

# Bear Brook State Park Management Plan



New Hampshire Department of Resources & Economic Development  
1994

# **CONTRIBUTING AGENCIES**

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**Division of Forests & Lands**

**Division of Parks & Recreation**

**New Hampshire Natural Heritage Inventory Program**

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# SECTION I

## THE SITUATION

### **ABSTRACT:**

This plan provides a mechanism to manage Bear Brook State Park in a manner that promotes the conservation of native biodiversity; the protection, utilization and development of multiple resource values and user interests; and allows for harmony between potentially conflicting uses.

In the past state owned properties were managed on a stand by stand, and site by site basis. Management activities focused on areas that provided immediate opportunities. This plan looks at Bear Brook State Park as a landscape within the surrounding human and natural landscapes. It introduces a system of management which provides for diversity across the landscape, and builds upon natural tendencies and opportunities while integrating the natural resource management of the Park with the recreation uses occurring in it.

The system takes the form of four **Management Criteria**, each of which is a series of **standards for management governing the type and degree of disturbance which will occur in any location**. With each Management Criteria comes a different level of disturbance which contributes to the overall diversity of the Park, be it diversity of plants, animals and natural communities, or diverse opportunities for recreation and other human aspirations.

A comprehensive public vision for Bear Brook State Park has been evolving since it was designated a state park in 1942. This plan is not intended as the last word in the management of Bear Brook. Rather, it is a framework to guide today's management of the Park, and a foundation to be built upon with public input and management experience. This plan attempts to coordinate the cultural management of Bear Brook with the natural resource management of the Park, not to simply avoid conflict, but to enhance the public purpose of both disciplines.

While a resource inventory of the Park was completed in 1990, detailed information on certain resources is lacking. Bear Brook contains several locations of rare species and exemplary natural communities identified by the New Hampshire Natural Heritage Inventory Program. However, the majority of these locations are based on historical data, and an effort to provide a more complete inventory of rare elements should be made. Further, a comprehensive cultural history inventory of the property is recommended.

This plan also recognizes the need to address certain parks operation issues, among them the Park entrance on the Deerfield Road; the activities presently taking place within Bear Brook, that are not related to its function as a state park; and the need for a "purchase boundary".

## **INTRODUCTION:**

The Department of Resources and Economic Development's, Division of Parks and Recreation and Division of Forests and Lands have joint management responsibility for Bear Brook State Park in conjunction with other natural resource agencies through the State Cooperative Land Management Committee.

The following laws govern management responsibility of Bear Brook State Park and other state lands:

- \* **RSA 206:10 - Fish and Wildlife Management**
- \* **RSA 206:23 - Cooperative Fish and Wildlife**
- \* **RSA 212-B:5 - Nongame Wildlife Management**
- \* **RSA 218:5 - Execution of Forestry Activities**
- \* **RSA 216-A:1 - Parks and Recreation Management**
- \* **RSA 216-A:2 - Cooperative Management and Use**

Forestry activities on all state owned forest lands are carried out by authority of **RSA 218:5**. **RSA 216-A:1** addresses the intent of parks management. **RSA 216-A:2** provides for cooperative recreational and forestry use of state lands. The management of fish and wildlife resources are carried out under the authority of **RSA 206:10** and **RSA 212-B**. **RSA 206:23** provides for cooperative fish and wildlife management programs.

Additional laws governing management activities at Bear Brook State Park, and other state owned lands are listed in the appendix.

The mission of the **Division of Parks and Recreation** is to provide high quality recreational and interpretive experiences for all visitors to the state's park and trail systems; to assure that these systems are adequate to meet the needs of today's and future generations; to provide reliable informational assistance to other agencies, communities, and the private sector about park and recreation standards, needs and impacts; and to encourage responsible stewardship and appreciation of our irreplaceable parklands, trails, and recreational resources.

The mission the **Division of Forests and Lands** is to **conduct and support programs for the protection, improvement, and proper utilization of New Hampshire's forests and forest related resources for the continuing benefit of its citizens.**

### **The Property:**

Bear Brook State Park plays an important role in the quality of life for the people of the region. Its large size (9,585 acres) and close proximity to the cities of Concord and Manchester, and the surrounding suburbs provide many opportunities and place many demands on the Park.



Allenstown: 6564.4 acres
Candia: 290.0 acres
Deerfield: 1937.6 acres
Hooksett: 793.0 acres

**Acreage by Town**

Act of 1942" 6,436 acres was transferred to the State from the United States Department of the Interior, National Park Service

Located in the towns of Allenstown, Deerfield, Hooksett and Candia New Hampshire, the Park is divided into eleven administrative **Compartments**. Compartment boundaries follow cultural features, such as roads and trails, or distinct topographic features, such as large streams. The property was acquired between 1916 and 1981 through a variety of purchases, gifts, condemnations, eminent domain and exchanges. Under the "Recreation Demonstration Projects

Of the Park's 9,585 acres, 482 acres are well distributed developed recreation areas. They include the beach and picnic areas, two 4-H Youth Camps (Spruce Pond Camp and Bear Hill Camp), and the campground. Approximately 3,175 acres of the Park is designated by agreement with the NH Fish & Game Department as a game refuge. An archery range is located within the refuge, off the Campground Road. The primary access for all the developed facilities is the Deerfield Road. From this a myriad of roads and trails extend across the Park. The trail network includes trails for use by snowmobiles, x-country skiing and hiking. Mountain bikers and equestrians also make use of the trail network.

**History:**

Within Bear Brook State Park numerous stone walls, old mill sites, cellar holes and cemeteries bear witness to the area's early settlement and past farming history. Gravestones date back to 1823. Old sawdust piles evidence a history of logging.

The first portion of the property to come into State ownership was 413 acres on the south side of the Deerfield Road, west of Bear Brook. Acquired in 1916, this property was then known as Bear Brook State Forest.

However, most of present day Bear Brook was "marginal farmland" purchased by the federal government. In the mid 1930's the Civilian Conservation Corps' (CCC) "Camp Bear Brook" started work. Much of their work was on site at Bear Brook, and continued after the property was transferred to the state in 1943. In 1941 the day use areas and the camps at Bear Hill and Spruce Pond were completed by the CCC, and the day use areas came under lease to the state. Following transfer to the state, the toll booth opened in the late 1940's, and in 1952 the campground opened with eighteen sites. During WWII the old CCC camp was used as a recreational facility for Naval personnel. This area, now known as the Depot, was placed on the National Historic Register in 1992. The Bear Brook Game Refuge was established by RSA 212:13 in 1943.

The CCC's projects were not confined to the developed park areas. Numerous plantations were established, including the so called "DAR" plantation during the 1939-40 biennium.

They established an extensive trail network. Additionally they built a fire tower on Bear Hill which went into service in 1939-40; it was closed and removed in 1974.

At Bear Brook State Park two dams have been installed and are maintained by the New Hampshire Fish & Game Department. The first dam, at Hall Mountain Marsh, was erected in 1956, while one at Haye's Marsh was installed in 1968. The dams are used to regulate water depth to manage waterfowl habitat. The dam at Archery Pond is also maintained by Fish & Game. Other dams, at Catamount Pond, Bear Hill Pond, and Beaver Pond were constructed by Water Resources and are maintained by the DRED's Design, Development and Maintenance section.

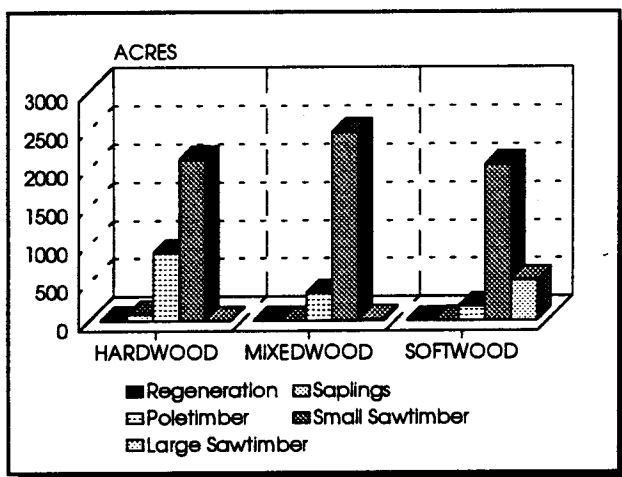
Since acquisition by the state, various forest management activities have been undertaken, including harvests, thinnings, and timber stand improvements. Specific wildlife habitat improvement projects, including prescribed burns, and mowing have also been effected.

**Resource Summary:**

Topography across Bear Brook State Park varies greatly, from low and wet, to steep and ledgy. While the Park is dominated by rolling landscapes with moderate slopes, other landforms are strongly represented. Approximately 900 acres of the Park are wetland, including Haye's Marsh and Hall Mountain Marsh. Three heights of land: Hall Mountain (925 ft.), Bear Hill (800 ft.+), and Catamount (700 ft.+) occur in the southern, central and northern portions of the Park respectively. Glacial erratics dominate areas in eastern portions of the Park. Ponds on the property include Catamount Pond, the Old Reservoir, Bear Hill

Pond, Spruce Pond, Beaver Pond, Smith Pond, Archery Pond and several small bodies of water. Brooks and streams are predominant. Major drainages, all of which eventually enter the Suncook River, are Bear Brook, Catamount Brook, and Boat Meadow Brook.

Soils vary from glacial tills to outwash. The most frequently mapped soil series are the Gloucester series and the Chatfield-Hollis-Canton complex. The potential for forest productivity on these soils varies from high to low. There are two historic sand and gravel excavations on the property.



**Figure 1 Size Class Distribution by Forest Type.**  
Based on the 1988-1990 Forest Resource Inventory.

The timber resource is distributed between hardwood, softwood, and mixedwood types, with roughly one third of the acreage in each category. The distribution on the ground,

however, is less even. Softwood types dominate the stream drainages and lowlands. Sixty-nine percent of the Park is in the small sawtimber class (10" to 14.9" dbh).

Wildlife use in the Park is considerable. Sign or sightings of deer, moose, red fox, coyote, bear, raccoon, porcupine, snowshoe hare, fisher, otter, beaver, hawk, piliated woodpecker and a variety of songbirds, other birds of prey, small mammals, reptiles and amphibians are common. Hunting and fishing are popular recreational uses in the Park. Hunting within the game refuge has been limited to archery hunting for white tail deer since 1947 by RSA 212:14. The Fish & Game Department has an ongoing stocking program for both trout and ring necked pheasants. Trapping in the Park is allowed by permit.

The Park contains several locations of rare species and exemplary natural communities identified by the New Hampshire Natural Heritage Inventory Program. However, the majority of these locations are based on historical data, and an effort to provide a more complete inventory of rare elements is recommended.

## MANAGEMENT ISSUES:

*"It's recreational potential, forest cover and wildlife effect the economic and social well being of the surrounding and visiting populace both directly and indirectly, and like all public holdings, should be managed with the Greatest Public Good as the primary objective."*

John Bork  
1948 Bear Brook Plan

### **Bear Brook State Park**

**Is** 9,585 acres of state controlled, relatively undeveloped land within easy traveling distance from two of the states largest cities.

**Is** property acquired for recreational purposes, with year round recreational opportunities.

**Has** 3,175 acres designated as a game refuge.

**Has** a tradition of hunting and fishing as recreational activities.

**Contains** sensitive sites and elements of rarity.

**Is** property with a history from early logging and farming, to work projects of the Civilian Conservation Corps.

**Has** a forest resource which can provide renewable raw materials, and whose management affords the mechanism for realizing other natural resource goals.

**Is** a property with educational opportunities, to demonstrate and interpret natural resource management.

**Is** public land with a wide range of public uses and demands placed upon it.

Here was our charge: to manage a large tract of land in such a way that all of the demands placed upon it could be met; to somehow balance the needs for recreation, wildlife habitat, timber production and resource protection.

A resource inventory was completed in September of 1990, laying a framework and providing much of the raw data necessary for multiple use management. However, implementing such management is not without its difficulties.

In the past, decisions regarding management practices were made on a stand by stand basis. Limited staffing left little choice but to find specific areas most in need of attention, be it for silvicultural, wildlife or recreation reasons, and deal with them first. Today's heightened expectations and demands require broad decision making involving various resource managers. But when experts from the various disciplines were asked to make recommendations concerning a proposed project there was a problem. **Just what would occur in the surrounding stands over time? How would a management action affect the property as a whole? Would certain elements or aspects of the forest be deficient or overabundant in the future? If so, how could management practices be implemented to influence this?**

Clearly a mechanism for getting the various disciplines together and recognizing **long term goals** was needed. The answer seemed to lie in a management plan to be developed by an interdisciplinary team made up of those individuals who would be out in the field implementing management. The process began in early 1991.

Once we started it became obvious that the problem was not only **what** would occur in the future, but **where** would it occur? The most recent resource inventory yielded a wide variety of recommendations across the property based on the current conditions of the individual stands. But on such a large tract of land it became apparent that the types of management implemented, now and in the future, needed to be regarded on a broader scale in order to integrate the needs of various disciplines. One basic objective of all the disciplines was to provide the range of habitats produced by different levels of manipulation, from no management, to large scale disturbance. This could be done on a stand by stand basis, but would it be most effective? For example, would 50 acres left undisturbed have any lasting impact if it were adjacent to a clearcut or a heavily used recreation area? On the other hand, what if there were several hundred or more acres left "unmanaged", with the level of disturbance to the surrounding area progressively increasing with the distance from the center? Then you could **consider the landscape**; look at **large blocks** where you could **predetermine the types and levels of management to be implemented**. All the resource managers would know what could happen in the future at different locations. Addressing specifics at the operations planning level would be simplified because those nagging questions about the surrounding areas would be answered. Broad management objectives on a **landscape** scale would predetermine the options available at the project level.

Now we had the means for management, but what exactly were the goals? **Multiple uses. Multiple demands. Multiple missions.** The common thread running through it all: **multiple, many, variety, diversity.**

With everything expected of a large piece of public land there was only one answer. To meet as many **needs**, as many **wishes**, as many **expectations** as possible: **provide diversity.**

For example, the goal of wildlife management on the property is to provide habitat to maintain viable populations of the species native to the area. A look at the list of species whose sign was noted during the resource inventory shows any number of species with different habitat requirements; and that list only scratches the surface of species which potentially inhabit the Park. The overall goal is not to promote any one species over another, but to do what is best to provide for a diversity of species. Wildlife diversity is tied to habitat diversity: the vegetative diversity in terms of species, size and age; the vertical diversity within the forest and so forth. Certainly, when opportunities for improving habitat requirements for certain species present themselves, they should be considered. But across the Park the necessity is to provide any and all the diversity which the individual sites can offer.

This is not only true of wildlife habitat management, but of all the disciplines. Take recreation management, where part of the mission is to provide a range of experiences and an opportunity for interpretive programs. What affords the most opportunity? An area providing a diverse landscape. With its size and status as public land, Bear Brook provides a unique opportunity in the southern portion of the state to meet such goals.

Landscapes and diversity. By combining the two, the major hurdles to multiple use management were cleared. Now all that was left to be done was to determine how, where, ~~what~~, when and why?

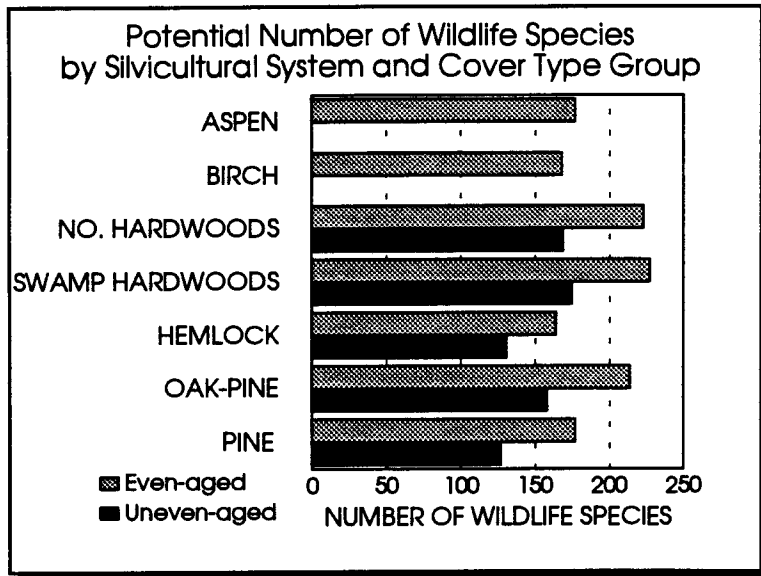
## SECTION II FOCUS & APPROACH

### MANAGEMENT FOCUS:

The management of Bear Brook State Park will consider the Park in the context of the surrounding natural and human landscape. The primary focus of all management activities is to work toward accommodating a wide variety of demands, without compromising the integrity of the natural resources.

### Natural Resources:

**Biological Diversity:** Bear Brook plays an important role in providing habitat for a wide array of plants, animals and natural communities. Managing for diverse habitats is a complex endeavor.



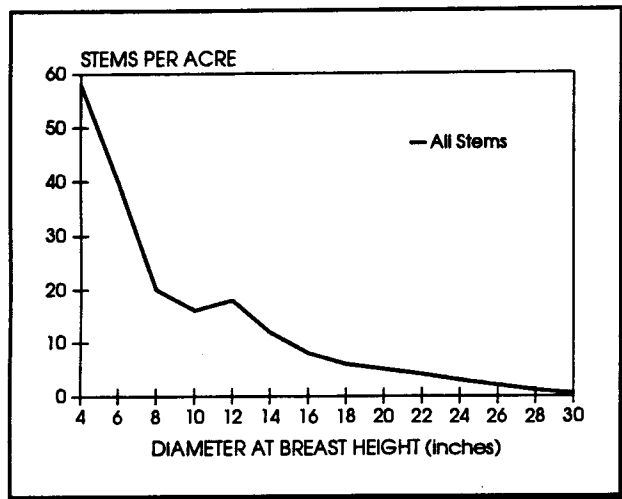
**Figure 2** Adapted from: "New England Wildlife: Management of Forested Habitats" by DeGraaf, Yamasaki, Leak and Lanier 1992.

Endangered, rare or unique plants, animals and natural communities native to the property will be given priority consideration in all planned activities. Beyond these priority elements, species preference will not direct overall management. Rather the goal of management will be natural diversity. A diverse landscape, based on site capabilities, will provide the habitat needs to maintain viable populations of virtually all species native to the Park. Management will strive to maximize wildlife viewing opportunities. Within the framework of diversity goals species specific management actions will be taken at the project level.

Diversity is not new to southern New Hampshire's forests. Local species are believed to have adapted to the natural diversity of the forest as constructed by disturbance or lack of it. Each facet of disturbance provides valuable habitat for wildlife. In pre-settlement New Hampshire

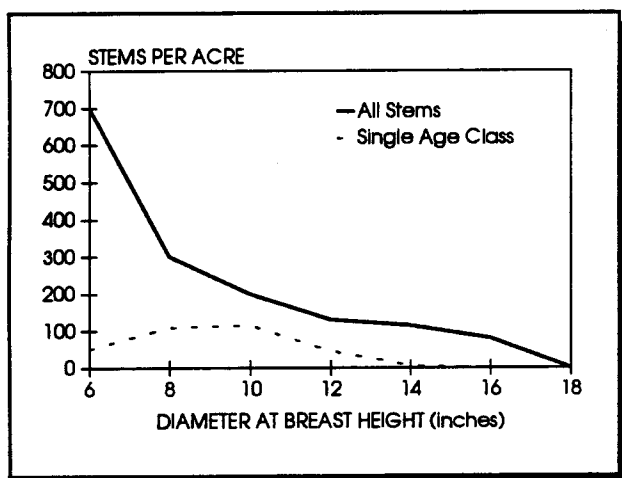
natural disturbances of varying intensities were readily distributed on a spatial and temporal scale. Many woodland creatures require heavily disturbed conditions to maintain viable populations. Other species require undisturbed sites. Still other species are best managed somewhere along the gradient of conditions fitting between these two extreme regimes.

**Natural Disturbance:** Forest disturbances generally fall into three categories. Each provides a distinct set of habitat conditions; together they produce a diverse landscape. The first category is undisturbed forest. This is represented by stands of trees that are allowed by site



**Figure 3a: Tree Stem Structure: Undisturbed Forest Stand** \*Based on the Bowl Natural Area

factors (both endo and exogenic) to surpass maturity age, reproduce beneath themselves, and maintain a dynamic equilibrium. Often referred to as "steady-state", this category tends to carry a balanced level of biomass, a sustainable distribution of tree stem sizes, and forest openings generally less than one tree height wide. Openings are often the result of mortality of a single stem or small aggregate of stems. This mortality is generally caused by such natural factors as wind, pathogens, lightning, insects, poor vigor, nesting or snow. The distribution of tree stems in such areas is believed to follow an inverse J-shaped structure as shown for an unmanaged stand in Figure 3a (based on the Bowl Natural Area in the White Mountain National Forest).



**Figure 3b Tree Stem Structure: Group Selection Stand** \*Based on simulations.

The second scenario involves moderate disturbances. Here a higher percentage of individual stems die and larger areas are affected. Natural openings approach and exceed a single tree height. In such areas both the temperature and amount of light are greater than in an undisturbed forest, which results in a higher proportion of plant species that prefer moderate to high light conditions. These conditions may result from a single severe disturbance or a coalescence of smaller gaps. Openings begin to depart from the inverse J-shape stem structure (shown in Figure 3a) to more of a "bell-shape" structure, however, the general tree stem structure of the area as a whole main-



tains the inverse J-shape pattern. Stem ages remain somewhat high but seldom reach the ages attained in stands where little disturbance results. The structure of these areas are similar to that shown by a stand managed by group selection which is shown in Figure 3b.

The last category is that of large, severe disturbances. Over time, large, natural disturbances have been recorded on a fairly periodic basis in southern New Hampshire. These disturbances are somewhat massive and can be totally destructive to tree stem structure. Both the light and daily temperature regime that exists within such an area can be extreme. On such sites this

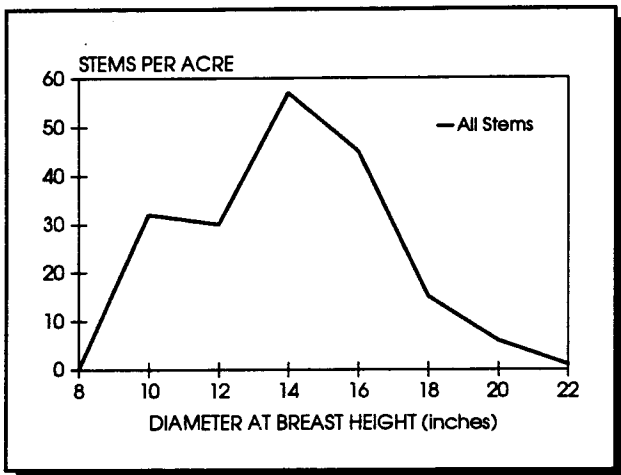


Figure 3c Tree Stem Structure: Even-aged Forest Stand \*Based on data from Taylor State Forest.

can result in the establishment of stands of trees (and other plants) that are of approximately the same age, and of species that are intolerant to shade conditions. The overall inverse J-shape structure is destroyed, and can take a century or more to re-establish. These stands exhibit a somewhat "bell-shape" tree stem structure which is comparatively simple and may include distinct flora and fauna not found in other disturbance regimes. The structure pattern of these areas is similar to that of an even age stand shown in Figure 3c. In the absence of future disturbance, these areas will have a tendency to move back toward the inverse J-shape structure of less disturbed stands.

**Spatial and Temporal Scale of Disturbance:** Not much is known about the scale and patterns of natural disturbance in southern New Hampshire over time. Even if it were possible to re-establish a pre-settlement disturbance pattern, it may no longer be valid in modern day New Hampshire because of the extensive urban development and increased demands on our forests by a multitude of users. However, though the patterns of disturbance may be different, it is still important to provide the wide array of vegetative habitat conditions that were once present, and with which the flora and fauna has adapted over thousands of years. This plan will provide for an array of conditions, reached by a somewhat balanced and informed approach. It is important to provide these conditions on a scale that will impart heterogeneity in a homogenous fashion. The spatial arrangement of these patterns is key to this.

Disturbance patterns were likely well distributed over time in the pre-settlement landscape. However, in this plan attempts to provide for them in a constant context. This is important because today's forests are more isolated and less contiguous than those in the past.

**Scale and Frequency of Disturbance:** Regulating the scale and frequency of disturbance can be problematic. In nature, as the size of the disturbance increases, the frequency with which

it occurs decreases, forming an inverse J curve. This is often true of natural population trends. For example, the frequency of occurrence of natural fresh-water water bodies relative to their size also forms an inverse J. Hunter<sup>1</sup> suggests that the size of disturbances, such as

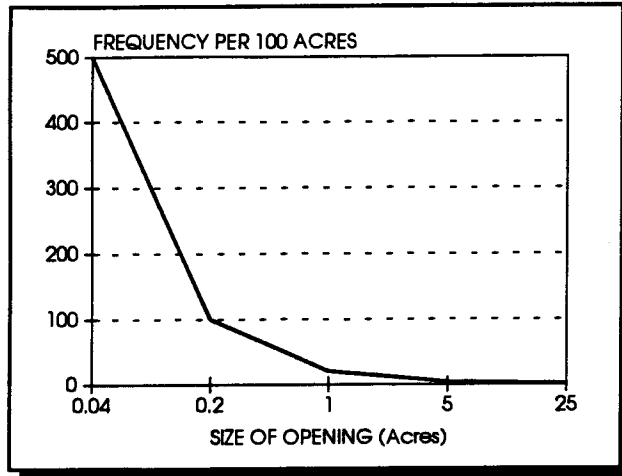


Figure 4 Distribution of Disturbances

silvicultural cuts, reflect these natural population tendencies. We have developed a model for disturbance that we believe fits the conditions of southern New Hampshire. While we do not know how well it resembles the natural patterns that once existed in this area, but we believe it to be effective in the modern landscape.

The model categorizes disturbances by size in magnitudes of five (5), then allocates an even acreage to each individual regime (see Figure 4). This exhibits the characteristic inverse J-shape pattern shown in Figures 3a & 3b. The model is to be used as a yardstick along with other data to periodically

evaluate the natural diversity being provided through vegetative management in the Park.

**Timber Management:** The state's forests are a source of renewable raw material for societal needs. At Bear Brook, the production of these raw materials will be a by-product of a timber harvesting program which promotes a healthy forest. Timber will be harvested on an ecologically sustainable basis. Vegetative rotations of 60 - 140 years will be used (depending on site capability, and vegetative composition goals). The intent of timber management is to provide an even distribution of age classes in a diversity of vegetative types. Timber management will concur with guidelines for biological diversity and will function as a major mechanism for their implementation.

**Cultural Resources:**

A comprehensive public vision for Bear Brook State Park has been evolving since it was designated a state park in 1943. This plan is not intended as the last word in the management of Bear Brook. Rather, it is a framework to guide today's management of the Park, and a foundation to be built upon with public input and management experience.

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<sup>1</sup> "Wildlife, Forests and Forestry: Principles of Managing Forests for Biological Diversity" by Malcolm Hunter 1990.

The plan attempts to coordinate the cultural management of Bear Brook with the natural resource management of the Park, not to simply avoid conflict, but to enhance the public purpose of both disciplines. This section takes a broad look at public use in Bear Brook State Park today, with some general observations and recommendations for the future. (The individual developed recreation facilities, are examined in more detail in Section III, "Opportunities, Recommendations and Guidelines".)

**Developed Recreation:** Bear Brook State Park contains numerous facilities for developed recreation. These facilities are very important to the public, and to a significant degree they define public perception of the Park. Various recreational opportunities include picnicking, camping, and swimming. Vegetative management in developed recreation areas will strive to enhance the recreation experience.

**Dispersed Recreation:** The Park as a whole receives a substantial amount of activity as a result of dispersed recreation. These activities include: hiking, biking, snowmobiling, cross country skiing, snowshoeing, hunting, fishing, trapping, bird watching and nature study. These are traditional pastimes which are recognized and encouraged in the Park. As such, these uses will be closely considered during the planning of any management action.

**Park Operations:** Circumstances, both man-made and topographic in nature, have left Bear Brook State Park inefficiently designed for park operations. The most significant design problem is in the northern portion of Bear Brook, where the Deerfield Road (a relatively busy town road) bisects the day-use portion of the Park. This road makes management control of these areas difficult. Further, it detracts from the park experience and is a safety concern. The Deerfield Road and the configuration of the Park boundaries make a single park entrance impossible. This lack of a single park entrance and the travel distance, over public roads, between developed day use areas, the campground, and the museum and administrative buildings all contribute to the difficulty in managing this sprawling park.

Other operational concerns exist in addition to these design issues. At various locations Bear Brook plays host to non-park related state facilities and operations. These include the police dog training facility, department warehouse, and federal surplus vehicle storage at the Depot, and a cabin leased to the UNH Outing Club located in Compartment 1. While such activities may be appropriate, a review of non-park related activities is recommended to examine the degree to which they conflict with the primary purpose of the property and to what degree they utilize facilities and land that may have a higher and better public use.

**Historic Resources:** A comprehensive cultural history inventory of the property is recommended. The location of such cultural resources as stone walls, cellar holes and graveyards, as well as the legacy of the CCC at the Park should be recorded in a single location. Presently much of this information exists in various forms, and at various locations. For example, many sites are indicated on the stand type maps generated by the Forest Management Bureau, and an inventory of the Depot was done when the CCC buildings were

nominated for the National Historic Register. The collection of this data in a single repository would help ensure the protection of this irreplaceable cultural legacy.

**"The Friends of Bear Brook State Park":** This recently formed group was created by local citizens to assist the state in managing the Park. This group will be encouraged to act as an umbrella organization for the diverse groups working within the Park. Such a group could: provide an efficient conduit for public input; provide a sounding board for park management; help define a comprehensive vision for the Park; and focus and encourage volunteerism.

**Interpretation:** An interpretive program is presently run from the Visitor Center (which also serves as a nature center) located at the Bear Brook Depot. The program consists of one seasonal interpreter who works in other state parks in the region. The Park interpreter staffs the center on a regular schedule and conducts special programs which include, nature hikes, childrens' activities, and specific educational programs on numerous topics. The interpretive program capitalizes on the audience provided by the campground.

Future interpretive programming at Bear Brook State Park will strive to integrate land management practices. Interpretative walks will visit ongoing management activities and draw on the expertise of the resource managers involved with these activities. Where appropriate interpretive signing will be employed to inform park users about management practices.

**Land Protection:** Bear Brook State Park is subject to heavy public use. Because of many uncontrolled access points, and the dispersed layout of recreational facilities, regulated use and property protection is difficult. These difficulties are accentuated by limited Park staff. Further, because much of the Park was acquired with federal Land and Water Conservation funds, certain restrictions apply which can affect the course of land protection. Land protection strategies include:

- \* Delineation of a "purchase boundary" and acquisition of key inholdings and significant intrusions, particularly those properties adjacent to undisturbed areas within the Park (see Management Criteria #1). Such acquisitions will assist in protecting natural values within the Park. They may also have the additional benefits of reducing the amount of boundary line maintenance and the potential for encroachment.
- \* Working closely with surrounding towns to address illegal dumping, unauthorized vehicle use, undesirable development and other threats to the environmental integrity of the Park.
- \* Considering fee acquisition and easements of connecting properties to create a greenway to Pawtuckaway State Park.

## MANAGEMENT APPROACH:

Management of Bear Brook State Park will be guided by four strategies called **Management Criteria**. Each Criteria is a series of standards for management governing the type and degree of disturbance which will occur in certain locations, and is designed to provide a specific contribution toward overall biological diversity, while addressing the multitude of demands placed on the Park. Lands falling under Criteria 1, 2 & 3 are those which will be managed for dispersed multiple use. Lands managed by Criteria 4 will be managed for developed recreational uses. A breakdown of the area in each Criteria is shown in Figure 5. An interdisciplinary team of resource management specialists (known as the State Lands Management Team) will provide necessary insight at various stages of management planning and implementation of projects.

One of the major benefits of the Criteria system is that it allows for a **broad landscape approach to management** of interdependent forest and human resources. For management activities to be most effective, their implications must be considered on a landscape basis. Two similar activities occurring on different landscapes or sections of a landscape will often result in very different consequences. The Criteria approach outlines the general guidelines and the type of practices which can occur at any given location. It provides management focus across the entire property. Because everyone is working within the same guidelines, it possible for experts of various disciplines to make informed recommendations.

The Criteria approach allows foresters to anticipate concerns from other disciplines when developing proposals for **timber management**. Such concerns can be paramount in decision making, and with this approach they can be addressed very early in the planning process.

Long term **recreation** planning is favorably affected by the Criteria approach. This strategy allows recreation managers to see where expansion and improvements may occur without threatening decades of effort to accomplish other goals. Conversely, by knowing where probable expansion may take place, other resource managers can modify efforts in those areas.

### Reasons for four Management Criteria are:

- \* Manage the Park in an ecologically sensitive manner.
- \* Provide a diverse range of habitats for native plants, wildlife, and natural communities.
- \* Coordinate and enhance interdisciplinary management efforts.
- \* Provide for a broad spectrum of high quality recreational experiences.

The Criteria approach makes it possible to anticipate **wildlife habitat needs**. For example, early successional habitat dwellers can be intensely managed where that vegetation occurs and will continue to occur in the future. Late successional habitat users and forest interior species can be managed for in areas which will not be subjected to present or future heavy cutting regimes.

**Vegetative Management** - As mentioned in the **MANAGEMENT FOCUS**, the vast majority of the goals and objectives for Bear Brook State Park will be obtained through vegetative manipulation, as permitted within the standards of the four Management Criteria.

Since Bear Brook is essentially a forested landscape, this vegetative manipulation will primarily result from the application of silvicultural treatments. Silviculture is the theory (art) and practice (science) of controlling forest establishment, composition and growth to meet management objectives. (Smith - 1962) A silvicultural system is a planned program of silvicultural treatments during the whole life of the stand, consisting of a number of steps conducted in a logical sequence. (Daniel, and others - 1979) Actions can be roughly broken into three categories: no action, application of an uneven-aged silvicultural system, or employment of an even-aged silvicultural system.

Uneven-aged management utilizes silvicultural treatments which result in an essentially continuous forest canopy, made up of a range of age classes. Single tree and group selection do not require the creation of large openings in the forest, generally favoring mid to late successional species. Dependant upon site capabilities rotations as short as eighty years may be considered, without undue encouragement of early successional species. While analysis of tree species and growing sites at Bear Brook indicate that one hundred and forty years is generally the most protracted rotation favorable.

Even-aged management, regardless of the specific regeneration practice employed, results in the creation of larger openings in the forest than does uneven-aged management. These openings are transitory in nature, their purpose being the regeneration of species, which due to their shade intolerance, cannot be propagated in a closed canopy situation. While rotations at Bear Brook may still extend to one-hundred and forty years in areas of even-aged management, shorter rotations will be favored. Where early successional species are being promoted, rotations may be as short as sixty years; rotations shorter than this may deplete the soil.

Vegetative management at Bear Brook will take advantage of the range of silvicultural options available:

- \* **Criteria 1** will involve little or no human impact (natural disturbance regimes).
- \* **Criteria 2** will center on uneven-aged management.
- \* **Criteria 3** will focus on even-aged management.

By combining the options for management so that the magnitude of disturbance radiates out from Criteria 1, to Criteria 3, it will be possible to create a progression of vegetative

opportunities across the Park. This should work to provide for a high degree of species richness and biological diversity.

## **MANAGEMENT CRITERIA 1:**

**Undisturbed landscape components** have recently been recognized as providing important habitat for many plants, animals and natural communities. Additionally, recreational use patterns, at Bear Brook and elsewhere, suggest a renewed interest in undisturbed landscapes and the particular recreation experience such a landscape component can offer. This includes a desire, by some Park users, for recreational opportunities away from more developed and motorized recreation.

Leaving areas to proceed through the natural processes of forest succession, without the direct influence of man, is an issue of current concern to many people. A large publicly held property, like Bear Brook State Park, is an area where this issue can be addressed in the southern part of the state. Part of the Division of Parks and Recreation's mission is to provide interpretive opportunities. Establishing areas which will receive little or no management affords an opportunity for interpretation unique in southern New Hampshire.

In this plan such areas fall into **Management Criteria 1**. It is recognized that the lands designated as Criteria 1 presently do not contain undisturbed forests, and that we cannot restore any portion of the property to **fully undisturbed** conditions. The influences of atmospheric and biotic factors around the property may never allow these locations to fully revert to undisturbed conditions. Still this plan recognizes the importance of **relatively undisturbed** sites and that unless some lands are set aside, free of direct human disturbance, such as the cutting of vegetation, they will never begin to approach an undisturbed condition. Some future operations may take place in these areas on a research basis, but only to **recreate natural phenomena** such as **natural gap dynamic studies** using timber cutting, and **controlled burning**.

Another mission on Department properties is to encourage responsible stewardship. However, to evaluate management decisions, there must be something to compare and contrast them with. Management Criteria 1 will serve as a control to assist in assessing the impacts of all other levels of management.

Minimizing man-made disturbance in Criteria 1 areas will increase the potential for the progression to later seral stages, such as hemlock, and development and maintenance of natural complex communities.

Areas of critical habitat for species and communities identified by the New Hampshire Natural Heritage Inventory Program will take precedence, and habitat management will be directly supervised by the appropriate agencies. Low impact recreation activities are an acceptable use of lands in Criteria 1, with the Division of Parks and Recreation ensuring that the integrity of Criteria 1, as relatively undisturbed areas, is maintained.



## **MANAGEMENT CRITERIA 2:**

Lands in Management Criteria 2 serve as a **transition** between the unmanaged sites in Criteria 1, and those which will be most heavily disturbed in Criteria 3. Such a transition zone serves to mitigate the impact which adjacent even-aged management could have on plants, animals, and natural communities occurring in Criteria 1.

The desired future condition for these areas will involve **minimal to moderate impact** from human activity. Harvesting will seek to balance "steady state" species with other seral stages especially mid-successional species. These lands will be managed for a balance of age classes, utilizing rotations appropriate for the site (80 - 140 years). **Uneven-aged management** will be the silvicultural system of choice. These areas will provide interpretive opportunities for uneven-aged management and communities tied to moderate disturbance regimes.

Recreation will focus on dispersed multiple use, and will include motorized recreation. Opportunities for establishment of vistas, which can be enjoyed by visitors traveling Park roads can be accommodated through uneven-aged management. Uneven-aged management techniques are also favored in aesthetical sensitive areas.

## **MANAGEMENT CRITERIA 3:**

The amount of early successional habitat in southern New Hampshire is in decline. Many species, both plant and animal, are tied to these habitats. These species include game birds, such as Ruffed Grouse, and songbirds such as Chestnut-sided Warbler, and Blue Birds. These early successional habitats are dependent on larger scale disturbances, such as those provided by even-aged management. Criteria 3 will emphasize **EVEN-AGED MANAGEMENT** when site conditions allow. (Conditions which may prevent large openings include deer yards, steep slopes, wetlands, riparian zones, critical faunal or floral habitat and shallow soils.) The desired future condition is the maintenance of a viable amount of **early successional vegetation**; a balance of age classes through the creation of large openings (5+ acres) when possible; creation of large maintained openings for certain wildlife species, and the practice of more economical timber harvesting. A balance of hardwood and softwood species will be sought where site conditions allow.

Management within Criteria 3 will result in high species richness, which will accommodate the ever increasing demand for recreational opportunities tied to the species which utilize these habitats. These recreational pastimes include birding and hunting.

Bear Brook has a long established pattern of heavy winter OHRV use. Such motorized recreational activities in these more heavily disturbed landscape components are less likely to conflict with other recreational uses.

**MANAGEMENT CRITERIA 4:**

Criteria 4 involves those areas that are currently supporting intensive and developed recreation use, and adjacent visually sensitive areas. The primary purpose of vegetative management in these areas is to enhance the recreational experience.

## **CONSIDERATIONS WHEN CHOOSING AREAS FOR EACH CRITERIA:**

**Take advantage of the opportunities which the landscape offers!**

### **Management Criteria 1**

1. Large, contiguous blocks of acreage.
2. Areas where the surrounding landscape components can either be controlled by ownership, remoteness, or existing site limitations.
3. Areas representing the range of sites/habitats occurring in the property as a whole.
4. Areas containing sensitive species or sites, such as unmanaged wetlands.
5. Areas easily accessible to the public wishing to experience an "unmanaged" situation, containing non-motorized trails. AND areas which are remote and less subject to human influences.
6. Areas not presently containing developed recreation sites.
7. Areas not slated for developed recreation.
8. Lands surrounded by areas suitable to uneven-aged management, which can serve as a transition zone into areas of even-aged management.
9. Areas containing mature and over-mature stands.
10. Areas which have received little or no recent commercial management.

### **Management Criteria 2**

1. Areas which serve as transition zones between Criteria 1 and Criteria 3 lands.
2. Areas of large, contiguous acreage.
3. Areas which present no limitations to the use of uneven-aged management.
4. Habitats which are best suited to the use of uneven-aged management.
5. Areas where aesthetic considerations favor uneven-aged management.

6. Areas which provide opportunities for the demonstration of proper uneven-aged management techniques.

### **Management Criteria 3**

1. Large, contiguous blocks of acreage.
2. Sites which favor the growth of intolerant and early successional species.
3. Habitats well suited to even-aged silviculture.
4. Areas where even-aged silviculture conflicts the least with other uses.
5. Areas where the ability to create larger openings increases the feasibility of management.
6. Areas which provide opportunities for the demonstration of proper even-aged silvicultural techniques.
7. Areas with historic motorized recreational use.
8. Areas with a tradition of active commercial forest management.
9. Portions of the Park bordered by heavily disturbed landscape components on abutting lands.

### **Management Criteria 4**

1. All current developed recreation areas.
2. All lands under Parks and Recreation Management zoning.
3. Areas of extreme visual sensitivity adjacent to high recreational use areas.

## **AREAS CHOSEN FOR CRITERIA 1:**

At Bear Brook two areas presented the best opportunity (see Criteria 1 map):

Compartment 3, at 1239 acres, afforded a large contiguous acreage, encircled by other Park property, and accessible by cross-country ski trails from the more developed areas of the Park. The compartment (with the exception of a small portion of the campground and Spruce Pond Camp) had traditionally been limited to non-motorized, undeveloped recreational activities, and did not fall into the range of any presently planned developed recreation expansion.

In the past twenty years little or no commercial forest management activity has taken place in this compartment. Therefore most Park users unaccustomed to seeing active management in this area.

The compartment contains nearly 300 acres of unmanaged wetlands, constituting 23% of the compartment. These wetlands vary from active beaver ponds, to hardwood swamps, to softwood swamps to grassy marshes.

In Compartment 2, adjacent to Compartment 3, additional areas of unmanaged wetlands, which extend along Bear Brook, and to the south of Spruce Pond presented an opportunity to extend Management Criteria 1 beyond the boundaries of Compartment 3. The area south of Spruce Pond is unique in that it is believed that this was once a glacial lake bed. This portion of Compartment 2 includes a number of stands at or beyond maturity.

This combined area of Compartments 2 and 3 is dominated by softwood cover (60% of Compartment 3), with the remainder equally divided between hardwood and mixedwood type. Examples of dry softwood plains (glacial outwash), washed till and fine till hardwood sites, as well as the range of wetland types are represented.

A large portion of Compartment 10 and a smaller section of Compartment 5 provide those needs not addressed by the Compartment 2 and 3 area. This 887 acre area, bounded by old roads now serving as snowmachine trails, is nonetheless remote. Boat Meadow Brook and a series of wetlands limit access from the east, while the access from the west, Holmesboro Road, has long been abandoned and overgrown. Hardwood cover dominates this portion of the Park (approximately 65%), with much of the remainder in a mixedwood situation. No developed recreation sites exist. In fact there are not even maintained trails within the area.

Much of the surrounding area is within DRED control and readily lends itself to uneven-aged management. The remaining uncontrolled area is remote, with difficult access and site conditions, such as shallow-to-bedrock soils, large boulders and difficult terrain, which make future development unlikely. Some of this abutting property is owned by the Manchester Water Works as part of the watershed of the Manchester municipal water supply. Much of the remaining uncontrolled area abutting Criteria 1 falls within an earlier proposed "purchase

boundaries" for the Park (see **Land Protection** page 15), and would likely be within any new purchase boundary.

No other portions of the Park are as well suited to Criteria 1.

#### **AREAS CHOSEN FOR CRITERIA 2:**

The areas chosen for Criteria 2 at Bear Brook (see Criteria 2 map) surround the Criteria 1 lands and serve as a transition zone between areas managed for little or no human disturbance, and those managed for greater human impact.

The historic use pattern of these areas is one of active forest management, and recreational use including snowmobiling.

The areas chosen are well suited to a system of uneven-aged management. For example, the softwood occurring on outwash soils within Compartments 1 and 8 naturally regenerates in small groups which will also favor wildlife use. On the fine tills in Compartment 2 quality hardwoods can best be encouraged and maintained through the application of uneven-aged management. Additionally, hardwoods can be grown to large diameters on these highly productive soils. A continuous representation of large stems, including mast and cavity trees, can best be maintained through the use of uneven-aged treatments. Moreover, most of the major drainages within the Park fall in the transition zone to be managed under the Criteria 2 strategy. Riparian zones where management is desirable can best be accommodated by uneven-aged management techniques. Vista opportunities and aesthetic considerations due to high visibility from the South Deerfield Road, Middle Road, Podunk Road, the Campground Road and Spruce Pond Road make uneven-aged management the system of choice in these locations.

#### **AREAS CHOSEN FOR CRITERIA 3:**

(See Criteria 3 map.) Soil habitats in the areas chosen for Criteria 3 management at Bear Brook include washed tills, shallow-to-bedrock, and outwash. The hardwood soils favor the growth of such intolerant and early successional species as aspen, birches and oaks. These species are readily encouraged and maintained by the use of even-aged techniques including clearcuts. Some of the soils in the chosen area offer little opportunity to grow larger diameter stems. Without large diameter stems to maintain, the management of oaks and other hardwoods is better done through even-aged processes.

The areas chosen for Criteria 3, especially those within Compartments 7, 6, 9 and 5 are bounded by heavily disturbed landscape components, outside of state control. Land uses include fields, housing developments, trailer parks and areas of recent, heavy timber cutting. It would be inappropriate to locate Criteria 1 adjacent to such uses (see **MANAGEMENT**

**CRITERIA 1** ). However, by juxtaposing Criteria 3 with such uses as farmland or heavy timber harvesting, the area favorably influenced by Criteria 3 management is enlarged.

Criteria 3 locations include areas (in Compartment 4, 6 and 7) which are readily accessible from developed facilities, roads and trails, and which afford ideal opportunities for interpretation of the habitats provided.

Snowmobile use has traditionally taken place in all of these areas. These snowmobile trails, as well as woods roads and skidder trails also serve as access for hunters and other recreational users.

**AREAS CHOSEN FOR CRITERIA 4:**

Most of the area which will fall under Criteria 4 are a given, due to historic recreational development within the Park.

In addition to the areas of developed recreation, and those lands under Parks and Recreation Management zoning, some locations were added to Criteria 4 for aesthetic reasons (see Criteria 4 map). These areas are located along the main access road into the Park, and adjacent to the day use areas, and are highly visible to a large percentage of Park users. The main intent of vegetative management within Criteria 4 is to enhance recreational values.

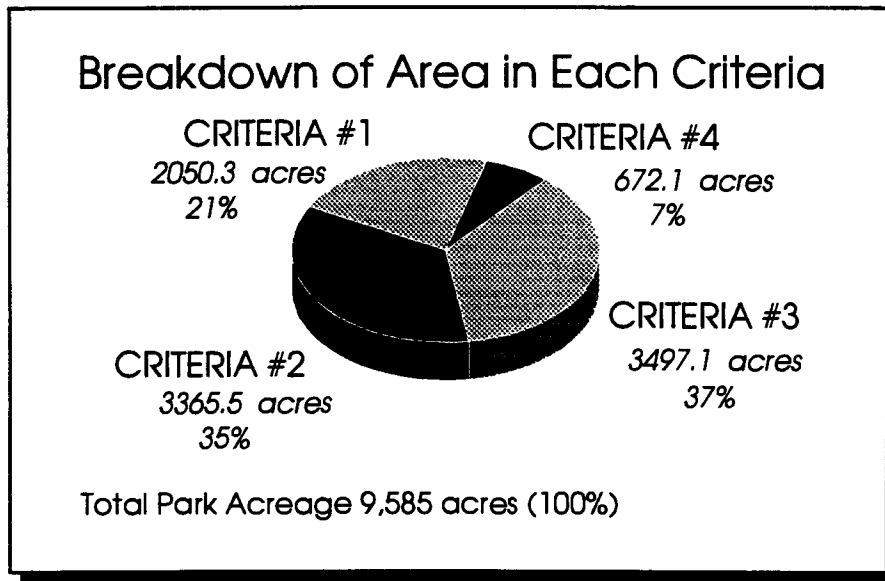


Figure 5

## **MANAGEMENT GUIDELINES FOR CRITERIA 1 LANDS:**

### **Natural Disturbance Contingency:**

In the awareness that natural disturbances will occur and that some disturbances may be large and catastrophic the following guidelines will be observed;

\* **Fire** - Wildfires must be extinguished per RSA 224:11. Controlled burning will be implemented with the input of the state lands management team and the appropriate permits. Any prescribed burning should be used in the manner of replacing wild naturally occurring woodland fires.

\* **Salvage** - Timber salvage within Management Criteria 1 will require a recommendation from the Forest Protection Bureau, the Forest Management Bureau, and input from the State Lands Management Team. Recommendations for salvage will be based on an identified threat to adjacent, managed timberland, or to the public health and welfare.

**Recreation** (Subject to the discretion of the Commissioner of the Department of Resources and Economic Development and the Director of Parks & Recreation):

Recreation activities will be **non-motorized** (except on Spruce Pond Road) and **undeveloped** (no campgrounds, day use areas etc.). New trails may be developed but should not interfere with natural values. Motorized management activities (maintenance, access, etc.) will be minimal, and allowed only when absolutely necessary.

### **Habitats:**

The habitat goals for lands under Criteria 1 will be for those plants, animals and natural communities occurring in later seral stages and/or requiring natural disturbance regimes. **Rare elements** will be managed for regardless of their successional tendencies.



## **MANAGEMENT GUIDELINES FOR CRITERIA 2:**

### **Silvicultural Options:**

- \* **Single Tree Selection**
- \* **Group and Patch Selection Cutting** - Openings up to 2 acres in size are allowed.
- \* **Intermediate Cutting**
- \* **No Cutting** will be an acceptable prescription if applicable due to site.

### **Fire:**

- \* **Prescribed burning** will be permitted with the support of the State Lands Management Team and appropriate permits.

### **Salvage:**

- \* **Timber salvage** will be permitted with State Lands Management Team input and appropriate departmental reviews.

### **Recreation** (Subject to the discretion of the Commissioner of the Department of Resources and Economic Development and the Director of Parks & Recreation):

- \* **Motorized recreation** will be permitted in designated areas during appropriate times.
- \* **Developed recreation** areas may be established with appropriate departmental review, including input from the State Lands Management Team.
- \* **Vista cutting** may be implemented at selected sites in conjunction with silvicultural activities.
- \* **Trails** - Reduced slash zones will be established when management operations are conducted within sight of trails. Hazard trees will be evaluated and removed as a part of management operations. Opportunities for new trails and trail relocations will be explored in conjunction with vegetative management operations.

## **Habitats:**

\* **New Hampshire Natural Heritage Inventory Elements** - Areas containing or in the vicinity of rare and endangered plants, animals or exemplary natural communities will be managed in conjunction with the appropriate agencies.

\* **Habitat goals** for lands under Management Criteria 2 are for plants, animals and natural communities positively impacted by uneven-aged systems, including small openings which favor a range of successional tendencies, from tolerant to intolerant.

\* **Unique Habitats** - The Park contains certain unique habitats which are not easily addressed at the landscape level. Such habitats will be considered on a project level. They include:

### **1. Wetlands**

**Managed Waterfowl Areas** - The NH Fish & Game Department is responsible for maintenance and management of Hayes Marsh. Goals are to maintain the marsh at full pool and maximize nesting and brood bearing habitat for waterfowl. Habitat is periodically evaluated and if necessary water levels are manipulated as a means of habitat improvement. Use and success rates for duck nesting boxes on the marsh are two of the guides used to determine if habitat evaluation is necessary. A number of duck nesting boxes are located at other, uncontrolled wetlands which receive significant waterfowl use (currently at Beaver Pond). Maintenance of these boxes is based on their usage as evaluated yearly by Fish & Game. Management of the uplands surrounding Hayes Marsh will consider waterfowl habitat needs which can be met within the context of the other Management Guidelines for Criteria 2.

**Other Wetlands** - Any activities in or around wetlands will be in accordance with the mandates of the NH Wetlands Board. Management of the surrounding uplands will consider both the impact on the wetlands themselves and those species which rely on wetland habitats.

**2. Deer Yards** - Known, or suspected deer wintering areas will be evaluated, with the assistance of the NH Fish & Game Department. Where necessary uneven-aged management practices will be employed to enhance this critical habitat. (See Wildlife Habitat Management Guidelines.)

**3. Openings** - Large grassy openings (such as Little Haye's Field) and brushy openings which presently exist will be maintained. No concerted effort will be made to establish new permanent openings on lands under Criteria 2.

**4. Aspen** - An aspen component will be promoted where possible using the uneven-aged silvicultural techniques allowed within Criteria 2.

## **5. Within Stand Features:**

**Old Orchards** - (See Wildlife Habitat Management Guidelines.)

**Cavity Trees & Snags** - Whenever possible, trees with existing cavities (which can be used by wildlife) and snags within a project area will be retained. Special emphasis will be placed on stems over eighteen inches in diameter.

**Log Landings** - Landings will only be seeded if deemed necessary for erosion control. The natural process of succession will be allowed to run its course in order to provide a variety of vegetative opportunities over time.

**Vernal Pools** - (See Wildlife Habitat Management Guidelines.)

**Riparian Zones** - (See Wildlife Habitat Management Guidelines.) Management may be modified on the basis of specific habitat needs, commensurate with all other Management Guidelines for Criteria 2.

**Bear Trees** - (See Wildlife Habitat Management Guidelines.)

### **MANAGEMENT GUIDELINES FOR CRITERIA 3:**

Management of these lands will emphasize **even-aged silviculture**.

#### **Silvicultural Options:**

- \* **Single Tree Selection**
- \* **Group and Patch Selection Cutting** - Openings up to 2 acres in size.
- \* **Even-Aged Management** - Even-aged openings up to 30 acres.
- \* **Intermediate Cutting**
- \* **No Cutting** will be an acceptable prescription if applicable due to site.

#### **Fire:**

- \* **Prescribed burning** will be permitted with the input of the State Lands Management Team and appropriate permits.

#### **Salvage:**

- \* **Timber Salvage** will be permitted at the discretion of the Forest Management Bureau; with State Lands Management Team input and appropriate departmental reviews.

**Recreation** (Subject to the discretion of the Commissioner of the Department of Resources & Economic Development and the Director of the Division of Parks & Recreation):

- \* **Motorized recreation** will be permitted in designated areas during appropriate times.
- \* **Developed recreation** areas will be established with the input of the State Lands Management Team.
- \* **Vista cutting** will be implemented at selected sites in conjunction with silvicultural activities.
- \* **Trails** - Reduced slash zone will be established when management operations are conducted within sight of trails. Hazard trees will be evaluated and removed as a part of management operations. Opportunities for new trails and trail relocations will be explored in conjunction with vegetative management operations.

## **Habitats:**

\* **New Hampshire Natural Heritage Inventory Elements** - Areas containing rare and endangered plants, animals or natural communities will be managed in conjunction with the appropriate agencies.

\* **Habitat goals** are for those plants, animals and natural communities positively impacted by even-age systems. These systems provide for a range of successional tendencies, but favor intolerant to intermediate species.

\* **Unique Habitats:** The Park contains certain unique habitats which are not easily addressed at the landscape level. Such habitats will be considered on a project level. They include:

### **1. Wetlands**

**Managed Waterfowl Areas** - The NH Fish & Game Department is responsible for maintenance and management of Hall Mountain Marsh. Goals are to maintain the marsh at full pool and maximize nesting and brood bearing habitat for waterfowl. Habitat is periodically evaluated and if necessary water levels are manipulated as a means of habitat improvement. Use and success rates for duck nesting boxes on the marsh is one of the guides used to determine if habitat evaluation is necessary. Duck nesting boxes may be located at other, uncontrolled wetlands which receive significant waterfowl use (none currently in Criteria 3). Maintenance of these boxes is determined on yearly basis by Fish & Game. Management of the uplands surrounding Hall Mountain Marsh will consider waterfowl habitat needs which can be met within the context of the other Management Guidelines for Criteria 3.

**Other Wetlands** - Any activities in or around wetlands will be in accordance with the mandates of the NH Wetlands Board. Management of the surrounding uplands will consider both the impact on the wetlands themselves and those species which rely on wetland habitats.

**2. Openings** - Large openings which presently exist will be maintained. Currently existing openings range from an agricultural lease, to a powerline right of way, to grass to dense brush. They make up a little over 2% of the acreage falling under Criteria 3. Ideally around 3% of the area should be in openings, with more of the openings within hardwood areas than softwood and, where possible, associated with aspen and birch. Since more species which need openings are associated with early successional species, efforts to create additional openings are more crucial in Criteria 3. The minimum size for new openings should be one acre, with three acres preferred.

**3. Deer Yards** - Known, or suspected deer wintering areas will be evaluated on a case by case basis, with the assistance of the NH Fish & Game Department. Where necessary uneven-aged management practices will be employed to enhance this critical habitat. (See Wildlife Habitat Management Guidelines.)

**4. Aspen** - Aspen will be promoted where possible using silvicultural techniques allowed within Criteria 3.

**5. Within Stand Features:**

**Old Orchards** - (See Wildlife Habitat Management Guidelines.)

**Cavity Trees** - In areas of uneven-aged management, and during intermediate treatments usable cavity trees will be retained wherever possible. In larger clearcuts (ten acres and up) one large (eighteen inches or larger) cavity tree within a small uncut area will be retained for each ten acres cut.

**Snags** - Except where safety concerns make it necessary to drop them, standing dead trees will be retained.

**Log Landings** - Landings will be seeded.

**Vernal Pools** - (See Wildlife Habitat Management Guidelines.)

**Riparian Zones** - (See Wildlife Habitat Management Guidelines.) Management may be modified on the basis of specific habitat needs, commensurate with all other Management Guidelines for Criteria 3.

**Bear Trees** - (See Wildlife Habitat Management Guidelines.)

## **MANAGEMENT GUIDELINES FOR CRITERIA 4:**

Management of these lands will emphasize **uneven-aged silviculture**

### **Silvicultural Options:**

- \* **Single Tree Selection**
- \* **Group Selection** - Group openings up to 1/4 acre in size.
- \* **Even-aged Management** - May be applied under particular conditions.
- \* **Intermediate Cutting**
- \* **No Cutting** will be an acceptable prescription if applicable due to site.

### **Fire:**

- \* **Prescribed burning** will be permitted with the input of the State Lands Management Team and appropriate permits.

### **Hazard Trees:**

- \* **Hazard Trees** will be identified and rated by the Division of Parks for their degree of risk. High risk trees that are identified will be removed as part of ongoing Park maintenance. Where possible hazard trees will be removed as a part of a commercial timber operation.

### **Recreation Sites:**

- \* **Campground** - Vegetative management goals include: creating a diversity of age groups to insure consistent forest cover; maintaining healthy stands of trees free of hazard trees, and maintaining a visual and sound buffer between campsites with low vegetation. This buffer is a high priority and may need to be augmented by periodic planting.
- \* **Day Use Areas** - Vegetative management goals include: creating a diversity of age groups to insure consistent forest cover; and maintaining healthy stands of trees free of hazard trees.

### **SECTION III OPPORTUNITIES, RECOMMENDATIONS & GUIDELINES**

#### **RECREATION AND CULTURAL MANAGEMENT:**

Bear Brook State Park has been a public recreation site for over fifty years. Much of the Park's rich cultural history is related to this recreation tradition, beginning with the construction of the developed recreational facilities by the Civilian Conservation Corps.

#### **Trails:**

##### **Inventory/Assessment**

Bear Brook State Park is endowed with a good network of single and multiple use trails. The existing trail system consists of: old woods roads, recreational trails built by the Civilian Conservation Corps, and other trails built more recently by the volunteer efforts of user groups. The current designated uses of recognized trails in the Park are compatible with this plan's Criteria Guidelines.

Although no hard numbers are available, observation indicates that trail use is heavier in the winter than in the summer. Snowmobiles and ATVs use designated trails in winter, while there is presently no permitted motorized recreational trail use in the summer. Additional winter trail use includes cross country skiing and dog sledding. The major summer trail use is for hiking, however, a continuing increase in equestrian and mountain bike use has been noted. Mountain bikes and equestrians are presently allowed on all Park trails, unless the trail is specifically closed to that use.

There are two designated trailhead parking areas specifically for the Park's trail system. A large parking lot off the Deerfield Road, near the day-use area, is designated for snowmobilers in the winter. The lot is kept plowed for this purpose. This parking lot is available in the summer for special use. The cross-country ski parking lot is located off the Podunk Road. It is designated for non-motorized users in the winter and general trail use in the summer.

Trails at Bear Brook are marked in a variety of ways, including blazes and wooden markers. Major trail junctions are numbered, and these numbers correspond to locations on trail maps



available to the public. Various factors contribute to making the trail system less than "user friendly" to the casual user. These include: the lack of trail signage; the dependance upon the maps to make sense of numbered intersections; unsigned and un-numbered intersections; inconsistent trail marking; and unavailable, inaccurate or incomplete trail maps.

The condition of trails varies through the Park, but many trails are in need of basic maintenance. Reduced maintenance budgets in the 1980's resulted in most work being done by volunteers on a somewhat hit or miss basis. Wheeled vehicle use, most of it illegal, has resulted in extensive treadway damage in some locations. This damage often compounded by poor trail location and lack of proper wetland crossings.

However, notwithstanding these problems, the Bear Brook trail system is basically a good one. The trails are well distributed in the Park, and they access a variety of interesting natural features. Further, they provide for a wide variety of recreational opportunities year round. The Park is part of a snowmobile trail corridor system, and is well situated for development of a greenway from Pawtuckaway State Park to Northwood Meadows State Park.

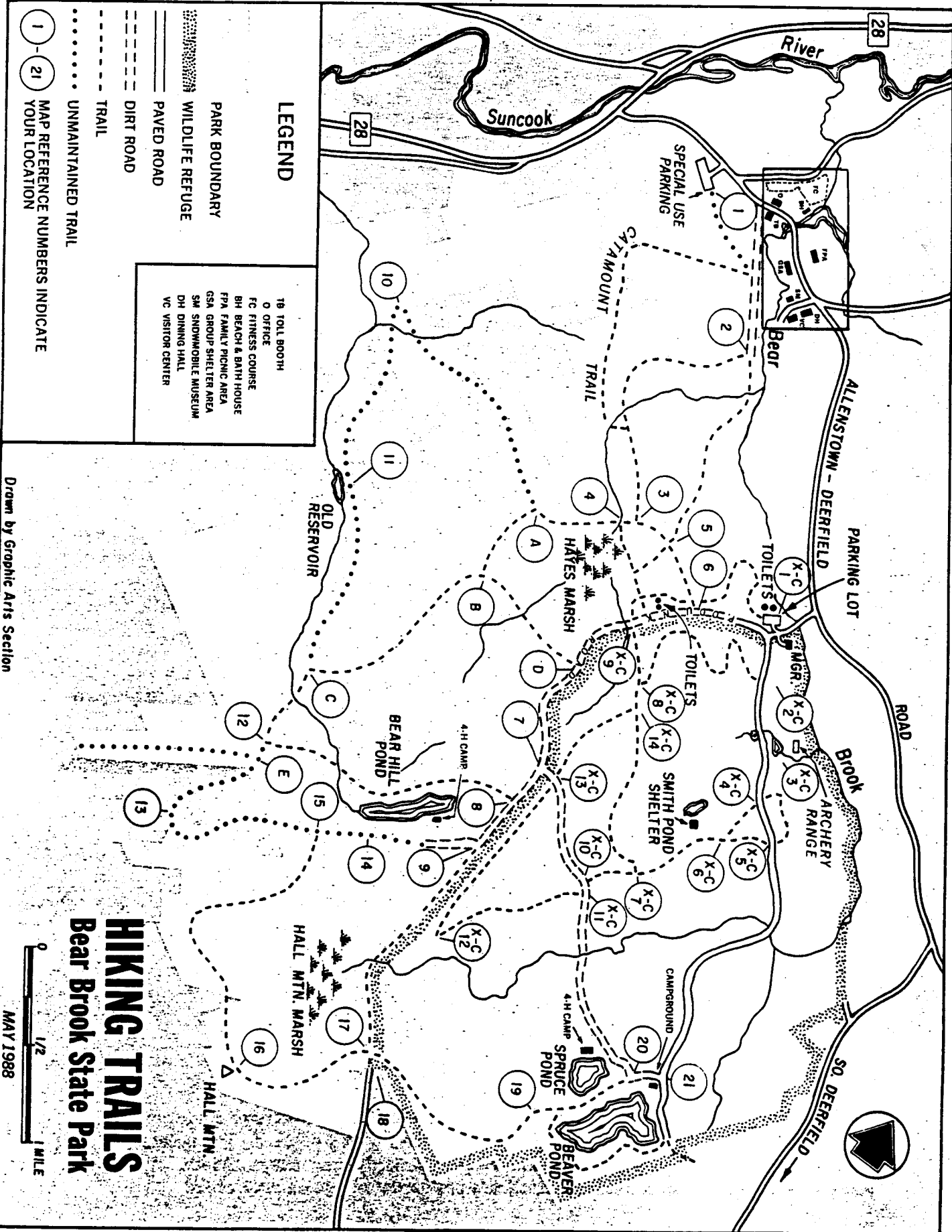
### **Maps**

The following maps are included in this plan:

1. The current recreational trail maps for Bear Brook.
2. The historic perspective: "Roads and Trails Plan" from the Bear Brook Recreational Demonstrations Project, 1939.

### **Recommendations/Needs**

1. Update existing maps for public distribution.
2. Assess the entire trail system in the context of whether it is, a.) meeting the recreational needs of the trail users, b.) meeting general park goals, and c.) compatible with natural resource stewardship.
3. Assess routes most appropriate for mountain bike and equestrian use. It may be desirable to have this information on maps for distribution.
4. Name trails, using old CCC trail names where possible. Rout signs to mark the trails.
5. Implement uniform trail marking, and adequately mark existing trails.
6. Develop trailheads, with trailhead maps and information boards at parking lots.
7. Assess the need for specific gates to control illegal motorized trail use and dumping.



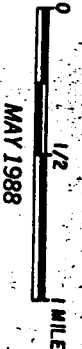
**LEGEND**

- PARK BOUNDARY
- ..... WILDLIFE REFUGE
- ==== PAVED ROAD
- - - - DIRT ROAD
- ..... TRAIL
- ..... UNMAINTAINED TRAIL
- MAP REFERENCE NUMBERS INDICATE YOUR LOCATION

- 18 TOLL BOOTH
- O OFFICE
- FC FITNESS COURSE
- BH BEACH & BATH HOUSE
- FPA FAMILY PICNIC AREA
- SM SNOWMOBILE MUSEUM
- DH DINING HALL
- VC VISITOR CENTER

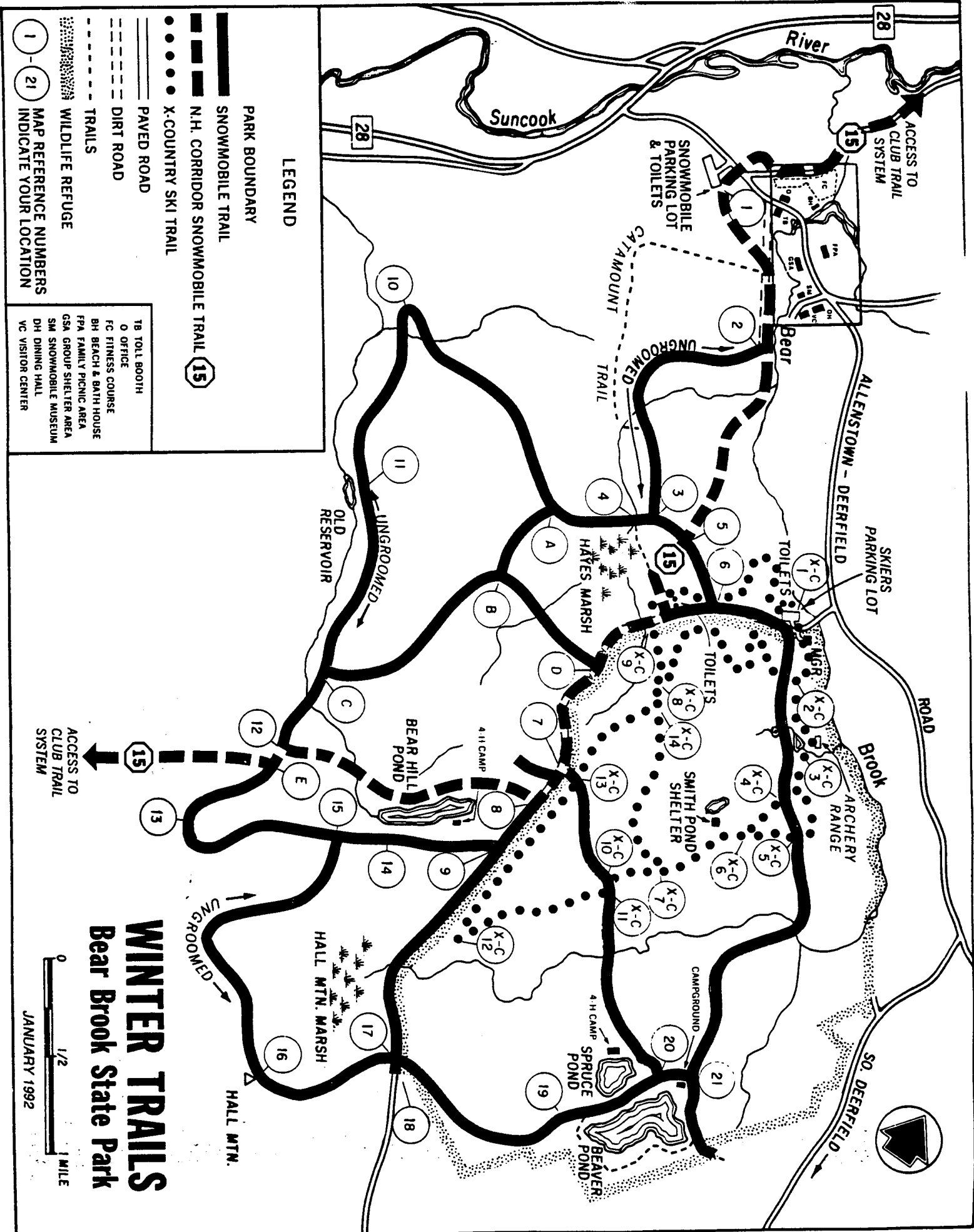
**HIKING TRAILS**  
Bear Brook State Park

Drawn by Graphic Arts Section



MAY 1988





**LEGEND**

- PARK BOUNDARY
- SNOWMOBILE TRAIL
- N.H. CORRIDOR SNOWMOBILE TRAIL 15
- X-COUNTRY SKI TRAIL
- PAVED ROAD
- DIRT ROAD
- TRAILS
- WILDLIFE REFUGE
- MAP REFERENCE NUMBERS
- INDICATE YOUR LOCATION

- TB TOLL BOOTH
- O OFFICE
- FC FITNESS COURSE
- BH BEACH & BATH HOUSE
- FPA FAMILY PICNIC AREA
- GSA GROUP SHELTER AREA
- SM SNOWMOBILE MUSEUM
- DH DINING HALL
- VC VISITOR CENTER

**WINTER TRAILS**  
**Bear Brook State Park**



JANUARY 1992



8. Move cross country ski trails out of the archery course.
9. Establish a trail maintenance program. All trail maintenance in the Park will be conducted under the guidelines of the "Best Management Practices for Erosion Control for Trail Maintenance and Construction".
10. Determine the status of landowner permission, relevant to Bear Brook trails, such as the section of the Catamount Trail on private land.
11. Organize and support volunteer groups to work on trail maintenance.

### **Campground:**

#### **Inventory/Assessment**

The Bear Brook State Park campground, located just north of Beaver Pond, contains 93 campsites. Public access to the campground is from the Campground Road, a three mile tar road which branches off the Podunk Road. There are two bath houses with toilets (but no showers) in the campground, one is not accessible to people with disabilities, and one is partially accessible. A new (fully accessible) toilet and shower building built in 1994, makes showers available in the campground for the first time. Another building at the campground houses the store and office. Additional amenities include a small beach on Beaver Pond, boat and canoe rentals, and a small ball field.

Campsites in the campground contain on-site vehicle parking, a picnic table, and a fireplace grill. The campsites have no electrical, water, or septic hookups. Water is available at a number of outlets situated through the campground. A septic dumping station for RVs (motor homes) is located near the entrance of the campground.

Most of the campground occurs within an even-aged, single canopy softwood stand (Compartment 1, Stand 7 and Compartment 3, Stand 13). There is little in the way of young trees or brush to provide visual and sound screening between sites. This condition is a result of the prolonged camping activity and an historical lack of vegetative management in the campground. A timber harvest conducted in the spring of 1991 (Project P1-326) treated about 60% of the campground. This project was a significant step towards creating an uneven-aged forest structure within the campground, and reversed a long-standing, informal policy of no timber harvesting within the developed recreation areas. The timber harvest in the campground was followed up with tree planting and a public education effort.

Visitation to the campground has remained relatively constant in recent years, with the levels of use strongly related to the weather. With the exception of certain busy weekends, the campground is usually not at capacity. The addition of showers should lead to an increase in use.

## **Recommendations/Needs**

1. Continue to actively manage the forest stands within the campground in order to create an uneven-aged forest structure with understory vegetation.
  - a. Schedule a timber harvest on that portion of the campground not treated during the 1991 campground timber sale.
2. Consider periodically taking some campsites out of use in order to encourage understory regeneration and allow the sites to recover from the impacts of use. Additional campsites could be developed to prevent a loss in camping opportunity. Although present demand does not indicate a pressing need for campground expansion, terrain and existing facilities would allow for a modest expansion.
3. Connect the campground, through a trail, to the cross-country ski trail system, to create trail opportunities easily accessible from the campground.

## **Day-use Recreation Area:**

### **Inventory/Assessment**

This area includes the beach, bath house, the picnic shelters and the two picnic areas on either side of the Deerfield Road, adjacent to Catmount Pond. A service charge is collected for public use in this area from a toll booth located on the south side the Deerfield Road on the westerly approach to the area. Relocation of the toll booth (in 1994) will place it further out of the traveled road. A small park office building is located opposite the toll booth on the north side of the road.

This developed recreation area offers a variety of recreation opportunities. Swimming and picnicking are predominant uses, but Catamount Pond is well-stocked with trout, and fishing (allowed on the south side of the road) is popular. The parking for the beach area also serves as a trailhead for the Catamount Trail. The picnic shelters are used for group-use outings, and are popular for that purpose. Visitation has, however, declined over the years for these day-use facilities. There were approximately 50,000 visitors in 1984, contrasted with approximately 26,000 visitors in 1993. There are a number of explanations for this trend: a decrease in the public's leisure time; an increase in recreation choices; changes in public recreation preferences; and to some degree, intrinsic design problems with the area.

The major problem with this area, previously referenced in the "Management Focus" section of the plan, is the presence of the Deerfield Road. This quote, from a 1984 park report<sup>2</sup>, is

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<sup>2</sup> "PARKS 1985: A Report on the Condition and Trend of New Hampshire State Park Properties"

illustrative: "The #1 need at this heavily-used park is the same one which the Division has faced since the year the Park first opened--relocation of the Allenstown-Deerfield Road to remove this adverse environmental impact and potentially-hazardous intrusion upon the Park's otherwise enjoyable Day-Outing Area." The road makes management control of the area difficult, detracts from the park experience, and is a safety concern.

### **Recommendations/Needs**

1. A relocation of the Deerfield Road away from the day-use area but on park property is possible. Funding and political support for this long-term solution should be sought.
2. Redesign of the existing approach to the day-use area is also possible, and probably more immediately feasible. Alternatives for redesign might involve building a short spur road, parallel to the Deerfield Road, in order to create a distinct entrance. In conjunction with such a design, pedestrian underpasses should be considered. Further study is needed to determine whether the short-term approach (recommendation #2) or the long-term approach (recommendation #1) is most appropriate, although the two proposed solutions are not necessarily mutually exclusive.
3. The Catamount Trail should be more clearly marked, and a crosswalk across the Deerfield Road should be designated for the trail.

### **The Camps:**

#### **Inventory/Assessment**

There are two separate recreation camps within Bear Brook State Park, the Bear Hill Camp and the Spruce Pond Camp. Both camps were built by the CCC. Each camp contains fifty-one buildings and is divided into four units, each unit containing eight residential cabins, a toilet building, and a lodge. Each camp also contains a centrally located building with dining facilities, as well as other miscellaneous buildings and a small playing field. There is an Adirondack style overnight shelter located near Smith Pond, in Compartment 3, that is utilized by the camps for overnight programs. The camps are operated by the University of New Hampshire Cooperative Extension 4-H and Youth Development Program through a lease with the Park. The 4-H utilize the camps for day use and overnight educational programs.

The Bear Hill Camp is located a short distance off the Podunk Road, in Compartment 10 toward the southern end of the Park. Bear Hill Camp has a potential overnight capacity of approximately 200 people. The present level of use is approximately 140 people. The camp is situated on a small rise overlooking Bear Hill Pond. The Spruce Pond Camp is located just north of the Bear Brook campground. It also has an overnight capacity of approximately 200 people, with present use approximately 50 people.

The buildings and grounds of the camps are in fair shape considering their age, but both camps have a lot of maintenance needs. They both have old water systems requiring extensive maintenance, and may need replacing to meet Federal clean drinking water standards. Repeated Gypsy Moth infestation in the hardwood forest surrounding Bear Hill Camp has resulted in higher than normal percentage of tree mortality, thus increasing the hazard tree maintenance requirements.

### **Recommendations/Needs**

The present use of the camps by the 4-H does not conflict with the operations of Bear Brook State Park, and is an appropriate use for these facilities. The 4-H program, working cooperatively with the Division of Parks and Recreation staff, has helped preserve these camps which are an important historical recreation resource.

1. The Division of Parks and Recreation should consider managing one or both of the camps for overnight recreation lodging, conference facilities, and educational programming. This should not be done at the expense of the 4-H programs, and any change in the present use of the camps should be accomplished with their cooperation. Several factors contribute to this recommendation, among them: the present level of 4-H programming at the camps might be accomplished at a single camp, and the Cooperative Extension 4-H Youth Development Program is considering an alternate youth camp site in the state. Additionally the physical plant of both camps will require substantial capital investment to meet maintenance needs in the near future.
2. Commercial forest harvest operations in the vicinity of either camp should, whenever possible, include the removal of hazard trees.
3. Use and maintenance of the overnight shelter at Smith Pond in Criteria #1 (Compartment 3) should, to the extent possible, be non-motorized.
- 4) The snowmobile trail that presently passes through the Bear Hill Camp should be rerouted around the camp, preferably by integrating this trail relocation with a timber harvest operation.

### **The Depot:**

#### **Inventory/Assessment**

The complex of twenty-one buildings built by the Civilian Conservation Corps off the Deerfield Road is known as the "Depot". These buildings received National Historic Landmark status in 1992. Over the years these buildings have served a variety of purposes. Presently two of the buildings house three museums: the New Hampshire Antique Snowmobile Museum; the Museum of Family Camping; and the Civilian Conservation Corps (CCC) Museum. The Bear Brook Nature Center occupies the original CCC headquarters building.

In existence since the 1950s, the Nature/Visitor Center features natural history exhibits and interpretive programs.

Public use is restricted to a small portion of the Depot. The department maintenance facilities and warehouse contribute to a relatively high level of vehicular traffic and other activity at the Depot.

#### **Recommendations/Needs**

1. Continue to expand the public use of this area for those public uses that compliment the identity of the entire property as a state park. Any use of the Depot, in part or whole, should protect the historical integrity of the buildings and grounds.

a. An expansion of the museum functions is desirable. A natural history and forestry museum, replacing the existing Nature/Visitor Center, would be an asset to the Park.

b. Utilize an existing building for use as a day-use function hall, available public use. This function was previously available in the Depot, and fills a public need.

2. Use of buildings for maintenance and administration is consistent with the original purpose of the Depot.

3. Develop appropriate signs to identify the CCC buildings in the Depot and their original functions.

4. There is a need to reduce the amount of travel and the number of vehicles in this area; further there is a need to improve traffic flow and safety.

#### **The Allenstown Meeting House:**

The old Allenstown Meeting House, located in Bear Brook State Park, was originally built in 1807 to accommodate the members of a Christian society called The Church of Christ. Construction of the one-story frame building began in 1807 by the church members. The town of Allenstown offered to complete the construction of and maintain the church with the agreement that the building would also be used as a town hall and a meeting house. In addition to decades of worship ceremonies and church activities, town meetings were held at the site for 60 years.

In 1901 the town transferred its rights to the building to the Daughters of the American Revolution - Buntin Chapter, with the agreement that the D.A.R. restore it to its original condition. From 1909 to 1985 the Buntin Chapter maintained the building.



On July 15, 1985 much of the building was destroyed by fire and then closed to the public. In 1991 the building was turned over to the state of New Hampshire, Division of Parks and Recreation and in 1992 was stabilized and restored. The NH Division of Parks and Recreation, in cooperation with the D.A.R. Buntin Chapter and a group of dedicated volunteers reopened the meeting house to the public in 1993. Future plans for the meeting house include having the building staffed completely by volunteers and opened daily to public, in season, for guided tours, exhibits, special events and lectures. The meeting house will also serve as an integral part of the Bear Brook State Park Museum Complex.

#### **Park Threats:**

This is an area of increasing concern in park management. Park threats in this context generally refer to threats to the environmental quality within the Park, although they may also refer to those factors that threaten a visitor's park experience.

#### **Inventory/Assessment**

**Development encroachment** is a common threat to park environments, and this is particularly true of Bear Brook. Parks and protected lands are desirable places to live near, and a number of housing developments and individual homes have been built immediately adjacent to the Park boundaries. The relatively high number of abutters to the park increases the likelihood of property line encroachment, non-source pollution, wildlife disruption, and other impacts of human activity. This is compounded by the irregular configuration of the Park's ownership.

**Illegal dumping** is another problem encountered at the Park. Construction and household trash is commonly dumped illegally off the Black Hall Marsh Road and the Podunk Road. In addition to the illegal dumping, the Park brush dump was historically used for a variety of trash materials. This practice was stopped and the dump was covered and graded a number of years ago. There may be other historical, undocumented dumps on the property.

**Illegal motorized use** on the Parks trail system has been a problem over the years. The result is trail erosion, wetland degradation, and undesirable activities (fire, litter, etc.) in remote parts of the Park.

**Forest health** is a concern in Bear Brook State Park. Foresters working on the property have noted a decline in overall vigor particularly apparent in Eastern white pine. Many of the pine stands in the Park show poor needle color and density. While there are a number of possible explanations for this phenomenon, air pollution is a prime suspect.

#### **Needs/Recommendations**

1. Work closely with surrounding communities to protect park values in local regulations.

**REGENERATION GUIDELINES:**

The following table shows the breakdown of acreage at Bear Brook, by compartment and Management Criteria. For each breakdown it indicates the silvicultural system or systems allowed, the minimum and maximum rotation lengths, the proportion of the area which could be regenerated using these rotations and the maximum acreage to be regenerated in any ten year period. Exact rotation lengths and cutting cycles will be determined at the project level.

Compartment	Criteria	Regeneration Guidelines
<p style="text-align: center;"><b>1</b> 626.5 acres</p>	<p style="text-align: center;"><b>2</b> 534 acres ----- <b>4</b> 92.5 acres</p>	<p style="text-align: center;"><b>Uneven-aged management. Rotation 80-140 years. Regenerate 7-12% within a ten year period, not to exceed 67 acres.</b> -----</p>
<p style="text-align: center;"><b>2</b> 1009 acres</p>	<p style="text-align: center;"><b>1</b> 190.5 acres ----- <b>2</b> 770 acres ----- <b>4</b> 48.5 acres</p>	<p style="text-align: center;">----- <b>Uneven-aged management. Rotation 80-140 years. Regenerate 8-12.5% within a ten year period, not to exceed 96 acres.</b> -----</p>
<p style="text-align: center;"><b>3</b> 1239 acres</p>	<p style="text-align: center;"><b>1</b> 1186.5 acres ----- <b>4</b> 52.5 acres</p>	<p style="text-align: center;">-----</p>
<p style="text-align: center;"><b>4</b> 861.5 acres</p>	<p style="text-align: center;"><b>3</b> 849 acres ----- <b>4</b> 12.5 acres</p>	<p style="text-align: center;"><b>Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 7-16.5% within a ten year period, not to exceed 141 acres.</b> -----</p>

2. Work with local and state law enforcement to discourage illegal dumping, and encourage local awareness of the problem.
3. Initiate or encourage the study of the apparent forest decline in the Park.
4. Institute a park watch program with the Friends of Bear Brook.

Compartment	Criteria	Regeneration Guidelines
<p style="text-align: center;"><b>5</b> 1245 acres</p>	<p style="text-align: center;">1 39.8 acres ----- 2 654.1 acres ----- 3 545.6 acres ----- 4 5.5 acres</p>	<p style="text-align: center;">----- Uneven-aged management. Rotation 80-140 years. Regenerate 8-12% within a ten year period, not to exceed 75 acres. ----- Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 8-16.5% within a ten year period, not to exceed 91 acres. -----</p>
<p style="text-align: center;"><b>6</b> 1404 acres</p>	<p style="text-align: center;">2 705.8 acres ----- 3 534.9 acres ----- 4 163.3 acres</p>	<p style="text-align: center;">----- Uneven-aged management. Rotation 80-140 years. Regenerate 8-12.5% within a ten year period, not to exceed 88 acres. ----- Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 8-16.5% within a ten year period, not to exceed 89 acres. -----</p>
<p style="text-align: center;"><b>7</b> 664 acres</p>	<p style="text-align: center;">3 479.2 acres ----- 4 184.8 acres</p>	<p style="text-align: center;">----- Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 8-16.5% within a ten year period, not to exceed 80 acres. -----</p>
<p style="text-align: center;"><b>8</b> 543.5 acres</p>	<p style="text-align: center;">2 503 acres ----- 4 40.5 acres</p>	<p style="text-align: center;">----- Uneven-aged management. Rotation 80-140 years. Regenerate 8-12.5% within a ten year period, not to exceed 63 acres. -----</p>
<p style="text-align: center;"><b>9</b> 602 acres</p>	<p style="text-align: center;">3 602 acres</p>	<p style="text-align: center;">----- Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 8-16.5% within a ten year period, not to exceed 100 acres. -----</p>

Compartment	Criteria	Regeneration Guidelines
<p style="text-align: center;"><b>10</b> 887.5 acres</p>	<p style="text-align: center;"><b>1</b> 633.5 acres ----- <b>2</b> 182 acres ----- <b>4</b> 72 acres</p>	<p style="text-align: center;">----- Uneven-aged management. Rotation 80-140 years. Regenerate 8-12.5% within a ten year period, not to exceed 19 acres. -----</p>
<p style="text-align: center;"><b>11</b> 503 acres</p>	<p style="text-align: center;"><b>2</b> 16.6 acres ----- <b>3</b> 486.4 acres</p>	<p style="text-align: center;">Uneven-aged management. Rotation 80-140 years. Regenerate 8-12.5% within a ten year period, not to exceed 63 acres. ----- Even-aged and Uneven-aged management. Rotation 60-140 years. Regenerate 8-16.5% within a ten year period, not to exceed 81 acres.</p>

## **WILDLIFE HABITAT MANAGEMENT GUIDELINES:**

### **General Vegetative Management Considerations:**

Vegetative goals will recognize that **wildlife species richness requires a balance of vegetative types and age classes varying from regeneration to old forest stands distributed in time and space across the landscape.** The ability to meet these goals are dependant upon site capabilities, management constraints, silvicultural opportunities and present conditions.

Horizontal diversity (between-stand variations) needs will be considered in establishing composition and age structure goals, and in the planning of both even-aged and uneven-aged management operations.

### **Threatened and Endangered Wildlife Species:**

All management activities will **avoid disturbance of, conflicts with, and deterioration or loss of habitat of threatened and endangered wildlife species.**

If threatened or endangered species are located, management actions necessary to protect or enhance their habitats will be determined and conducted.

### **Riparian Areas:**

Avoid stream crossings whenever possible. When necessary, minimize the number of crossings, adhere to guidelines and designs in the "best management practices" (BMP)<sup>3</sup> manual, and comply with all applicable state regulations.

On streams with **high value fisheries**, no crossings will be constructed from October through April to avoid egg loss due to sedimentation.

Trees with cavity holes or broken tops, standing dead trees and downed trees shall be retained whenever possible during management operations in riparian areas. Further, an effort will be made to maintain a component of "big trees" which will be held past full maturity in these locations.

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<sup>3</sup> From Resource Manual *"Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire"*, compiled by JB Cullen and others, 1990.

Whenever practical, operations in riparian areas shall be restricted to frozen ground or late-summer harvests to avoid peak reptile and amphibian breeding periods and minimize soil compaction.

#### **Vernal Pools:**

A vernal pool is a temporary pond containing water for 2 months or more, regardless of its size, location, or season of filling. Vernal pool habitat includes the pool and an area up to 200 ft wide surrounding the pool.

All vernal pools are considered significant unless determined not to be. Central to a determination of significance is the presence of obligate or facultative vernal pool species and the absence of fish.

Management activities should not disturb the pool, its edges or adjoining soils. Log landings, haul roads and main skid trails should not be located within the vernal pool habitat and the location of recreational trails immediately adjacent to vernal pools should be avoided. Tops and slash should not be intentionally felled into the pool. If tops do fall into the pool they should be left to avoid site disturbance.

Management is acceptable within the vernal pool habitat zone. However, the pool should remain shaded and cool. Minimal disturbance should occur within 50 ft of the pool edge.

Soil disturbance (rutting, compaction and exposure of mineral soil) should be avoided within the vernal pool habitat. Frozen ground operations are preferred.

#### **Deer Wintering Areas:**

Examine softwood stands for evidence of winter use by deer, such as: tracks, established trails, winter pellet groups, bark scarring, and excessive browsing of hardwoods in and around softwood stands. Design management in deer wintering areas, and adjoining stands, to maintain functional shelter, encourage softwood regeneration, and provide accessible browse.

Functional shelter in deer wintering areas is softwood cover at least 35 feet tall with at least 70% crown closure. Operations should maintain at least 50% of the area in functional shelter at all times, through a system of area regulation. Frequent entries regenerating smaller acreage is preferred as a way to reduce the area disturbed per entry and create a more sustainable supply of browse and overhead cover.

Utilize uneven-aged management by area regulation in softwood stands less than 200 acres in size. Group selection is recommended with openings remaining small, to favor softwood regeneration. Distribute openings uniformly throughout the treatment area. Treat no more than half the stand at each entry, unless it is too small for this to be practical. Openings created by natural mortality must be considered when determining the total area of allowable cuts.

Where possible, schedule bare ground logging for scarification to promote softwood regeneration.

Intermediate treatments promoting softwood crown development and discriminating against hardwoods in softwood stands are appropriate. At each entry, young sections of the stand not scheduled for group selection cutting should be evaluated for thinning.

Hardwoods within the treatment areas should be removed at each entry unless other wildlife values dictate they should remain. Hardwoods to retain include large beech, snags greater than 12" dbh; live and dead trees with nest cavities and den holes; and trees with raptor nests (large stick nests).

To ensure uninterrupted mobility through wintering area, travel corridors of dense softwood cover should be maintained during all operations. The appropriate width and character of travel lanes will vary by location, however, these should generally be at least 200 feet wide and located in areas of frequent wildlife use, such as along streams and slope breaks.

#### **Alder Community Type:**

Alder stands may require non-commercial treatment to maintain their vigor. They should be evaluated to determine the present condition of the alder and the degree of stand invasion by less desirable vegetation. If necessary, alder should be regenerated in narrow strips (50-75 ft wide) removing 20% of the stand at each entry. Cut additional strips at 4-5 year intervals with a rotation age of 20-25 years.

#### **Bear Trees:**

Beech trees that have been repeatedly climbed by bears should be retained during cutting operations. If less than 18" dbh, release their crowns from competition to promote mast production.



Stands with at least 20% of their basal area in American beech and showing extensive claw marks or broken branches from black bears should be managed to promote the development of large crowned beech trees and to increase the proportion of beech in the stand.

#### **Cavity Trees, Den Trees and Snags:**

To maintain self-sustaining populations of all snag and cavity dependent wildlife, retain the following during forest management operations unless they present a clear safety or fire hazard: live trees with excavated or natural cavities suitable for nests or dens, standing dead trees greater than 6" dbh and 15 feet tall, and live trees greater than 12" dbh with broken tops.

At a minimum, 6 cavity and/or snag trees per acre should be retained in all upland habitats, with at least one of these greater than 18" dbh and three greater than 12" dbh.

Cavity trees are particularly important in wetlands and riparian corridors. Trees flooded in beaver impoundments should not be harvested.

In all managed stands, retain a minimum of one live tree per acre greater than 18" dbh as a deferment tree to remain uncut through its natural life span and period of decay. Preferably, trees designated as deferment trees should have at least two major defects, such as cracks or large broken limbs.

#### **Dead and Down Trees:**

Dead and down trees are important within stand habitat elements, providing cover and foraging substrates for small mammals, reptiles and amphibians. While top-wood and slash has value, large logs are more important due to the greater substrate they provide and longer period of time they last.

Harvest operations can increase the abundance and improve the distribution of dead and down logs. In stands where downed logs are not available, mark at least one cull per acre to be felled and left. Encourage loggers to leave noncommercial sections of logs (which present no immediate threat of spreading disease to the residual stand) in the woods rather than piled at the landing.

**Raptor Nests:**

Field staff should watch for and note the location of large sticks nests. Hawks and owls frequently reuse nests or nest in the same stand over a period of many years.

No cutting should occur within 300 ft of active nests from mid-March through July. An uncut buffer of at least 60 feet should surround large stick nests, and clearcutting should not occur within 300 feet.

**Old Orchards:**

Existing apple trees will be released from competing vegetation. Maintenance will be handled per "Care of Wild Apple Trees" by David Olson and Clarence Langer.

## **SECTION IV MONITORING**

Monitoring for compliance with this plan will take a three phase approach. The ongoing phase of monitoring involves the review of all projects by the State Lands Management Team at the project planning level.

The second phase will consist of an overall review of projects done in the Park at five year intervals. This will take the shape of a report to the State Cooperative Land Management Committee.

The third phase will involve a major review of the plan itself at approximately twenty years, in conjunction with the next forest resource inventory. Issues could involve:

- \* Re-examination of goals for and demands placed on the Park.
- \* Ease of implementation.
- \* How well has it worked?
- \* Has it achieved effective coordinated management efforts and results?

At any phase of this process input from interested and effected groups, such as the Friends of Bear Brook, will be welcomed.

## **SECTION V SUMMARY**

This plan provides a mechanism to manage Bear Brook State Park in a manner that promotes the conservation of native biodiversity; the protection, utilization and development of multiple resource values and user interests; and allows for harmony between potentially conflicting uses.

The evolution of the plan itself has provided a process for bringing together the various disciplines responsible for the management of the Park. Often the vision of management from these disciplines can seem at odds; this process has shown that that appearance is usually deceiving, and frequently has been a by product of limited staffing and single project focus. This plan incorporates the cultural and natural resources of Bear Brook and, with luck, furnishes an approach which meshes their management.

The plan predetermines the levels of management/disturbance regimes that can be anticipated at any given location. This in and of itself simplifies long term planning and coordination for the various disciplines responsible for the management of a large property like Bear Brook. Further, since the plan looks at these levels of disturbance on a broad landscape basis, individual management actions at the project level can ultimately be more effective in working toward the desired future condition of the Park.

Each Management Criteria allows and guides a different level of disturbance. Together they will result in distinct, large areas, of differing vegetative composition, with similar successional tendencies within each Criteria. Over time, management will provide an array of vertical structure within each area. Across the Park the combination of these levels of management will enhance overall diversity.

Vegetative manipulation, however, is not the only aspect of management affected by the criteria system. Cultural management activities and goals were driving forces in the establishment of criteria boundaries. Management actions fall in line with and take advantage of the recreational opportunities afforded by each level of disturbance. Additionally, the plan recognizes cultural management issues, many of which are unique to Bear Brook, and presents potential short and long term resolutions. Ultimately, these combined with established long term natural resource management goals offer one more tool to be used in building a comprehensive vision for Bear Brook State Park.

## SECTION VI APPENDIX

### ADDITIONAL LAWS:

- \* RSA 212A - Endangered Species
- \* RSA 216-A:3-c - Development Plans for State Parks
- \* RSA 217A - Native Plant Protection
- \* RSA 219:1 - Purchase and Provision for Management
- \* RSA 219:4 - Protection: Improvement
- \* RSA 219:5 - Gifts of Land for Forestry Purposes
- \* RSA 219:9 - Forestry Demonstrations
- \* RSA 224:10-11 - Fire Fighting
- \* RSA 430:2 - Suppression of Pests

The protection of threatened or endangered wildlife is provided by RSA 212A, and threatened or endangered plants by RSA 217A. Provisions for management are made by authority of RSA 219:1 and 219:9. Cutting and removal of trees as part of a forest management program are provided for under RSA 219:4 and 219:5. RSA 224:10-11 direct forest fire wardens to extinguish all forest fires occurring in their towns and provide for the upkeep of woods roads and trails for the passage of men and equipment in case of forest fires. RSA 430:2 provides for the protection of forests from destructive insects and plant diseases. RSA 216-A:3-c addresses expansion and improvement of developed recreation areas.

### SILVICULTURAL DEFINITIONS:

**Even-aged Stand** - all trees are the same age or at least of the same age class; a stand is considered even-aged if the difference in age between the oldest and youngest trees does not exceed 20 percent of the length of the rotation. From an ecological viewpoint, the minimum size of an even-aged stand could be considered as the size of the largest opening entirely under the influence of adjacent mature timber. The opening of critical size might be that which, at the very center, exhibited the same temperature regime as any larger opening. Such an opening is probably about twice as wide as the height of the mature trees.

**Even-aged Management** - A timber management system that results in the creation of stands in which trees of essentially the same age grow together. Regeneration in a particular stand is

obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Cutting methods producing even-aged stands are: 1) clearcutting, 2) shelterwood, or 3) seed tree.

1) **Clearcutting method** - an even-aged cutting method that lays bare the area treated in one cutting which leads to the establishment of an even-aged high forest or stand. Reproduction of the new forest is secured after cutting either artificially or naturally. Modifications of the clearcutting method include: a) clearcutting in patches, and b) clearcutting in strips.

a) **Clearcutting in patches** - a modification of the clearcutting method where the area being treated is removed in a series of clearcuts made in patches. Often employed to regenerate even-aged stands which cannot be reproduced by natural seeding if all trees are removed in a single cutting. Minimum patch size could be considered as the size of the largest opening entirely under the influence of adjacent mature trees (see even-aged stand).

b) **Clearcutting in strips** - a modification of the clearcutting method where the area being treated is removed in a series of clearcuts made in strips. Trees on the uncut strips furnish all or part of the seed for stocking the cut strips, and protects the cutover area and new crop. The width of cut strips depends on the distance of effective seed dispersal, usually not exceeding 5 times tree height.

2) **Shelterwood method** - a even-aged cutting method that removes the mature timber in a series of cuttings, which extend over a relatively short portion of the rotation, by means of which the establishment of essentially even-aged reproduction under the partial shelter of seed trees is encouraged.

3) **Seed-tree method** - an even-aged cutting method that removes the mature timber in one cutting except for a small number of seed trees left singly or in small groups to serve as a seed source for the establishment of regeneration.

**Uneven-aged Stand** - a stand of trees that contains at least three well-defined age classes intermingled on the same area.

**Uneven-aged Management** - The application of a combination of actions needed to maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a

planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are: 1) single tree selection, 2) group selection, and 3) patch selection.

1) **Single-tree selection method** - removal of the mature timber, usually the oldest or largest trees, either as single scattered individuals or in exceedingly small groups at relatively short intervals, repeated indefinitely, by means of which the continuous establishment of reproduction is encouraged and an uneven-aged stand is maintained.

2) **Group selection method** - periodic removal of trees in small groups producing openings smaller than the minimum feasible acreage for a single stand under even-aged management (see Even-aged Stand) leading to the formation of an uneven-aged stand with a mosaic of small and variable sized age-class groups. Differing from single-tree selection in that the predominant characteristics of the *group* are evaluated for treatment rather than individual stems.

3) **Patch selection method** - removal of *all* trees down to a fixed limit (commonly 2 inches) on areas from a fraction of an acre up to the minimum feasible acreage for a single stand under even-aged management (see Even-aged Stand). Differing from group selection method in that all trees within the boundary are cut rather than a few adjacent, individually selected stems.

#### REFERENCES:

Askins, Robert A. 1992. Open Corridors in a Heavily Forested Landscape: Impact on Forest-Interior and Shrubland Birds. Unpublished Manuscript.

Bormann, F.H. and Likens, G.E. 1979. Pattern and Process in a Forested Ecosystem. Springer Verlag Publishers New York 253 pp.

Chapman, Donald H. 1974. "New Hampshire's Landscape-How It Was Formed". In: New Hampshire Profiles Magazine January 1974.

Cullen, J.B. (Editor). 1990. Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire. State of New Hampshire, Department of Resources and Economic Development, Division of Forests and Lands, Information and Planning Bureau.

DeGraaf, Richard M. "Breeding Bird Assemblages in Managed Northern Hardwood Forests in New England". In: Wildlife and Habitats in Managed Landscapes Rodiek, J.E.; Bolen, E.G.

\_\_\_\_\_ 1992. "Effects of Even Aged Management on Forest Birds at Northern Hardwood Stand Interfaces". In: Forest Ecology and Management 46(1992)95-110. Elsevier Science Publishers B.V.

\_\_\_\_\_ and Rudis, D.D. 1986. New England Wildlife: Habitat, Natural History, and Distribution. Northeast Forest Experiment Station Forest Service USDA General Technical Report NE-108.

\_\_\_\_\_ ; Yamasaki, Mariko; Leak, William B. and Lanier, John W. 1992. New England Wildlife: Management of Forested Habitats. Northeast Forest Experiment Station Forest Service USDA General Technical Report NE-144.

Elliott, C.A. (Editor). 1988. Forester's Guide to Managing Wildlife Habitats In Maine. University of Maine Cooperative Extension Service and the Maine Chapter of the Wildlife Society, Inc. 58p.

Forman, Richard T.T. 1988. "Landscape Ecology Plans for Managing Forests". In: Is Forest Fragmentation a Management Issue in the Northeast ? DeGraaf, R; Healy, W.

Grena, John. 1981. Natural Old Growth Stands in Maine. Maine State Planning Office, Executive Department, State of Maine.

Harris, Larry D. 1984. The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity. The University of Chicago Press Chicago,IL.

Heck, M.E. 1992. National Registration of Historic Places Nomination for the Civilian Conservation Corps Camp at Bear Brook State Park, Allenstown, NH.

Hughes, Jeffrey W. and Fahey, Timothy J. 1991. "Availability, Quality and Selection of Browse by White-Tailed Deer after Clearcutting". In: Forest Science Vol 37, No. 1 pp. 261-270.

Hunter, Malcolm Jr. "Managing Forests for Spatial Heterogeneity to Maintain Biological Diversity". In: Transcripts of the 52nd North American Wildlife and Natural resources Conference pp. 60-69.

\_\_\_\_\_ 1990. Wildlife, Forests and Forestry - Principles for Managing Forests for Biological Diversity. Prentice Hall Company Englewood Cliffs, NJ 07632.

Lanier, John W. 1993. Forest Wildlife Biologist, USDA Forest Service, White Mountain National Forest. Personal Communication.



Lanier, John W. 1994. Wildlife Habitat Biologist, State of New Hampshire Fish & Game Department. Personal Communication.

Leak, William B. 1975. "Age Distributions in Virgin Red Spruce and Northern Hardwoods". In: Ecology Vol. 56, No. 6 pp.1451-1454.

\_\_\_\_\_ and Filip, S.M. 1975. Uneven-aged Management of Northern Hardwoods in New England. Northeast Forest Experiment Station Forest Service USDA Research Paper NE-332.

\_\_\_\_\_ and Filip, S.M. 1977. "Thirty Eight Years of Group Selection in New England Northern Hardwoods" In: Journal of Forestry. Society of American Foresters 10/77 pp. 641-643.

\_\_\_\_\_ 1982. Habitat Mapping and Interpretation in New England. Northeast Forest Experiment Station Forest Service USDA Research Paper NE-496.

Litvaitas, John A. 1992. Influence of Historic Land Use on Temporal Patterns of Diversity Among Forest Vertebrates. Unpublished Manuscript.

Litvaitas, John A. 1993. University of New Hampshire. Personal Communication.

Miner, Charles. 1994. Federal Aid Coordinator, State of New Hampshire Fish & Game Department. Personal Communication.

Nylen, Per. 1963. Master Plan of Development: Day-Use Area Bear Brook State Park Allenstown NH. State of New Hampshire, Department of Resources and Economic Development, Division of Parks and Recreation.

Pastor, John. 1989. "Nutrient Cycling in Aspen Ecosystems". In: Aspen Symposium '89 Proceedings. Adams, Roy D. North Central Forest Experiment Station Forest Service USDA.

Raven, Peter H.; Evert, Ray F. and Eichhorn, Susan E. 1992. Biology of Plants 5th Edition. Worth Publishers, New York, NY. 791pp.

Reay, R.S.; Blodgett, D.W.; Burns, B.S.; Weber, S.J. and Frey, T. 1990. Management Guide for Deer Wintering Areas in Vermont. Vermont Department of Forests, Parks and Recreation, and Vermont Department of Fish and Wildlife. 35p.

Robinson, Edward J. 1991, 1993. Wildlife Biologist, State of New Hampshire Fish & Game Department, Inland Fisheries and Wildlife Division. Personal Communications.

- Runkle, James R. 1991. "Gap Dynamics of Old Growth Eastern Hardwood Forests: Management Implications". In: Natural Areas Journal Vol. 11, No. 1 pp. 19-25.
- Silver, Helenette. 1957. New Hampshire Game and Furbearers - A History Vol.1. Survey Report No. 6. New Hampshire Fish & Game Department.
- Smith, David M. 1962. The Practice of Silviculture 7th Edition. John Wiley & Sons Inc. New York, NY.
- State of Missouri Department of Conservation. 1986. Forest Land Management Guidelines. 81pp.
- State of New Hampshire Department of Resources and Economic Development. Biennial Reports: 1935-36, 1937-38, 1939-40, 1941-42, 1943-44, 1945-46, 1973-74.
- State of Pennsylvania Game Commission. 1991. Wildlife Habitat Management Manual.
- State of Vermont Department of Fish and Wildlife. Wildlife Management Area Operational Procedures Manual. 154p.
- Thomas, Malcolm. 1985. Parks 1985 - A Report on the Condition and Trend of New Hampshire State Park Properties. State of New Hampshire, Department of Resources and Economic Development, Division of Parks and Recreation.
- Thompson, Daniel Q. and Smith, Ralph H. The Forest Primeval in the Northeast - A Great Myth ? pp. 255-265 Source Unknown.
- Tubbs, C.H.; DeGraaf, R.M.; Yamasaki, M. and Healy, W.M. 1987. Guide to Wildlife Tree Management in New England Northern Hardwoods. Northeast Forest Experiment Station Forest Service USDA General Technical Report NE-118. 30p.
- Twitchell, John; Dudley, Melissa; Simpson, Erin; Spoerl, Robert and Smith, Alan. 1994. Best Management Practices for Erosion Control for Trail Maintenance and Construction. State of New Hampshire, Department of Resources and Economic Development, Division of Parks and Recreation, Trails Bureau.
- USDA Forest Service White Mountain National Forest. 1989. "Wildlife Chapter" In: State Service Forester' Handbook. Northeastern Area, NA-FR-38. 43p.
- USDA Forest Service White Mountain National Forest. 1986. Land and Resource Management Plan. Appendix B - Wildlife Management Strategy. p. VII-B-1 to VII-B-28.

Wilcove, David S. 1988. "Forest Fragmentation as a Wildlife Management Issue in the Eastern United States". In: Is Forest Fragmentation a Management Issue in the Northeast ? DeGraaf, R; Healy, W.

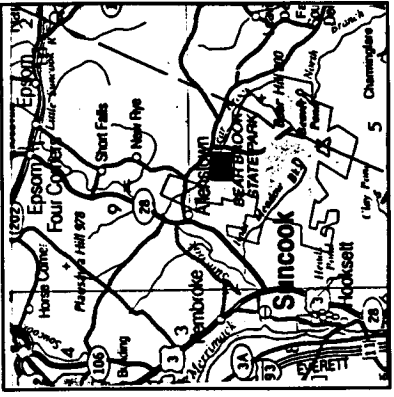
Wiley, J.E. III. 1988. Wildlife Management Area Operational Procedures Manual. 154p.

#### **ACKNOWLEDGEMENTS:**

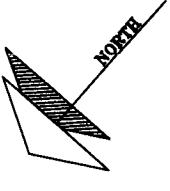
The original discussion of the need for an integrated management plan for Bear Brook State Park, developed by the individuals implementing management in the field, took place at the Park in the autumn of 1990 during a field review of a proposed timber sale. Following this discussion several meetings took place involving: John Twitchell, Recreation Resource Specialist from the Division of Parks and Recreation; Thomas Miner, Administrator of the Division of Forests and Lands Forest Management Bureau; Forest Management South Region staff Raymond Boivin, Kenneth Desmarais and Ingeborg Seaboyer; and Charles Bridges (then) Wildlife Habitat Biologist from the New Hampshire Fish & Game Department. William Leak from the USDA Forest Service and Eric Orff, Regional Biologist from Fish & Game each attended separate meetings.

Since that time the plan has evolved through numerous drafts. Principle authors of the plan have been Division of Forests & Lands, Forest Management Bureau, South Region staff members Kenneth Desmarais, Forester I, and Ingeborg Seaboyer, Forest Technician II (Forestry and Wildlife Program). Parks and Recreation information was written by John Twitchell, and Wildlife Management Guidelines came from Charles Bridges, (now) Chief of the Inland Fisheries and Wildlife Division, at the Fish & Game Department. Andrew Cutko (then) of the New Hampshire Natural Heritage Inventory Program and Daniel Spurduto from The Nature Conservancy reviewed and commented on the plan early in the process.

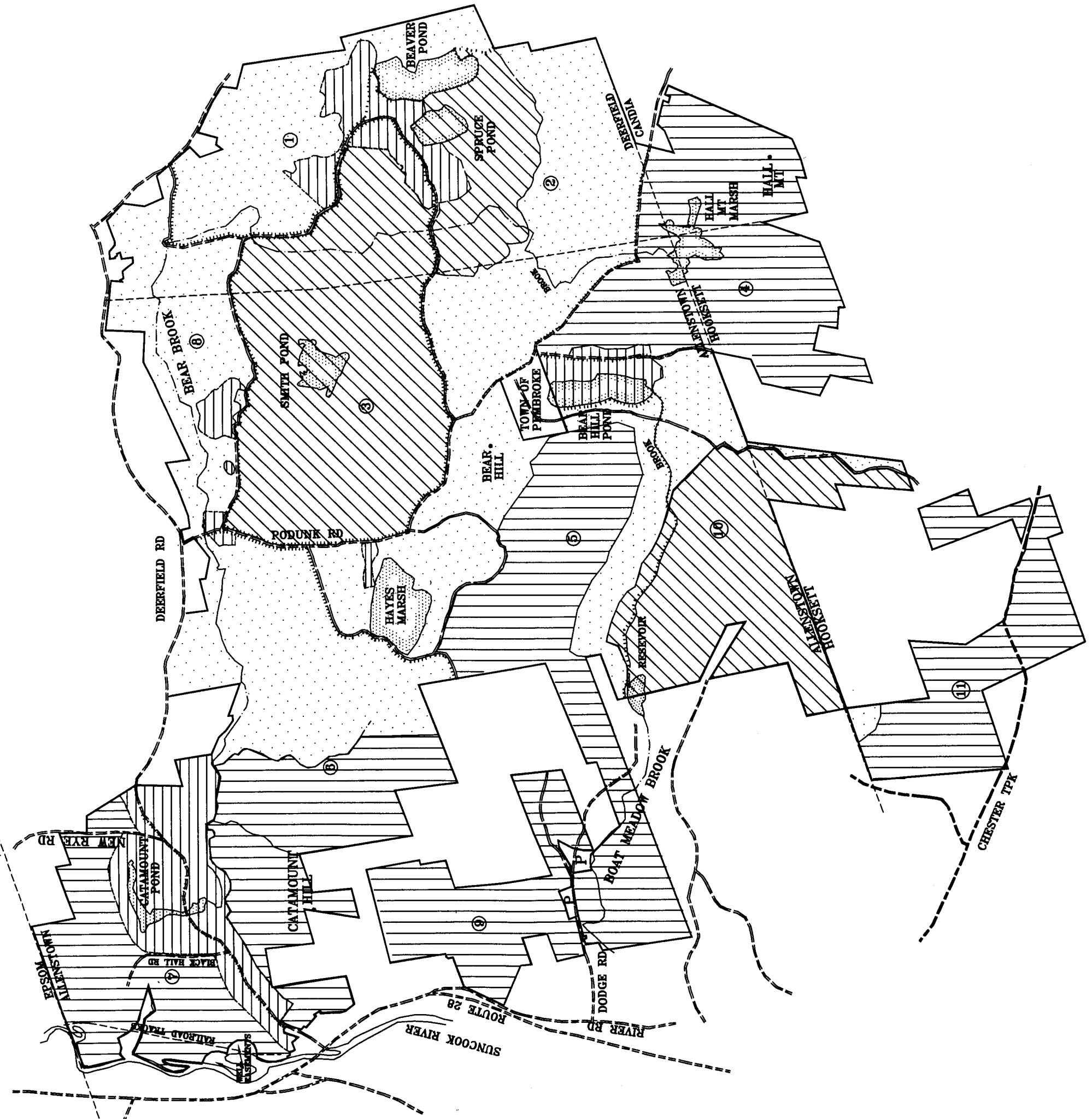
The plan has been reviewed by the initial principles including Thomas Miner, John Twitchell, Charles Bridges, and Raymond Boivin. Additional in house review and comment has been made by: John Lanier, (now) Wildlife Habitat Biologist from the New Hampshire Fish & Game Department (formerly of the UDSA Forest Service); David Moore of the New Hampshire Natural Heritage Inventory Program; Director Wilber LaPage, Robert Spoerl, Allison McLean and James Lane of the Division of Parks and Recreation; and State Forester John E. Sargent and Laura Falk of the Division of Forests and Lands. Review and comment from outside the Department was made by: William Leak and Mariko Yamasaki of the USDA Forest Service, and Malcolm Hunter of the University of Maine.



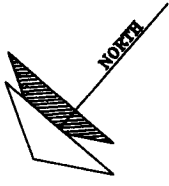
LOCATION SKETCH



- CRITERIA 1
- CRITERIA 2
- CRITERIA 3
- CRITERIA 4
- COMPARTMENT LINES
- BOUNDARY LINE
- COMPARTMENT #
- P=PRIVATE



STATE OF NEW HAMPSHIRE  
 DEPT. OF RESOURCES & ECONOMIC DEV.  
 BEAR BROOK STATE PARK  
 ALLENSTOWN, DEERFIELD, HOOKSETT, CANDIA  
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CRITERIA 1

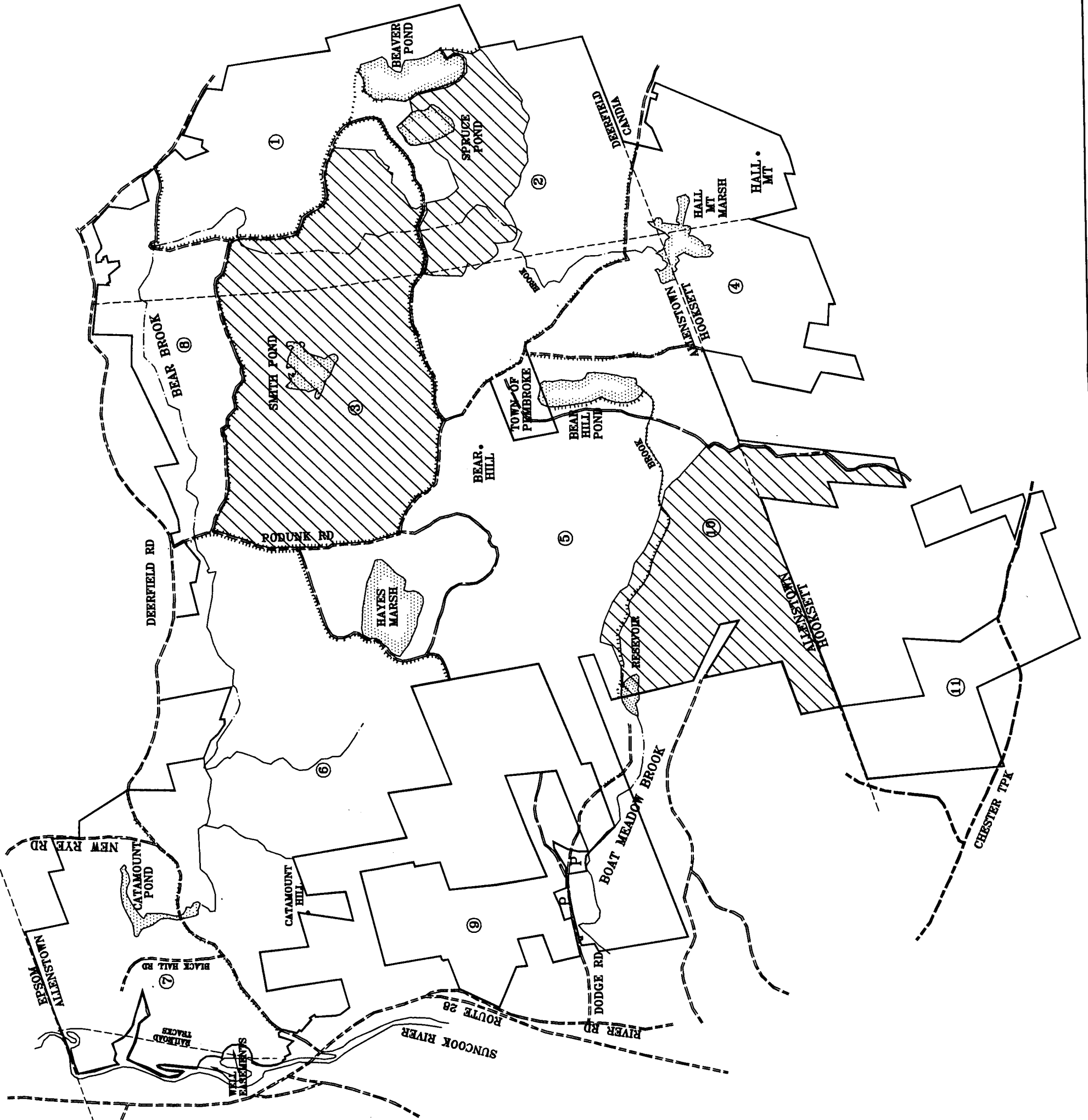


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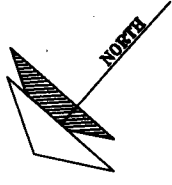
BOUNDARY LINE

COMPARTMENT #

P=PRIVATE



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AREA= 9686 AC±	SURVEYED BY:



CRITERIA 2

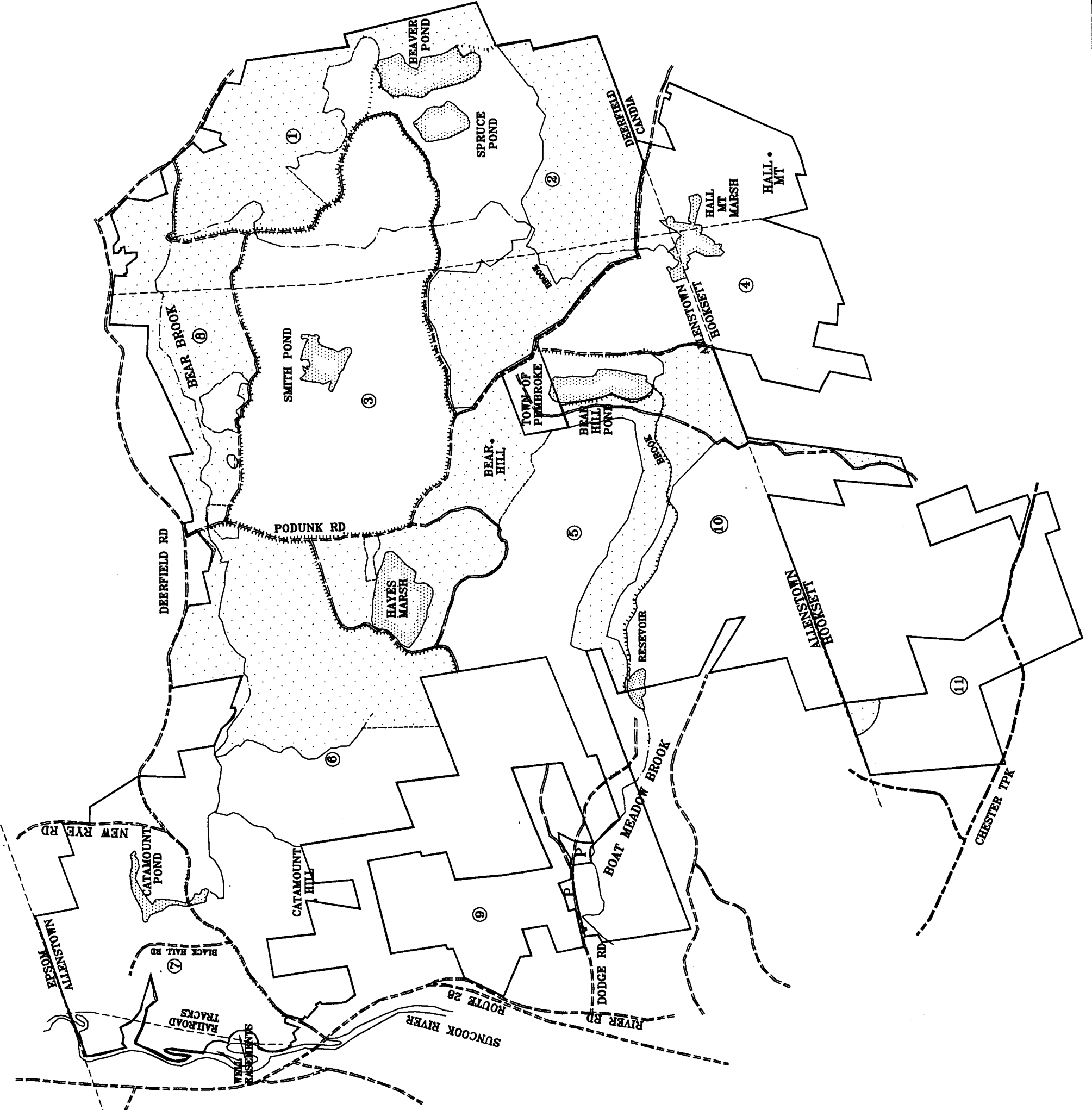


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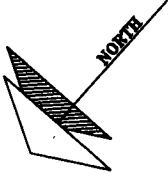
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CRITERIA 3

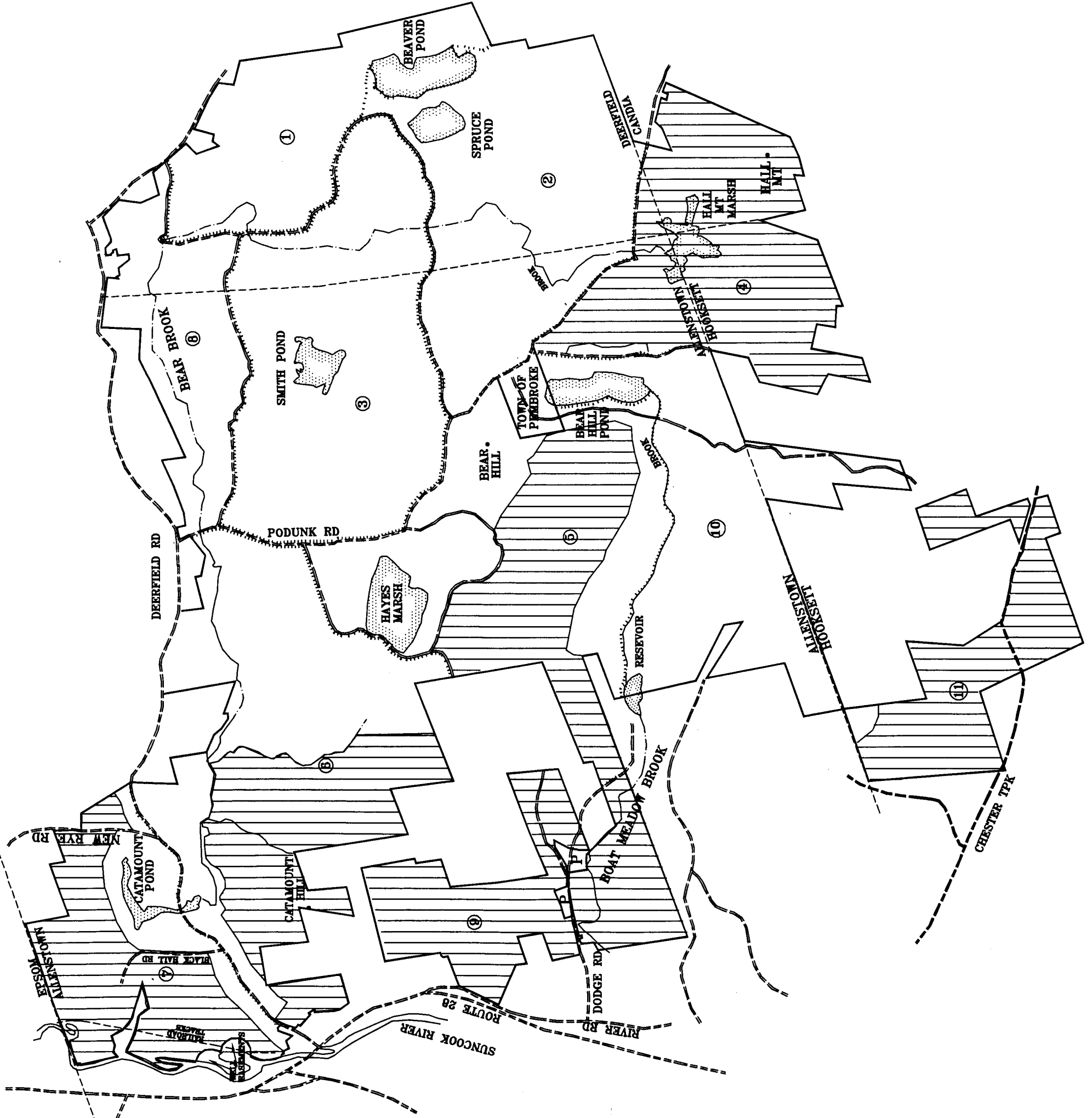


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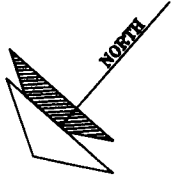
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BEAR BROOK STATE PARK  
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AREA= 9585 AC± SURVEYED BY:



CRITERIA 4

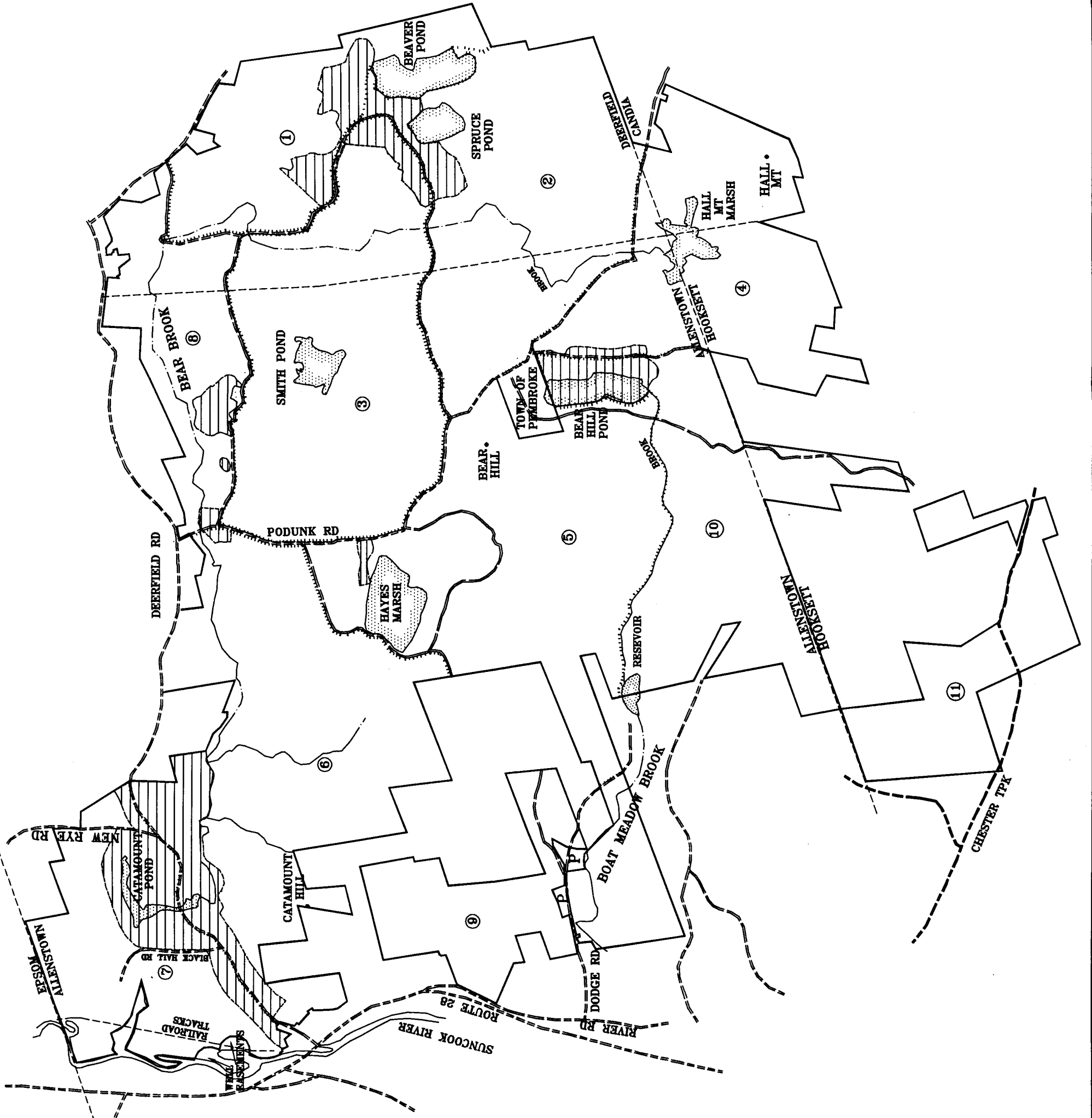


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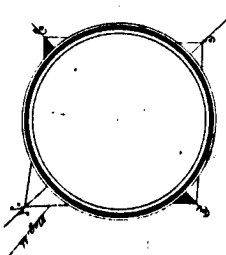
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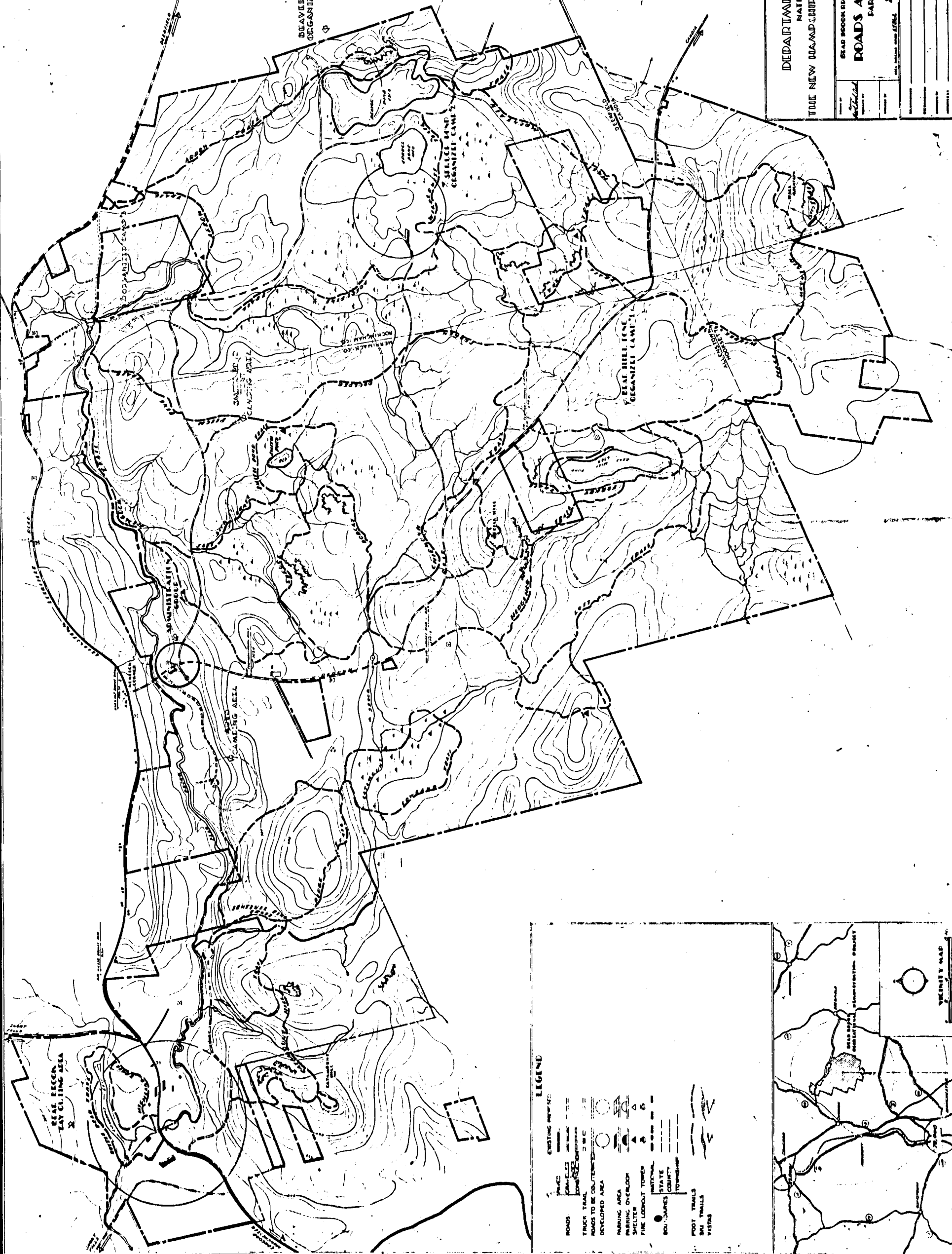


BEAVER POND ORGANIZED LAND

UNITED STATES  
 DEPARTMENT OF THE INTERIOR  
 NATIONAL PARK SERVICE  
 THE NEW HAMPSHIRE DEPT. OF FORESTRY & RECREATION  
 COOPERATING

GRAND BROOK RECREATIONAL DEMONSTRATION PROJECT  
**ROADS AND TRAILS PLAN**  
 PART OF THE MASTER PLAN

Scale: 1" = 1/2 MILE  
 Date: 7/21/50



**LEGEND**

EXISTING IMPROVEMENTS:  
 ROADS: SOLID LINE  
 CANALS: DASHED LINE  
 TRAILS: DOTTED LINE  
 TRAILS TO BE COLLECTED: DASHED-DOTTED LINE  
 DEVELOPED AREA: SHADING

PARKING AREA: RECTANGLE  
 FIRE LOOKOUT TOWER: TRIANGLE  
 SHELTER: SQUARE  
 POOL: WAVE LINE  
 STATE: DASHED LINE  
 COUNTY: DOTTED LINE  
 TOWNSHIP: DASHED-DOTTED LINE

FOOT TRAILS: DOTTED LINE  
 SML TRAILS: DASHED LINE  
 VISTAS: WAVE LINE

