjacent to winter cover, activities should be implemented to create forest regeneration and high quality browse for deer.

This area also serves as core forest. Efforts should be made to limit ‘perforations.’ It is recommended that roads be constructed only where they are necessary to meet management objectives. In these instances, they should be as narrow as possible, temporary in nature, and only located in areas less sensitive to human disturbance.

- b) Historic – No historic resources have been identified in this area.
- c) Recreation – No winter-use trails will be allowed through the deer wintering area; however, dispersed, non-motorized recreational activities such as hiking, snowshoeing, hunting, fishing, and cross-country skiing are allowed. Motorized access off the existing town road which passes through the forest will be prevented through barricades, signs, and enforcement. A section of the existing Echo Lake Vista Trail crosses through this area. Recreational activities and use of this trail will continue in a way that minimizes disturbance to ecological resources.
- d) Utilization – Management activities to maintain the critical wintering area will be implemented through either commercial harvesting or noncommercial activities. Because of steep slopes along the Buffalo Brook drainage, timber sales would be feasible only along the eastern side of the wintering area. All activities carried out will be planned and implemented in cooperation with the Vermont Fish & Wildlife Department. Regulated hunting, fishing, and trapping are allowed. Tree cutting for hiking trail and vista maintenance is also allowed.

**2.7) Buffalo Brook and Wooded Buffer Area – 18 acres (map reference 2.7)** – This area is made up of softwood and mixed wood slopes that border Buffalo Brook. This buffer is designed to protect water quality and fish habitat. However, an old road that is considered to be a class 4 road by the Town of Plymouth runs parallel to Buffalo Brook through this area. This road receives heavy ATV and 4WD vehicle use and crosses the brook six times at ford locations either within the park or along the park boundary and is causing significant levels of erosion. Gold mining operations occurred along the brook in the mid to late 1800s, although no mining-related cultural sites other than possible tailing piles have been identified on state land.

- a) Ecological – Existing natural community types, habitats, and riparian areas will not be disturbed. There are no vegetative or wildlife management practices prescribed for this area.
- b) Historic – No historic resources have been identified in this area.
- c) Recreation – Use of the class 4 road needs to be controlled in order to prevent erosion damage to the road and subsequent sedimentation in the brook. The possibility of gating this road will be discussed with the Plymouth Selectboard. Keys to the gate could be provided to the Town of Plymouth road foreman, fire department, cemetery commission, and to all landowners whose properties are accessed by this road. There would be room to get around the gate for recreational users including hikers, mountain bikers, and horseback riders.

The existing Echo Lake Vista Trail fords the brook in this area and also follows along the brook on the class four town road. Recreational use and maintenance activities on this hiking trail will continue in a way that minimizes disturbance to ecological resources.

- d) Utilization – No timber harvesting activities will occur within this area. Regulated hunting, fishing, and trapping are allowed. Tree cutting for hiking trail maintenance is also allowed.

3) **General Use Area**

**3.0) Forest land – 141 acres (map reference 3.0).** The primary emphasis is on production of quality sawtimber, maintenance and enhancement of wildlife habitat, and recreational uses.

- a) Ecological – The general forest management areas within Camp Plymouth State Park are located in the northern hardwood, red spruce-northern hardwood and hemlock community types which are common in Vermont. Timber harvesting practices will be implemented to maintain existing community types, mast-producing trees, and snag trees in cooperation with the Vermont Fish & Wildlife Department.

- b) Historic – Stone walls, cellar holes, and other cultural artifacts will be protected according to ANR guidelines for protection of historic sites. One old stone-lined cellar hole has been located within this area. Additional research on the history of this site is recommended at some point in the future.
- c) Recreation – Non-motorized recreational activities such as hiking, snowshoeing, hunting, fishing, and cross-country skiing are allowed within these areas.
- d) Utilization – All timber harvesting practices will be implemented according to the U.S. Forest Service Silvicultural Guides and ANR guidelines for timber harvesting including: AMPs and the Landowner’s Guide for Wildlife Habitat Management. All-aged management will be the primary guide; however, even-aged practices may be used to regenerate white pine, aspen, and red oak, and, if necessary, to get advanced regeneration past heavy deer browse. The vegetation in an existing one-acre clearcut will be maintained in an early successional stage through periodic noncommercial cutting. Regulated hunting, trapping, and fishing are allowed. Seeps and vernal pools will be buffered from logging operations according to guidelines provided by the Vermont Department of Fish & Wildlife.

4) **Intensive Use Area**

4.2) **Camp Plymouth State Park Group Camping Area – 4 acres (map reference 4.2).** Group camping area consisting of six lean-tos and tent sites located just south of the day-use area. Lean-tos are arranged in pairs and are available to organized groups of eight or more people. Each pair of lean-tos has a fireplace and picnic table. Drinking water and pit toilets are available on site. This area is also open to campers with horses.

- a) Ecological – This area is located in a mowed grassy field. On the northern side of the field, a narrow forested buffer strip separates this area from Buffalo Brook. Mowing will be curtailed within approximately 10’ of this buffer strip in order to increase the width of the buffer strip.
- b) Historic – This area has been identified as an archeologically sensitive area because it may contain pre-contact site locations. No development is planned for this area. No new development or any significant site disturbance will be allowed within this intensive use area without prior consultation with the Vermont Division for Historic Preservation.
- c) Recreation – Continue current management practices and uses on this area – no changes are planned. Conduct necessary maintenance work

on lean-tos – including replacement of two roofs. Hunting is not allowed in developed recreation areas from May 1 through October 15.

- d) Utilization – Vegetative management will be directed toward aesthetic and safety considerations. Hazardous trees within and around this area will be inventoried on a periodic basis and removed according to Department procedures.

4.3) **Camp Plymouth State Park Day Use Area – 23 acres (map reference 4.30).** This popular day-use area features a beach, playground, picnic area, concession stand, and boat rentals. There is a large enclosed picnic shelter as well as two smaller open pavilion-style picnic shelters that can be rented for group functions. Four rental cottages are also located within the park. The day-use area is open from late May through Labor Day weekend. The trail head access area for the Echo Lake Vista Trail is located across from the main entrance to the day use area.

- a) Ecological – 17 acres of the intensive use area is located within a mowed grassy area that also contains a few scattered trees. An additional six acres is located within a white pine stand growing on a site where the predicted natural community is red oak-northern hardwood forest.

There is a narrow forested buffer strip between Buffalo Brook and the south side of this day-use area. Grass mowing will be curtailed within 10' of this forested buffer strip in order to increase its width.

- b) Historic – A portion of this intensive use area has been identified as an archeologically sensitive area because it may contain pre-contact site locations. Also located within this area are the stone foundation remains of the old Pollard farmstead which has been registered with the State of Vermont Division for Historic Preservation. No new development or significant site disturbance is allowed in this intensive use area without prior consultation with the Vermont Division for Historic Preservation.

Several buildings from the former boy scout camp are still in use within the park. This includes two of the main buildings, the dining hall and the ranger's quarters, and two small cabins that were extensively renovated and are now used for rental cabins. Records indicate that the dining hall was constructed in 1961, while the ages of the other three buildings are not known at this time. Even though the dining hall and ranger's quarters may not qualify yet as Historic Standing Structures (more than 50 years old), these two buildings should be maintained as closely as possible to their present condition as they represent an important former use of the property. No major

renovations should be conducted to these two buildings without prior consultation with the Vermont Division for Historic Preservation.

- c) Recreation – Very little in the way of change is planned regarding Camp Plymouth State Park’s operating philosophy and recreational activities. The focus will remain on providing a quality experience at the day-use waterfront area while also providing limited camping opportunities. Most changes will be related to facilities upgrades and maintenance, which is a high priority for the park. An interpretive birding trail may be developed within this area. It would consist of several stations providing information on birds and their habitats. Hunting is not allowed in developed recreation areas from May 1 through October 15. Fishing is not allowed in designated swimming areas during the park operating season.
- d) Utilization – Vegetative management will be directed toward aesthetic and safety considerations. Hazardous trees will be inventoried on a periodic basis and removed according to Department procedures for detection, assessment, and correction of hazardous trees in recreational areas.

## C. Management Strategies by Resource Type

### 1) **Vegetative Management**

Timber Harvest Objectives – The State began a program of active forest management soon after acquiring the Camp Plymouth property in 1984. This park will be managed under an uneven-age management system implemented by thinning, crop tree release, individual and group tree selection, and patch clearcuts one to three acres in size. The schedule for silvicultural treatments leading to forest harvesting is generally based upon soil productivity.

The primary objectives for timber harvesting in the Unique and Special and the General Use areas designated within Camp Plymouth State Park will be to:

- Protect the recreational experience for the public while at Camp Plymouth State Park.
- Retain the winter deer cover currently offered by dense stands of hemlock.
- Improve timber quality.
- Retain red oak component.
- Release desirable regeneration.
- Provide an abundant mixture of different tree species.
- Favor those species most suited to the existing soils.
- Strive to maintain a distribution of tree age classes.
- Maintain the aesthetic nature of this property.

Recognized U.S. Forest Service silvicultural guides will be used when developing stand prescription for timber harvests. Stand treatment decisions will be based on health and vigor of stands, the rate of individual tree crown closure, wildlife habitat requirements, evidence of heavy deer browsing, and stand basal area. New information, changes in state lands policy, and recommendations from other departments or agencies may change specific recommendations.

Forest Sustainability – The Agency of Natural Resources defines sustainability as “the production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.”

Soil Productivity Guidelines – Four forest site classes are used in this plan to express potential for forest productivity and for vegetative management (see *Soils Productivity Map*). Site productivity is based on the Windsor County Soils Survey and considers information such as soil potential, soil limitations, slope, surface features, and soils depths. The following map locates these various site productivity classifications as they occur in this management area.

Soils, site class, and slopes are all important information when considering which tree species to favor, and how intensive the management effort should be.

The site class values can be used for broad planning purposes. However, on-site investigations are recommended to assess variations in site conditions and slope variations especially in the “E” slope category which range from 35% to 60%. A thru E subscript represents percent slope and is defined as:

A	less than 3%
B	3 to 8%
C	8 to 15%
D	15 to 35%
E	35 to 60%

As a general rule, commercial harvesting operations as we know them in the northeast can easily be accomplished on slopes up to 35%. Considerable care and planning are required on slopes up to 50%. We generally consider slopes of 60% and over to be non-commercial.

Sugar maple is the indicator species used to develop potential ratings for northern hardwoods. On glacial outwash soils, white pine tends to dominate and was substituted for sugar maple ratings.

- 2) **Water Resources** – The management of Camp Plymouth State Park by the Department of Forests, Parks & Recreation will, at minimum, maintain the quality of all the surface waters associated with the land. It is understood that agricultural and silvicultural activities which follow Accepted Agricultural Practices and Accepted Management Practices are presumed to conform with the rebuttable presumption of compliance with Vermont’s Water Quality Standards.

Managers of ANR land holdings will cooperate with the ANR's Department of Environmental Conservation, Water Quality Division with their watershed planning initiatives for the Black River Basin when it is undertaken. The watershed basin planning effort includes the determination of the water management type of all waters located within the basin. Through this process, the assignment water classification and water management type for all waters will take into consideration the existing water quality, the desired water quality, and whether or not the desired quality is attainable.

The goal for the water management type of waters below 2,500 feet that flow through Camp Plymouth State Park is of a high level (potentially B1). B1 waters are managed to maintain an almost natural condition showing minimal changes from reference conditions for aquatic macroinvertebrates and fish assemblages.

A survey of Echo Lake's watershed was conducted in September 2002 by staff from the ANR Water Quality Division. In the survey it was noted that several years ago a flash flood event caused Buffalo Brook to wash out sections of the park access road and flow overland through the picnic area. It was also noted that portions of Buffalo Brook's streambanks had been artificially bermed up to help keep the brook in the original channel. The Water Quality staff observed a very large and fresh gravel delta in Echo Lake at the mouth of Buffalo Brook. They also observed that upstream of the park, the brook carries a moderate load of gravel, most likely the result of some type of erosion problem. They recommended further investigation of the sources of ongoing erosion in the upper reaches of the watershed (Arthur Davis WMA) and the potential for damage to park facilities during peak flow events.

- 3) **Fire Management** – District state lands staff will advise loggers and other forest users about hazard reduction, fire access roads, and woods operation precautions during fire season. All timber harvesting operations, timber stand improvement crews, and Vermont Youth Conservation Corps crews operating within Camp Plymouth State Park will be carried out in conformance with State regulations for slash disposal and Department guidelines for preventing wildfires.

# Soils Productivity Map

# Soils Type Map

Wildfire detection will be based upon public reporting and air patrol during periods of high to extreme fire danger. The town fire warden in Plymouth is responsible for wildfire suppression on all fires in Camp Plymouth State Park. The Forest Resource Protection forestry specialist will assist the town fire warden and overhead fire responsibilities as well as provide guidance in determining compensation to the town involved with fire suppression. State lands personnel will actively assist the town in suppression efforts if requested. The State also has a reciprocal agreement with the U.S. Forest Service to provide equipment and manpower at no charge to the State for the first 24 hours.

Prescribed Burns – Prescribed fire may be used as a management tool within Camp Plymouth State Park to maintain vegetation in existing forest openings and to reduce a fire hazard. All prescribed burns will be conducted in accordance with a written prescribed burn plan and Department guidelines for conducting prescribed fires.

## Implementation Schedule

<b>Year</b>	<b>Actions/ Purpose</b>	<b>Comments</b>	<b>Responsible Parties</b>	<b>Outcomes</b>
Annually	Park maintenance	Widen buffer strip along Buffalo Brook within intensive use area by reducing area mowed	Parks	Enhanced recreational experience; increased protection for Buffalo Brook
Annually	Trail maintenance		Forestry	Enhanced recreational experience
Annually	Monitoring of disease and insect problems	Check for hemlock woolly adelgid	Forest Protection section	
2004 (periodically on an as-needed basis)	Skid road repair and maintenance	Repair damage to skid roads and rebuild waterbars that were destroyed by illegal off-road vehicle use	Forestry	Protect skid roads from continued damage and reduce erosion
2004-05	Interpretative Birding Trail	Establish several stations in and around day use area where information is provided on bird habitats	Parks and F&W	Information & Education
2004	Gate Buffalo Brook Road	Work with Plymouth Selectboard to restrict vehicular access on road	Forestry	Protect Buffalo Brook Road from continued damage to road bed, reduce erosion into Buffalo Brook
2004 –06 (18 to 20 year intervals)	Timber harvest; stand #1; 21 acres	Date of last timber sale 1986; selection and crop tree release; buffer around seeps; fall or winter job: conduct non-commercial activities to enhance deer wintering area such as maintaining existing 1-acre clearcut	Stewardship Specialist	Salvage large scattered white pine, thin clumps of white pine, crop tree release in northern hardwoods
2009-11 (25-35 year intervals)	Timber harvest; portions of stands #2, 3, 4, 6; 100± acres	Review sale with F&W; patch cuts in hardwoods adjoining deer wintering area; single and group tree selection in hardwoods; patch cuts in red spruce to release softwood regeneration; need to secure logging access to area	Stewardship Specialist	Create browse adjacent to deer wintering area; retain softwood cover and healthy mast producers; release softwood regeneration

# **Vegetation Management Map**

## **VI. Monitoring and Evaluation**

During the life of the Long Range Management Plan for Camp Plymouth State Park, periodic monitoring will be conducted by the Agency of Natural Resources to insure that State-owned resources are protected from fire, insect and disease, other natural disturbances, encroachments, or unforeseen problems that may occur within the campground and the forest.

Additionally, management activities carried to conform with scheduled actions and planned outcomes will be evaluated to determine how closely the results matched those projected within the plan. The Agency of Natural Resources may make recommendations for changes in planned activities to reflect changed conditions or unanticipated results. Any major revisions to the plan would be proposed as amendments and be subject to public review and approved by the Vermont Agency of Natural Resources Lands Stewardship Team.

### **A. Forest Health**

The health of the forest stands within Camp Plymouth State Park will be monitored yearly by Department personnel through a system of aerial observation and ground checking. Significant changes in forest stand conditions will be recorded and investigated by the Forest Resource Protection specialist. The specialist will provide specific information on identified problems sufficient to make informed management decisions and will assist the State lands staff in formulating appropriate management strategies. Strategies for managing forest stands damaged by insect and disease will be ecologically acceptable and will be based upon appropriate silvicultural practices.

### **B. Vegetative Management**

Timber harvests and wildlife management practices completed within Camp Plymouth State Park will be periodically reviewed by the stewardship specialist and the district State Lands Stewardship Team to determine how well the State is doing in achieving its planned objectives. If the monitoring results indicate that there is a significant difference between the outcomes predicted by the plan and the actual conditions, the Agency may recommend changes to the plan.

### **C. Natural Communities & Rare Species**

All exemplary, unique, and special natural communities and rare, threatened, and endangered (RT&E) species of plants and animals will be periodically evaluated by the stewardship specialist and the district State Lands Stewardship Team to determine conservation status (threats from recreational or other land uses) and successional trends.

Management strategies may be developed to insure that those communities and species continue to be afforded the highest level of protection and stability.