



---

## **Property Overview, Regional Significance, and Management Summary**

---

### **Landscape/ Regional Context**

The area north of Interstate 90 in Otis and Becket, Massachusetts is mostly forested. There is one major road, Interstate 90, and extensive primary and secondary paved and dirt roads, as well as woods roads and trails used for recreation and forest operations through much of this hilly landscape. Some of the properties in this area are under Chapter 61. The forests of this area have been greatly affected in the last century by forest cutting practices; the chestnut blight, which eliminated chestnut; the hurricane of 1938, little or no evidence of blowdown is present on the Historic Quarry and Forest; and the gypsy moth outbreak of the early 1980's, which thinned out many oak stands.

With the current development trend throughout the region, land conservation and land preservation become even more important. Integral to land conservation is forest management with goals for providing high quality wildlife habitat and critical plant communities for supporting potential wildlife species. It is also important to note that Land Trust properties have unique potential for providing these habitat areas since their land is owned in perpetuity and is being managed not only for current citizens and users, but for generations to come who will witness further changes in land use throughout the region.

The terrain throughout the region is generally sloping with areas of exposed rock, streams, and wetlands including vernal pools and beaver ponds. There are many stone walls and some other cultural resources, such as cemeteries and cellar holes that are found in this area and much of the region. This particular property and the abutting lands are situated south of Quarry Road, east of Bonny Rigg Hill Road, and north of Interstate 90. These roads vary from paved with heavy use to unpaved with minimal use.

### **Property Overview**

This 300-acre property is located between Quarry Road and Bonny Rigg Hill Road with road frontage on Bonny Rigg Hill Road. The parcel has gentle to steep slopes with aspects in every direction. Several hills are on the property with a maximum elevation at 531 meters above sea level. The soils found on this property vary from very well drained and thin to deep and very poorly drained to bare rock. In general, the soils of the slopes are moderately to well drained with those of the uplands being very well drained and sandy. The soils of the lowlands around streams and within wetlands are generally very deep and poorly drained. The terrain of this property is mostly the result of the last Ice Age, which also deposited much of the base material on which these soils have developed. The granite deposits on this property were extensively quarried in the past and remnants of the operations are evident and provide historical and educational opportunities. The granite deposits also make much of the terrain rough and difficult to operate. This terrain has implications on forest growth and management.

The headwaters of Cushman Brook run through this property, which eventually feeds the Westfield River. There are several wetlands on this parcel as well; these are located around streams.

The parcel is dominated by several different forest types which are all typical of this region: northern hardwoods, birch-maple, oak-hardwoods, and hemlock hardwoods. In addition to these forest types, other vegetative cover types exist on the property in the form of sedge meadow, pond, and bare rock. The general size of the trees on this parcel is about 4-18 inches with a mean stand diameter for the

whole property of about 10 inches. Past forest cutting practices over much of the property have left the forest in generally poor health. There is some tree regeneration present through most of property with good representation of several overstory species. The overall health of the forest is moderate to poor and the current value of the timber stock is low due to past treatments. However, most of the forest is currently accessible and establishment of young stands stocked with a variety of species would be a feasible best management practice. The wildlife habitat value of the property seems relatively low for many species as this property is dominated by one forest type, which is in turn dominated by few species. For example, beech dominates the northern hardwoods forest type through much of the property. Most of the beech growing stock is diseased and is, therefore, not providing the seed that a healthy beech component would. There is little evidence of past gypsy moth damage but this insect has been deterred from large outbreaks by a fungus. There are some standing dead trees, or snags, on this property which provide wildlife habitat for several species of bird and mammal and plenty of downed logs. There are stonewalls found along some boundaries and in the interior. The historic quarry sites are considered cultural resource areas of interest and their protection is being planned by the Becket Land Trust.

### **Property Role**

Due to the location of the parcel near a highway and located in a forested region, but experiencing rapid development, this property plays a vital role in providing recreational and educational opportunities for the people of Otis and Becket and vital wildlife habitat through contiguous and unique plant communities. The achievement of the management objectives will serve to increase the amount of early successional forest throughout the property. Late and early successional conditions are lacking in Massachusetts as many of our forests are within the middle successional age classes. This provides a window of opportunity for a property such as this whose current forest condition would largely be improved by creating openings and reestablishing the forest. The achievement of the objectives should also serve to minimize siltation in streams, provide educational and recreational opportunities, and provide income to the Land Trust into the future. Forests provide one of our most valuable renewable resources, wood. Active forest management under the sound scientific and ecological guidelines will provide high-value wildlife habitat, clean water, and income for generations to come.

### **Management Summary**

The management recommendations, summarized, state that the forest on this property will be enhanced by removing some of the overstory and allowing new growth to become established. These management recommendations are being tailored to the Becket Land Trusts long-term forest management goals. Management practices will be carried out in order to reach goals such as improving wildlife habitat and increased biological diversity. These guidelines are being established to begin the management of The Historic Quarry and Forest. In ten years, the property should be reevaluated and the plan updated.



---

## Wildlife Habitat Management and Forest Type Wildlife Species Potential

---

### Wildlife Habitat Management

The term “wildlife management” is something of a misnomer, as no one can purport to “manage” wildlife. Wildlife habitat can be altered for a particular purpose, so “wildlife habitat manipulation” is probably a more accurate description of what a wildlife manager does. The effect of this habitat manipulation may be to attract particular species to an area, or simply to increase existing populations. Many of the more mobile species may use an area for only a brief period. For instance, one effect of a light thinning of poor-quality trees for cordwood would be to increase the production of berry-producing plants, such as Canada mayflower and viburnum due to the increased sunlight available after the thinning. This would make the area more attractive to migrating songbirds in the fall.

There are many wildlife species with many different, and sometimes opposite habitat requirements. A management decision, including the decision to do nothing, may benefit one type of wildlife community while causing another to decline. One goal of this plan is to identify the wildlife habitat resources on the Historic Quarry and Forest that are of particular value and to make recommendations for the protection and enhancement of these resources. In addition, the plan will identify habitat weaknesses and make recommendations for management work designed to increase wildlife diversity and abundance.

In general, moderate timber harvesting activity increases the productivity of woodland wildlife habitat. Thinning around large-crowned mast-producing trees increases their seed/nut production, thereby increasing wildlife food supplies. Harvesting activity increases the growth of food and cover plants on the forest floor. If the several guidelines listed below are adhered to, the detrimental effects of harvesting on various species can be minimized:

- 1) Maintain nesting cavities for the birds and mammals. Research shows that the most valuable cavity trees are large (<18” DBH is ideal) and located within 300’ of a body of water. A buffer strip of 100’ along all bodies of water should be left largely uncut to allow trees to decline, insuring a future supply of cavity trees. In addition, all large existing cavity trees and “wolf” trees throughout the property should be protected.
- 2) Harvesting should be avoided during the spring when most animals are raising young.
- 3) Understory food plants like hop hornbeam, shadbush, apple, and highbush blueberry should be damaged as little as possible. At least three large, mast-producing trees per acre should be left as wildlife food sources. A mix of mast-producing species is best.
- 4) If wildlife clearings or other heavy cuttings are done, they should be clustered near each other. Large areas of brushy habitat provide more wildlife value than small ones.

### Forest Type Wildlife Species Potential

In general, the forest layer of the Historic Quarry and Forest of the Becket Land Trust in Becket and Otis, Massachusetts is dominated by the following forest stand types: **sedge meadow, northern hardwoods, and hemlock hardwoods**. These stand types are common to this region. The following descriptions and explanations are based on field data gathered April 2003 and New England Wildlife: Management of Forested Habitats, by Richard DeGraaf, Mariko Yamasaki, William Leak, and John Lanier.

**Sedge meadows** are characterized emergents, mosses, lichens, persistent emergents, shrubs, and trees. This sedge meadow is dominated by sedges, cattails, red maple, highbush blueberry, and hemlock. The following species may utilize this wetland habitat: northern leopard frog, spotted turtle, bog turtle, eastern ribbon snake, sedge wren, Henslow’s sparrow, water shrew, star-nosed mole, eastern cottontail, northern bog lemming, and meadow jumping mouse.

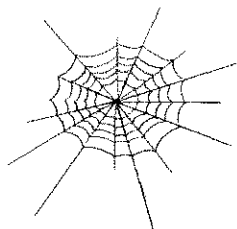
The **northern hardwoods** forest type is the basic hardwood type in northern New England. This forest type is divided into three subtypes: sugar maple/white ash, beech/birch/maple, and beech/red maple. This property supports all three in different proportions. These stands are often found on moderately- and well-drained upland

soils. The dominant forest layer often enriches the soils through the decomposition of leaf litter, particularly that of white ash and sugar maple. The northern hardwoods type often supports the growth of 100 or more plant species in the herbaceous layer, most of them deciduous. The wildlife usage of these stands depends on the species composition and the health and maturity of the stand. In general, healthier stands of mature growth are of higher value due to their increased mast production by ash, oak, maple, beech, and birch. The potential wildlife species found on the northern hardwoods dominated forest include: Cooper's hawk, northern shrike, northern oriole, sharp-shinned hawk, barred owl, scarlet tanager, northern goshawk, great horned owl, red-breasted nuthatch, hermit thrush, Nashville warbler, northern parula, black-throated green warbler, blackburnian warbler, pine siskin, red-tailed hawk, house wren, eastern bluebird, red bat, hoary bat, red squirrel, porcupine, ermine, long-tailed weasel, black bear, and white-tailed deer. As with any stand, the vertical and age structure determines which species will utilize the stand. These northern hardwoods stands will provide for different species before and after treatment.

**Hemlock-hardwoods** stands are quite common throughout this region and when hemlock densities are high, they support little or no understory layer. Disturbed hemlock sites tend to support blueberries, wintergreen, bracken, wild lily-of-the-valley, and other low species common to dry sites. Herbs and shrubs common to hemlock-hardwood sites include wood sorrel, goldthread, bluebead lily, hobblebush, ferns, and clubmosses. These sites often provide the necessary habitat elements for wildlife species such as barred owl, pileated woodpecker, red-breasted nuthatch, brown creeper, golden-crowned and ruby-crowned kinglets, wood thrush, black-throated green warbler, Canada warbler, pine grosbeak, pine siskin, hoary bat, porcupine, fisher, and white-tailed deer.

## Stewardship Issues

Massachusetts is a small state, but it contains a tremendous variety of ecosystems, plant and animal species, management challenges, and opportunities. This section of your plan will provide background information about the Massachusetts forest landscape as well as issues that might affect your land. **The Stand Descriptions and Management Practices sections of your plan will give more detailed property specific information** on these subjects tailored to your management goals.



**Biodiversity:** Biological diversity is, in part, a measure of the variety of plants and animals, the communities they form, and the ecological processes (such as water and nutrient cycling) that sustain them. With the recognition that each species has value, individually and as part of its natural community, maintaining biodiversity has become an important resource management goal.

While the biggest threat to biodiversity in Massachusetts is the loss of habitat to development, another threat is the introduction and spread of invasive non-native plants. Non-native invasives like European Buckthorn, Asiatic Bittersweet, and Japanese Honeysuckle spread quickly, crowding out or smothering native species and upsetting and dramatically altering ecosystem structure and function. Once established, invasives are difficult to control and even harder to eradicate. Therefore, vigilance and early intervention are paramount.

Another factor influencing biodiversity in Massachusetts concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that, for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1" in diameter). Yet we currently have no more than 2-3% early successional stage seedling forest across the state. There is also a shortage of forest with large diameter trees (greater than 20"). See more about how you can manage your land with biodiversity in mind in the "Wildlife" section below. (Also refer to *Managing Forests to Enhance Wildlife Diversity in Massachusetts* and *A Guide to Invasive Plants in Massachusetts* in the binder pockets.)

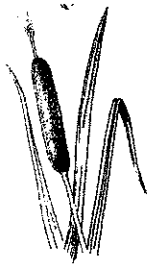


**Rare Species:** Rare species include those that are **threatened** (abundant in parts of its range but declining in total numbers, those of **special concern** (any species that has suffered a decline that could threaten the species if left unchecked), and **endangered** (at immediate risk of extinction and probably cannot survive without direct human intervention). Some species are threatened or endangered globally, while others are common globally but rare in Massachusetts.

Of the 2,040 plant and animal species (not including insects) in Massachusetts, 424 are considered rare. About 100 of these rare species are known to occur in woodlands. Most of these are found in wooded wetlands, especially vernal pools. These temporary shallow pools dry up by late summer, but provide crucial breeding habitat for rare salamanders and a host of other unusual forest dwelling invertebrates. Although many species in Massachusetts are adapted to and thrive in recently disturbed forests, rare species are often very sensitive to any changes in their habitat

Indispensable to rare species protection is a set of maps maintained by the Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) that show current and historic locations of rare species and their habitats. The maps of your property will be compared to these rare species maps and the result indicated on the upper right corner of the front page of the plan. Prior to any

regulated timber harvest, if an occurrence does show on the map, the NHESP will recommend protective measures. Possible measures include restricting logging operations to frozen periods of the year, or keeping logging equipment out of sensitive areas. You might also use information from NHESP to consider implementing management activities to improve the habitat for these special species.



**Riparian and Wetlands Areas:** Riparian and wetland areas are transition areas between open water features (lakes, ponds, streams, and rivers) and the drier terrestrial ecosystems. More specifically, a **wetland** is an area that has hydric (wet) soils and a unique community of plants that are adapted to live in these wet soils. Wetlands may be adjacent to streams or ponds, or a wetland may be found isolated in an otherwise drier landscape. A **riparian area** is the transition zone between an open water feature and the uplands (see Figure 1). A riparian zone may contain wetlands, but also includes areas with somewhat better drained soils. It is easiest to think of riparian areas as the places where land and water meet.

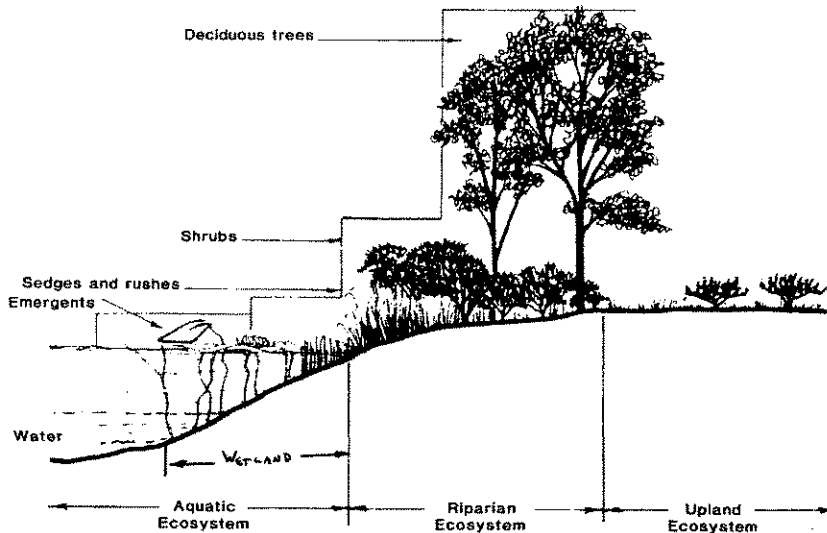


Figure 1: Example of a riparian zone.

The presence of water in riparian and wetland areas make these special places very important. Some of the functions and values that these areas provide are described below:

**Filtration:** Riparian zones capture and filter out sediment, chemicals and debris before they reach streams, rivers, lakes and drinking water supplies. This helps to keep our drinking water cleaner, and saves communities money by making the need for costly filtration much less likely.

**Flood control:** By storing water after rainstorms, these areas reduce downstream flooding. Like a sponge, wetland and riparian areas absorb stormwater, then release it slowly over time instead of in one flush.

**Critical wildlife habitat:** Many birds and mammals need riparian and wetland areas for all or part of their life cycles. These areas provide food and water, cover, and travel corridors. They are often the most important habitat feature in Massachusetts' forests.

**Recreational opportunities:** Our lakes, rivers, streams, and ponds are often focal points for recreation. We enjoy them when we boat, fish, swim, or just sit and enjoy the view.

In order to protect wetlands and riparian areas and to prevent soil erosion during timber harvesting activities, Massachusetts promotes the use of “Best Management Practices” or BMPs. Maintaining or reestablishing the protective vegetative layer and protecting critical areas are the two rules that underlie these common sense measures. DEM’s Massachusetts Forestry Best Practices Manual (included with this plan) details both the legally required and voluntary specifications for log landings, skid trails, water bars, buffer strips, filter strips, harvest timing, and much more.

The two Massachusetts laws that regulate timber harvesting in and around wetlands and riparian areas are the Massachusetts Wetlands Protection Act (CH 131), and the Forest Cutting Practices Act (CH132). Among other things, CH132 requires the filing of a cutting plan and on-site inspection of a harvest operation by a DEM Service Forester to ensure that required BMPs are being followed when a commercial harvest exceeds 25,000 board feet or 50 cords (or combination thereof).



**Soil and Water Quality:** Forests provide a very effective natural buffer that holds soil in place and protects the purity of our water. The trees, understory vegetation, and the organic material on the forest floor reduce the impact of falling rain, and help to insure that soil will not be carried into our streams and waterways.

To maintain a supply of clean water, forests must be kept as healthy as possible. Forests with a diverse mixture of vigorous trees of different ages and species can better cope with periodic and unpredictable stress such as insect attacks or windstorms.

Timber harvesting must be conducted with the utmost care to ensure that erosion is minimized and that sediment does not enter streams or wetlands. Sediment causes turbidity which degrades water quality and can harm fish and other aquatic life. As long as Best Management Practices (BMPs) are implemented correctly, it is possible to undertake active forest management without harming water quality.



**Forest Health:** Like individual organisms, forests vary in their overall health. The health of a forest is affected by many factors including weather, soil, insects, diseases, air quality, and human activity. Forest owners do not usually focus on the health of a single tree, but are concerned about catastrophic events such as insect or disease outbreaks that affect so many individual trees that the whole forest community is impacted.

Like our own health, it is easier to prevent forest health problems than to cure them. This preventative approach usually involves two steps. First, it is desirable to maintain or encourage a wide diversity of tree species and age classes within the forest. This diversity makes a forest less susceptible to a single devastating health threat. Second, by thinning out weaker and less desirable trees, well-spaced healthy individual trees are assured enough water and light to thrive. These two steps will result in a forest of vigorously growing trees that is more resistant to environmental stress.



**Fire:** Most forests in Massachusetts are relatively resistant to catastrophic fire. Historically, Native Americans commonly burned certain forests to improve hunting grounds. In modern times, fires most often result from careless human actions. The risk of an unintentional and damaging fire in your woods could increase as a result of logging activity if the slash (tree tops, branches, and debris) is not treated correctly.

Adherence to the Massachusetts slash law minimizes this risk. Under the law, slash is to be removed from buffer areas near roads, boundaries, and critical areas and lopped close to the ground to speed decay. Well-maintained woods roads are always desirable to provide access should a fire occur.

Depending on the type of fire and the goals of the landowner, fire can also be considered as a management tool to favor certain species of plants and animals. Today the use of prescribed burning is largely restricted to the coast and islands, where it is used to maintain unique natural communities such as sandplain grasslands and pitch pine/scrub oak barrens. However, state land managers are also attempting to bring fire back to many of the fire-adapted communities found elsewhere around the state.



**Wildlife Management:** Enhancing the wildlife potential of a forested property is a common and important goal for many woodland owners. Sometimes actions can be taken to benefit a particular species of interest (e.g., put up Wood Duck nest boxes). In most cases, recommended management practices can benefit many species, and fall into one of three broad strategies. These are **managing for diversity, protecting existing habitat, and enhancing existing habitat.**

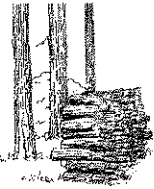
**Managing for Diversity** – Many species of wildlife need a variety of plant communities to meet their lifecycle requirements. In general, a property that contains a diversity of habitats will support a more varied wildlife population. A thick area of brush and young trees might provide food and cover for grouse and cedar waxwing; a mature stand of oaks provides acorns for foraging deer and turkey; while an open field provides the right food and cover for cottontail rabbits and red fox. It is often possible to create these different habitats on your property through active management. The appropriate mix of habitat types will primarily depend on the composition of the surrounding landscape and your objectives. It may be a good idea to create a brushy area where early successional habitats are rare, but the same practice may be inappropriate in the area's last block of mature forest.

**Protecting Existing Habitat** – This strategy is commonly associated with managing for rare species or those species that require unique habitat features. These habitat features include vernal pools, springs and seeps, forested wetlands, rock outcrops, snags, den trees, and large blocks of unbroken forest. Some of these features are rare, and they provide the right mix of food, water, and shelter for a particular species or specialized community of wildlife. It is important to recognize their value and protect their function. This usually means not altering the feature and buffering the resource area from potential impacts.

**Enhancing Existing Habitat** – This strategy falls somewhere between the previous two. One way the wildlife value of a forest can be enhanced is by modifying its structure (number of canopy layers, average tree size, density). Thinning out undesirable trees from around large crowned mast (nut and fruit) trees will allow these trees to grow faster and produce more food. The faster growth will also accelerate the development of a more mature forest structure, which is important for some species. Creating small gaps or forest openings generates groups of seedlings and saplings that provide an additional layer of cover, food, and perch sites.



Each of these three strategies can be applied on a single property. For example, a landowner might want to increase the habitat diversity by reclaiming an old abandoned field. Elsewhere on the property, a stand of young hardwoods might be thinned to reduce competition, while a “no cut” buffer is set up around a vernal pool or other habitat feature. The overview, stand description and management practice sections of this plan will help you understand your woodland within the context of the surrounding landscape and the potential to diversify, protect or enhance wildlife habitat.



**Wood Products:** If managed wisely, forests can produce a periodic flow of wood products on a sustained basis. Stewardship encompasses finding ways to meet your current needs while protecting the forest’s ecological integrity. In this way, you can harvest timber and generate income without compromising the opportunities of future generations.

Massachusetts forests grow many highly valued species (white pine, red oak, sugar maple, white ash, and black cherry) whose lumber is sold throughout the world. Other lower valued species (hemlock, birch, beech, red maple) are marketed locally or regionally, and become products like pallets, pulpwood, firewood, and lumber. These products and their associated value-added industries contribute between 200 and 300 million dollars annually to the Massachusetts economy.

By growing and selling wood products in a responsible way you are helping to our society’s demand for these goods. Harvesting from sustainably managed woodlands – rather than from unmanaged or poorly managed forest – benefits the public in a multitude of ways. The sale of timber, pulpwood, and firewood also provides periodic income that you can reinvest in the property, increasing its value and helping you meet your long-term goals. Producing wood products helps defray the costs of owning woodland, and helps private landowners keep their forestland undeveloped.



**Cultural Resources:** Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago, or the remains of a farmstead from the 1800’s, these features all tell important and interesting stories about the landscape, and should be protected from damage or loss.

Massachusetts has a long and diverse history of human habitation and use. Native American tribes first took advantage of the natural bounty of this area over 10,000 years ago. Many of these villages were located along the coasts and rivers of the state. The interior woodlands were also used for hunting, traveling, and temporary camps. Signs of these activities are difficult to find in today’s forests. They were obscured by the dramatic landscape impacts brought by European settlers as they swept over the area in the 17<sup>th</sup> and 18<sup>th</sup> centuries.

By the middle 1800’s, more than 70% of the forests of Massachusetts had been cleared for crops and pastureland. Houses, barns, wells, fences, mills, and roads were all constructed as woodlands were converted for agricultural production. But when the Erie Canal connected the Midwest with the eastern cities, New England farms were abandoned for the more productive land in the Ohio River valley, and the landscape began to revert to forest. Many of the abandoned buildings were disassembled and moved, but the supporting stonework and other changes to the landscape can be easily seen today.

One particularly ubiquitous legacy of this period is stone walls. Most were constructed between 1810 and 1840 as stone fences (wooden fence rails had become scarce) to enclose sheep within pastures, or to

exclude them from croplands and hayfields. Clues to their purpose are found in their construction. Walls that surrounded pasture areas were comprised mostly of large stones, while walls abutting former cropland accumulated many small stones as farmers cleared rocks turned up by their plows. Other cultural features to look for include cellar holes, wells, old roads and even old trash dumps.



**Recreation and Aesthetic Considerations:** Recreational opportunities and aesthetic quality are the most important values for many forest landowners, and represent valid goals in and of themselves. Removing interfering vegetation can open a vista or highlight a beautiful tree, for example. When a landowner's goals include timber, thoughtful forest management can be used to accomplish silvicultural objectives while also reaching recreational and/or aesthetic objectives. For example, logging trails might be designed to provide a network of cross-country ski trails that lead through a variety of habitats and reveal points of interest.

If aesthetics is a concern and you are planning a timber harvest, obtain a copy of this excellent booklet: *A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters & Landowners*, by Geoffrey T. Jones, 1993. (Available from the Northeast Regional Agricultural Engineering Service, (607) 255-7654, for \$7). Work closely with your consultant to make sure the aesthetic standards you want are included in the contract and that the logger selected to do the job executes it properly. The time you take to plan ahead of the job will reward you and your family many times over with a fuller enjoyment of your forest, now and well into the future.

---

**This is your Stewardship Plan.** It is based on the goals that you have identified. The final success of your Stewardship Plan will be determined first, by how well you are able to identify and define your goals, and second, by the support you find and the resources you commit to implement each step.

It can be helpful and enjoyable to visit other properties to sample the range of management activities and see the accomplishments of others. This may help you visualize the outcome of alternative management decisions and can either stimulate new ideas or confirm your own personal philosophies. Don't hesitate to express your thoughts, concerns, and ideas. Keep asking questions! Please be involved and enjoy the fact that you are the steward of a very special place.

