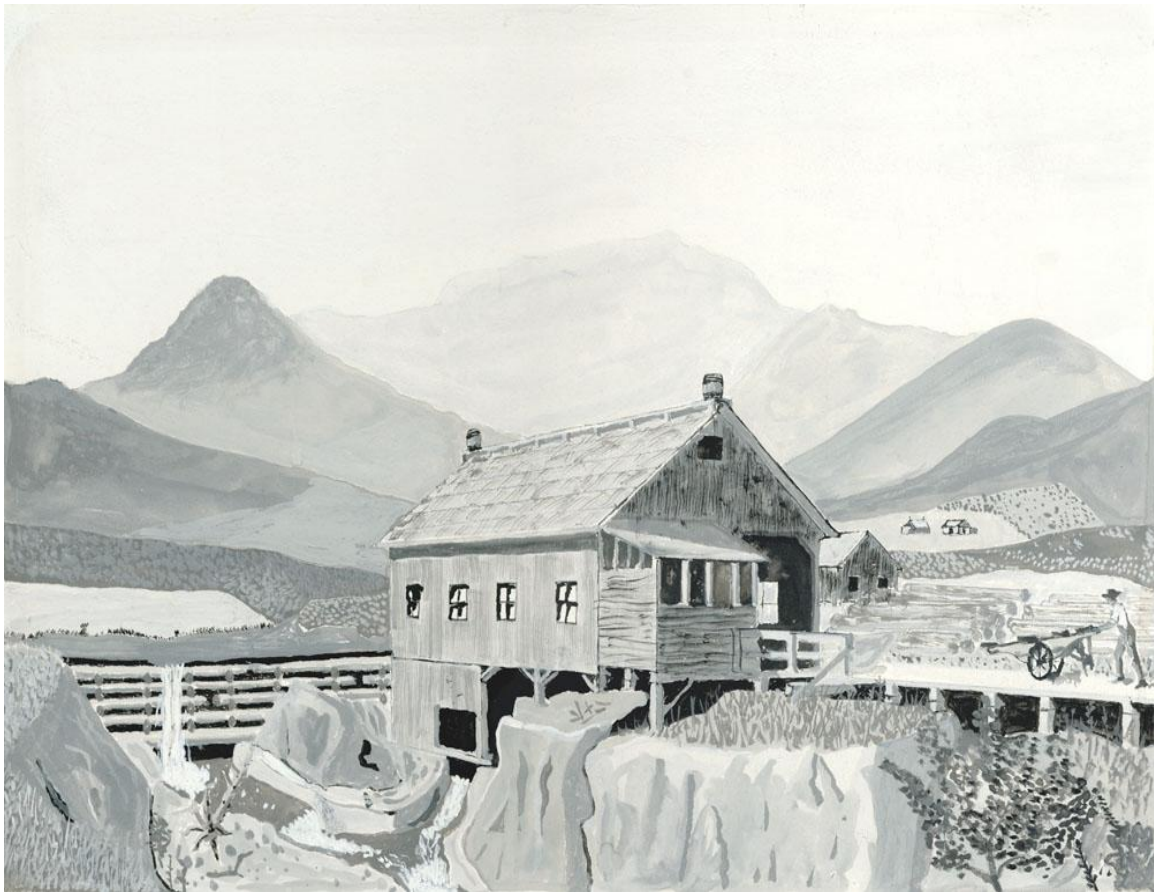


Sterling Forest Management Plan

Adopted by the Stowe Selectboard

December 23, 2013



STERLING FOREST MANAGEMENT PLAN

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Please contact the Stowe Conservation Commission or the Director of Planning for any inquiries regarding this management plan.

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Sterling Forest Management Plan

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A. Summary

This is a management plan for Sterling Forest, owned by the Town of Stowe. Sterling Forest is publicly owned conservation land purchased by the people of the Town of Stowe in 1995 as part of the Tricentennial Conservation Project in celebration of Stowe's 200th anniversary.

This management plan is designed to provide a framework for decision making and a set of guidelines for the supervision and management of the forest. It is designed to integrate the principles of silviculture, wildlife habitat management, recreation, historic preservation and aesthetics with long-term management objectives. These objectives include:

- a. Preservation, maintenance, and improvement of wildlife habitat;
- b. Watershed and water resources protection;
- c. Recreation including hiking, x-c skiing, mountain biking, naturalizing, hunting, and winter use of snowmobiles on the VAST trail only;
- d. Preservation of historical/cultural sites, including cellar holes, stone walls, mill site, etc.;
- e. Education & demonstration of forest uses, values, management, etc.;
- f. Sustainable timber management;
- g. Providing and maintaining parking for appropriate year-round public access; and
- h. Other objectives as defined by the community.

In generating this plan, the Conservation Commission followed several general guidelines:

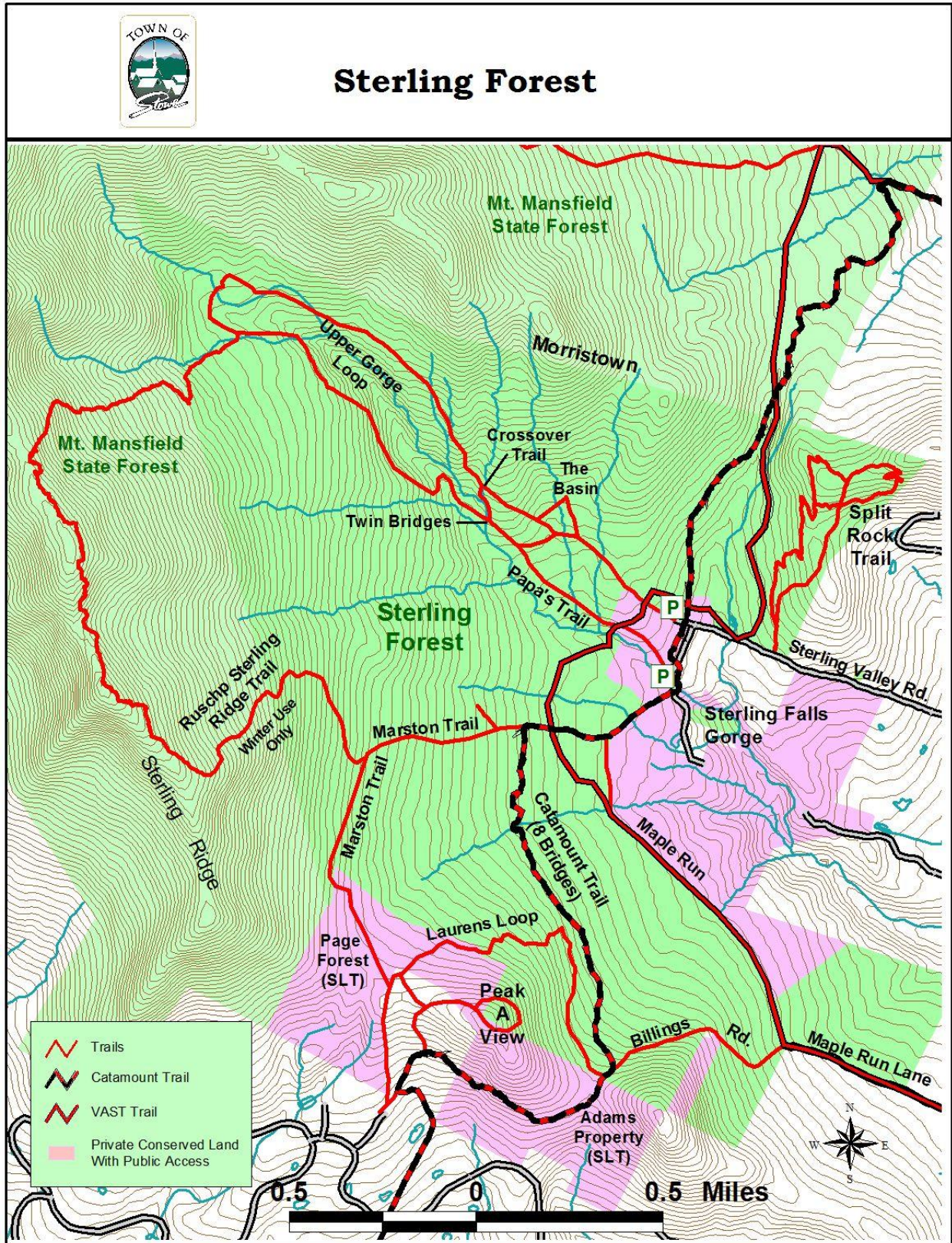
- a. All components of the plan must comply with written deed restrictions.
- b. All management activities are to be conservative and based on ecological principles.
- c. All objectives of the Town of Stowe shall be considered in developing the plan.
- d. Protection, preservation, and improvement are of primary concern.
- e. Provisions shall be made for monitoring the forest and re-evaluating and revising the plan periodically.
- f. Education, experimentation, and demonstration of sound, sustainable management techniques should be incorporated into all management activities.

The management plan provides an overview of existing conditions. It also outlines recommended policies and procedures for the management of these existing resources and features.

Implementation of the plan will be in the form of recommendations for specific management activities such as timber harvesting, habitat manipulation, trail and road maintenance, etc.

General Recommendation

This forest plan should be re-evaluated and updated every 10 years or as needed.



B. Management Objectives, Guidelines and Recommendations

The following guidelines shall be considered in developing any specific management strategies:

- a. All management activities are based, to the greatest possible extent, on current ecological principles.
- b. All management objectives are considered and integrated into management decisions with emphasis on the following:
 - a. Protection of historic and/ or cultural resources
 - b. Preservation of wildlife habitat
 - c. Protection of water resources
 - d. Maintenance and enhancement of recreational resources and public access
 - e. Management of timber resources
- c. Some of the management guidelines stress protection and preservation as well as recommending activities that will improve the quality and/ or stability of the resource.
- d. It is important to monitor the forest and its resources on an ongoing basis. This plan should be evaluated and updated at a minimum of every 10 years, particularly as new information emerges about both the forest and management techniques.

1. Overview

1.1 General Description

Sterling Forest is comprised of 1,530 acres of public conservation land in the northwestern corner of the Town of Stowe in an area known as Sterling Valley. The original 1,500-acre forest parcel, formerly owned by IBM Chairman, Thomas Watson, was part of a larger 2,150-acre parcel known locally as “Watson Forest”, acquired by the Town in 1995 as part of the Tri-centennial Conservation Project. The land was purchased as a gift of natural legacy for all citizens, and it is intended that its protection will be guaranteed for all future generations. The purchase of the property was part of a larger conservation project that included the entire Watson Forest with 500 acres deeded to the State of Vermont and three 50-acre parcels deeded to neighboring landowner contributors. All five deeds include nearly identical conservation easements held by the Vermont Land Trust providing for permanent public access. An additional 30-acre parcel along Maple Run Lane was donated to the Town of Stowe by Stowe Land Trust in 2008.

Sterling Forest spans about 1,000 feet of vertical relief from near 1,500 feet up to approximately 2,500 feet, above which the State of Vermont owns. The area comprises the upper watershed of Sterling Brook which, since the last glaciation, has incised a deep ravine through the property. Sterling Forest is largely mixed hardwoods of varying successional stages. Early- and middle-successional forests are located in lower elevation areas which were more recently farmed. Soil depth varies greatly; overlying glacial till and bedrock, and bedrock outcrops dot the landscape.

The northern edge of Sterling Forest is contiguous to the 3,000-acre Beaver Meadows tract of Mt. Mansfield State Forest acquired by the State of Vermont in 1993. To the west the forest adjoins a large expanse of Mount Mansfield State Forest that contains the Long Trail corridor. To the south are Page Forest, owned by Stowe Land Trust and the privately owned “Adams Property” conserved by Stowe Land Trust, also providing public access. To the immediate east is Sterling Falls Gorge owned by the Sterling Falls Gorge Natural Area Trust, Stowe’s second 501(C)3 conservation land trust and three 50-acre conservation parcels owned by neighboring landowner contributors. The first conservation land ever purchased by the Town of Stowe is the 3.8 acre Lot 5 of the Sterling Falls Gorge subdivision. This purchase was made to create a buffer zone and extend the 7.3 acre conservation land donated by the Anderson family to the Sterling Falls Gorge Natural Area Trust.

The forest is crisscrossed by old logging trails, many of which are used today as recreational trails. Recreational use of these trails is becoming increasingly popular as people discover their location and the easy cost free access provided to Sterling Forest and Sterling Falls Gorge. Several of the trails connect with others outside of the forest, allowing further access to a vast expanse of terrain. The Edson Hill trails, the Catamount Trail, the Long Trail, the VAST Trail and trails in the Beaver Meadows tract are all accessible from Sterling Forest.

1.2 Parking and Access

There are four primary means of vehicular access to Sterling Forest:

- The Sterling Forest parking lot, located at the end of Sterling Valley Rd. is the primary access point with room for many cars to park. This was an old gravel pit formerly owned by the Anderson Family and conveyed to the Town in a conservation land swap.
- The Sterling Gorge parking lot, located at the end of the public section of Sterling Gorge Rd. is a much smaller and well-used parking area that provides closer access to Sterling Falls Gorge, Maple Run, the Marston Trail and Catamount Trail.
- Maple Run Lane off of West Hill Rd. provides access to a large portion of the southern and eastern edge of the Forest. However, this access is limited as there is currently no public parking anywhere along the length of Maple Run Lane.
- A log landing that contains a historic home site on Sterling Valley Rd. past Sterling Cemetery provides summer parking for access to the Split Rock Trail.

1.3 Public Information

The Town should maintain accurate information about Sterling Forest such as rules, guidelines and maps, and make these available to the public. These should be posted at parking and trailhead locations within Sterling Forest.

2. Wildlife, Habitat and Timber Resources

2.1 Management Objectives

2.1.1 Wildlife and Habitat

The strategy for the management of wildlife in Sterling Forest is to provide an array of habitat types to support species whose range falls within the forest. For instance, the Phase 3 timber harvest in 2013 was designed to create nesting habitat for songbirds and browsing areas for moose and deer. The Phase 1 and 2 harvests included strategies to enhance long-term mast production in hardwood stands. Phase 2 also included enhancement of songbird habitat.

Specific objectives of habitat management guidelines are as follows:

- Maximize diversity within the forest according to the natural structure and species composition of mid- to high-elevation forests typical of Lamoille County, Vermont.
- Encourage balanced populations of each species to promote natural levels of interaction. With species having large home ranges that likely extend well beyond the borders of Sterling Forest, this is an obvious challenge. In such cases, regional wildlife management must be considered.

2.1.2 Timber

Timber or habitat manipulations shall occur in Sterling Forest only under the supervision of a qualified forester and all such activities shall be directed by a specific forest management plan written by a qualified forester.

The specific forest management plan should follow and reflect the objectives and management strategies described within this general forest plan. More specifically, silvicultural prescriptions should:

- a. Increase the vigor and productivity of forested stands through thinning and regeneration techniques to decrease susceptibility of stands to pests and disease problems.
- b. Ensure sustainable harvesting practices that improve the value of the forested resource over the long term.
- c. Manage for species and types that naturally exist in the forest.
- d. Provide opportunities for demonstration and experimental techniques and community involvement (e.g., fuel wood cuttings made available to locals in need, etc.)
- e. Protect the water quality of Sterling Brook.

2.2 Conditions and Current Activities

See sections 7 and 10 for additional information about wildlife, habitat, and forest.

Timber management in Sterling Forest has been guided by three-phase timber harvest plan developed by Michael Snyder, former Chittenden County State Forester and currently the

Commissioner of the Vermont Department of Forests, Parks & Recreation (FPR). The Phase 1 harvest was completed during the winter of 2002 and included an area along the Catamount Trail north of the Sterling Forest Parking lot (see following map). Phase 2, which involved the area around the Split Rock Trail, was completed in 2007. The first two phases generated approximately \$14,000 in revenue which has been used for ongoing trail improvements in Sterling Forest. Sterling Forest has been widely cited as a demonstration forest in terms of how timber management can successfully coexist with recreational uses while improving the quality of the timber stock and improving wildlife habitat, particularly for forest songbirds.

The Commission is currently working with FPR, Vermont Land Trust (VLT), and Audubon Vermont to plan and implement Phase 3 in a roughly 100-acre area in the southeast section of the Forest, between Maple Run Lane and the Catamount Trail. The intention is to conduct the harvest during the winter of 2014.

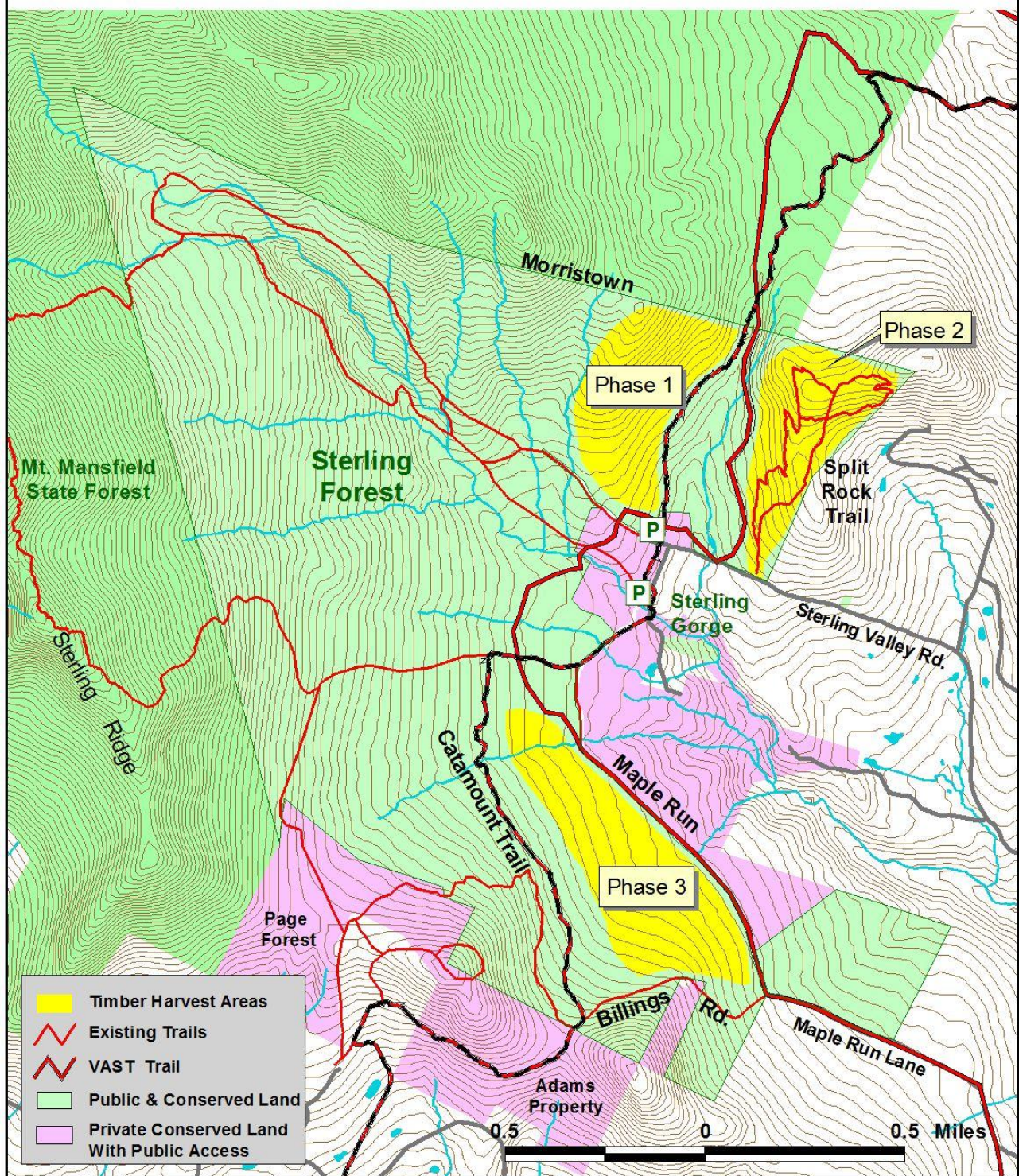
Audubon VT and FPR, through the “Foresters for the Birds” project, have created a timber management strategy that includes options for integrating timber and bird habitat management. The general plan for Phase 3 is to create a number of “patch cuts” ranging in size from ½ acre to as large as 5 acres with the intention of creating songbird habitat as well as browse for moose and deer. Audubon VT will coordinate monitoring both pre-harvest, post-harvest and into the future, to track the effects of the harvest. Pre-treatment bird monitoring began in June 2012. Dan Kilborne, the VLT Stewardship Forester, in collaboration with Michael Snyder, has developed the actual harvest plan and will work directly with the logger.

The Phase 2 timber harvest included milling logs from Sterling Forest on site that were used to build 8 bridges along the Catamount Trail.





Sterling Forest Timber Harvest Plan



2.3 Management Guidelines

2.3.1 Wildlife and Habitat

The following management guidelines could be applied to specific habitats in the forest by contracting with a forester and/ or wildlife specialist to prescribe a schedule of specific wildlife management actions:

- a. Protect and enhance long-term mast production in hardwood stands with significant beech densities in order to support bear habitat.
- b. Improve species diversity in mid-elevation hardwood stands.
- c. Create at least four small openings 0.5-5 acres in size along the Maple Run Lane corridor, managing for early successional species and soft-mast producers such as serviceberry, cherry, and apple.
- d. Maintain the high-elevation spruce-fir stands.
- e. Limit or prohibit harvesting within 200 feet adjacent to Sterling Brook and the low-elevation wetland area adjacent to Sterling Valley Road. Enforce strict water quality protection practices at all times.
- f. Require regeneration treatments in association with all harvesting operations in hardwood and softwood stands to promote food and cover.
- g. Maintain and regenerate inclusions of softwood cover in predominantly hardwood stands and inclusions of hardwood cover in predominantly softwood stands.
- h. Create and maintain some permanent openings dominated by grasses, forbs, or shrubs within the upland forest and use them periodically as log landings.
- i. Manage existing and potential deer wintering areas to provide shelter, travel lanes to access food, escape from predators, and access to preferred browse.
- j. Maintain some cavity and den trees, particularly trees with diameters exceeding 18 inches.
- k. Manage for coarse woody debris by retaining material that currently exists and allowing its accumulation where it is currently missing.

2.3.2 Timber

- a. Timber resources shall be managed according to principles of sustainable forestry to protect biodiversity, water quality, and site productivity.
- b. Retain a minimum of two large (> 16" diameter) dead and downed trees per acre.
- c. Grow the largest trees and use the longest rotations possible within site and log quality limitations. (For example, for high quality red and sugar maple, yellow birch, beech, and white ash, the diameter objective should be 18 inches or greater.) Culmination of mean annual board foot growth for these species occurs at 100 to 120 years.

- d. When planting, use only local sources of native species, plant three or more species, and include deciduous species.
- e. When thinning or regenerating stands, favor native species over non-native ones. Use natural regeneration to the maximum practical extent.
- f. Biological legacies of the forest community, including coarse dead wood, logs, and snags; trees that are large, living, and old; buried seeds; soil organic matter; invertebrates; sprouting plants; and mycorrhizal fungi, should be retained to aid in post-harvest recovery and to keep the forest from becoming oversimplified.
- g. Promote the seed bearing capacities of poorly represented members of the stand. Tree felling should be avoided on slopes exceeding 50%.
- h. Leave on the site all materials that are less than 4 inches in diameter.
- i. Promote a vertical stand structure that includes overstory, midstory, shrub, and herbaceous vegetation layers.
- j. The use of insecticides, fungicides, and herbicides shall be extremely limited.
- k. Residual stand damage, including basal wounds, broken and/ or scraped tops, and exposed roots, should be confined to 10% or fewer of the dominant or codominant trees.
- l. All trees to be removed should be marked prior to the inception of harvest. Average annual harvest volumes should not exceed 85% of the average annual growth.
- m. Avoid grazing by domestic animals.
- n. Avoid spring harvests and/ or rutting that extends beyond the A soil horizon. All skid trails, truck roads, and log landings should be flagged or otherwise planned and marked prior to the inception of harvest.
- o. The timber harvesting access network, including truck roads, skid trails, and log landings, should be carefully designed and constructed and should not expose mineral soil on more than 15% of the treated area.
- p. Truck roads should be built at grades from 3% to 10% and skid trails from 3% to 15%.
- q. Skid trails, truck roads, and log landings located on easily compacted soils should only be used when adequately dry or frozen.
- r. Minimize the number and extent of truck roads and skid trails-- particularly in or near sensitive areas such as stream crossings, protective strips, and steep slopes.
- s. Truck roads and skid trails should be properly drained during and after use according to Table 1 in the Vermont AMP manual.
- t. Log landings should be located on nearly level, stable ground; be kept away from protective strips; have water diversions installed; and be graded to prevent erosion and sedimentation.

- u. Protective strips, characterized by minimal soil disturbance, nearly-complete canopy closure, and many large mature trees, should be maintained between the access network and surface waters according to Table 4 in the Vermont AMP manual.
- v. Areas of exposed soil that occur within the protective strip should be seeded and mulched according to Table 3 in the AMP manual.
- w. Stream buffer strips should be kept free of logging vehicles, have only little or no tree cutting; and be at least 25 feet in width.
- x. Stream crossings should be restored and non-permanent structures should be removed as soon as possible.
- y. Streams should be crossed with bridges or culverts which are properly sized according to Table 2 in the AMP manual and installed at right angles.
- z. Sediment should be prevented from entering streams by using turn-ups or broad-based dips on truck roads and skid trails prior to all stream crossings.
- aa. Drainage ditches should not feed directly into streams or other surface waters. Post-harvest use of the access network should be restricted in order to prevent erosion, compaction, and site disruption.

2.4 Recommendation

The Town should engage the services of a qualified forester to prepare a specific timber and habitat management plan beyond the current three-phase timber harvest plan, under the guidance of the Vermont Land Trust Forest Steward for the property.

3. Recreation Resources

3.1 Management Objectives

Sterling Forest is actively used by many people for a variety of recreational pursuits. Such uses should continue at a level that causes minimal impact to the forest and its natural denizens.

3.2 Conditions

3.2.1 Town Roads

There are three town highways existing on or abutting Sterling Forest:

- Maple Run Lane (TH#7), Sterling Gorge Road and Sterling Valley Road (TH# 6).
- Maple Run Lane is a Class IV road to the intersection with the old logging road known as Billings Rd. From that intersection to Sterling Brook, Maple Run Lane was reclassified to a Legal Town Trail in 2009.
- Sterling Valley Road is a Class III road up to the Sterling Forest parking lot. From the Sterling Cemetery to the parking lot, Sterling Valley Rd. is a locally designated Scenic

Road. Beyond the parking lot, the former Class IV section of Sterling Valley Rd. was also reclassified to a Legal Town Trail in 2009 and is now part of the Upper Gorge Loop.

3.2.2 Private Roads

There is one private road and bridge near Sterling Forest. This private portion of Sterling Gorge Rd. begins at the terminus of the town-owned portion of Sterling Gorge Road at the Sterling Gorge parking lot, crossing Sterling Brook over a private bridge and ending at a private residence. This private road and bridge are maintained by the private, Sterling Falls Gorge Homeowners Association.

3.2.3 Interior Woods Roads and Trails

Old logging trails weave through much of Sterling Forest. Many of these old roads and trails have been improved and adopted for use by a variety of recreational uses, including hikers, skiers, snowshoers, hunters, mountain bikers, horseback riders, etc.

In 2003, the Stowe Mountain Bike Club received permission from the Stowe Selectboard to begin work to improve the Sterling Forest trail system to make it more suitable for mountain biking. SMBC has a signed Memorandum of Understanding with the Town of Stowe that designated the Club as the official trail manager for the mountain bike trails in Sterling Forest.

Upper Gorge Loop: More or less a continuation of Sterling Valley Road into the forest's interior. This 3.5-mile loop takes off from the Sterling Forest parking lot and forms a loop along each side of Sterling Brook. The loop includes areas known as The Basin, Twin Bridges and the Upper Gorge itself. The short Crossover Trail running from the start of the long climb on the east side to Twin Bridges on the west side forms a smaller version of the loop for hikers and skiers desiring a shorter trail. The Upper Gorge Loop is very popular with skiers and snowshoers. It also provides northern access to the Ruschp Sterling Ridge trail.

Marston Trail: From Maple Run Lane, just south of the Sterling Gorge parking lot, this trail enters the forest and runs southwesterly for a couple miles, crossing Page Forest, owned by Stowe Land Trust, before connecting with the "Sterling Run" trail of the Edson Hill Ski Touring network. It also provides southern access to the Ruschp Sterling Ridge trail.

Billings Road: This old woods road branches off Maple Run Lane, and connects to the Catamount Trail before it enters the "Adams Property" conserved by Stowe Land Trust. It is used year-round.

Laurens Loop: A multi-use trail suitable for mountain biking, built by the Stowe Mountain Bike Club that connects Billings Rd. to the Marston Trail in Page Forest.

Peak-A-View: Accessed by private trails, this provides a commanding view of Mt. Mansfield.

Split Rock Trail: A 1.5-mile loop off of Sterling Valley Rd. that was built in 2004 as a multi-use recreational trail suitable for mountain biking.

Ruschp Sterling Ridge Trail: This trail was constructed during the summer of 2013. Originally built by Peter Ruschp, it features viewpoints of both Mount Mansfield to the West and Mount Washington to the East. This trail has been designed for winter use only.

Sterling Falls Gorge Interpretive Trail: This trail is owned and managed by the Sterling Falls Gorge Natural Area Trust. From the Sterling Gorge parking area and after crossing the private bridge on Sterling Gorge Rd, this interpretive trail descends along the south side of Sterling Brook to the bottom of Sterling Falls Gorge. The trail provides Gorge visitors with a natural experience and features interpretive trail signs written by Vermont State Naturalist and author, Charles Johnson, documenting the geographic history of Sterling Gorge to educate visitors regarding the natural processes that helped create Sterling Falls Gorge. The Waterfall Trail at the bottom of the Sterling Gorge Trail leads to the bottom of the waterfalls and a large swimming hole. Due to the steepness of the Gorge, caution should be exercised by staying on the trail and supervising children and pets.

3.2.4 Catamount Trail

The Catamount Trail is a cross-country ski trail running 300 miles the length of Vermont. It is managed by the Catamount Trail Association (CTA) and maintained largely by local resident volunteer members.

The Catamount Trail has deeded access through Sterling Forest and adjacent private land. The deeded trail easement consists of 50-foot corridor through which motorized vehicles are not allowed. The easement also allows the Catamount Trail Association to relocate the trail and the easement.

In 1998, after some years of coexistence with snowmobile use on Maple Run Lane, the Catamount Trail was relocated westward from Maple Run Lane into the Forest to a permanent, non-motorized, "quiet" route on two portions of conservation land. In 2006, eight bridges were constructed along the trail across small drainages to improve it both for skiing and increased non-winter uses. The trail runs west of Maple Run Lane but east of the bear-scarred beech stand.

3.2.5 VAST/Stowe Snowmobile Club Trail

The Vermont Association of Snow Travelers (VAST) and the Stowe Snowmobile Club have made annual requests to cross Sterling Forest using Maple Run Lane and in 1997 and 1998 they helped to construct new sections of trail to complete a snowmobile route (separate from the Catamount Trail) on the Anderson Conservation parcel from Sterling Brook, north past the Sterling Forest parking lot, east to the beaver pond, then north again across Sterling Forest property to the Beaver Meadow tract of State land.

3.3 Management Guidelines

The primary focus of any management activity related to recreation should be simply to allow reasonable use while mitigating any conflict between increased recreational use and other uses or values desired by the Town. A second focus should be the promotion of the educational benefits afforded by Sterling Forest. The following sections of this plan outline management guidelines and recommendations for four sub-components of recreational use: liability, access/parking, trails and roads, and education.

Access and parking: Vehicular access within Sterling Forest is strictly limited. Motorized vehicles are banned outright with the following exceptions:

- a. Emergency response and rescue.
- b. Habitat improvement and timber harvesting
- c. Snowmobiles only on the designated V.A.S.T. trail
- d. Seasonal trail maintenance.

Recreational all-terrain vehicles are strictly prohibited from Sterling Forest. Vehicle parking for visitors to Sterling Forest should be limited to roadway and designated parking areas. All designated parking areas should be designed and maintained in a manner consistent with the conservation purposes of the property and are subject to review by the Vermont Land Trust.

Prohibiting (albeit with exceptions) vehicular access to the interior of the forest will minimize negative impacts on wildlife habitat, water resources, and recreational/ aesthetic values and it will reduce maintenance costs for roads into the forest.

Trails and Roads

Hiking Trails: All of the trails identified on Figure 1 are available to hikers, skiers, snowshoers, and other pedestrian uses. They shall be closed to all motorized vehicles including snowmobiles and ATV's (except for snowmobiles within the designated VAST trail corridor and emergency and forest management use).

Mountain Biking Trails: Riding of bicycles is permitted on designated trails and roads. Their use should be monitored and regulated so as to prevent undue disturbance. The Stowe Mountain Bike Club has a Memorandum of Understanding with the Town of Stowe to serve as the corridor manager of all mountain bike trails in Sterling Forest.

Since the adoption of the first Sterling Forest Management Plan in 2001, extensive trail improvements have been undertaken throughout the entire trail system. This has involved a very successful partnership between the Town of Stowe, SMBC, the Sterling Falls Gorge Natural Area Trust, the Catamount Trail Association, the Vermont Department of Forests, Parks and Recreation, and the Vermont Association of Stowe Travelers. Ongoing maintenance and trail enhancements are essential given the increasing popularity of the trail system.

Cutting of new trails should be discouraged except as part of a well-planned trail expansion program, with all proposals for new trails approved by the Conservation Commission and Selectboard.

Catamount Trail: The Catamount Trail within Sterling Forest is open to all-season pedestrian uses as well as mountain biking. It is closed at all times to all motorized vehicles (except for emergency and forest management use).

The Town of Stowe, via the Stowe Conservation Commission, shall work cooperatively with the Catamount Trail Association, SFGNAT and SMBC in managing the trail for year-round use. Forest management activities shall not be restricted within the Catamount Trail corridor, but due sensitivity to the trail and its users should be exercised when planning and implementing all management activities.

VAST Trail: Snowmobile traffic in Sterling Forest is limited to one dedicated snowmobile corridor. The Vermont Association of Snow Travelers (VAST) trail runs northeast, crossing the Catamount Trail and private conservation land and then back onto Town Forest property in the vicinity of the Sterling Valley Road beaver pond, onto Sterling Valley Road for a short distance (< 100 feet), and then back into the Forest, proceeding north to the Town line, crossing the Catamount Trail again once more at the boundary.

The southern leg of the VAST trail (from the Sterling Forest parking lot) crosses the Anderson's conservation land north and west of their pasture to a bridge across Sterling Brook, then back on to Town land west of (and avoiding) the Maple Run wetland before swinging back to the south and east to re-connect with Maple Run Lane. The VAST trail then continues along the town highway (Maple Run Lane) at the discretion of the Selectboard. It is imperative that maintenance of this trail be to the highest and best standards and practices.

The use of this snowmobile trail should be limited to daytime hours. Commercial snowmobile tour operations may be approved by a special permit from the Stowe Selectboard.

Maple Run Lane: The section of Maple Run Lane from Billings Rd. to Sterling Brook that was reclassified as a Legal Town Trail is gated and closed to vehicular traffic year-round (except for management and emergency use and where it is a part of the designated snowmobile corridor). It should, however, be maintained in a condition suitable for use by emergency and forest management equipment (i.e., as a "truck road" although open to such uses only on an as-needed basis.

Sterling Valley Road: The section of this former Town road that was reclassified to a Legal Town Trail that runs from the Sterling Forest parking lot into the forest is gated and should be maintained as a "truck road" for emergency and management purposes.

All Sterling Forest roads and trails are identified on site by a coherent set of signs using the Town of Stowe branding that is consistent with all Town properties. The signs should be maintained and replaced as needed.

- a. A new multi-use trail suitable for mountain biking off of the beginning of the Upper Gorge Loop has been permitted by Act 250 as part of the "Vermont Ride Center" and should be constructed.
- b. Sterling Valley Road beyond the gate should be maintained as a "truck road" for emergency and forest management access.
- c. Trail maintenance equipment should be permitted on the property as needed for seasonal trail maintenance and repairs. All maintenance activities must have approval from the Conservation Commission prior to commencement. Exempt from this requirement are activities conducted under a Memorandum of Understanding with the Town, and small scale incidental maintenance such as removing trees that have fallen across a trail utilizing hand tools only.
- d. The Legal Trail portion of Maple Run lane should be maintained for sustainable four-season recreational use.

4. Historic Resources

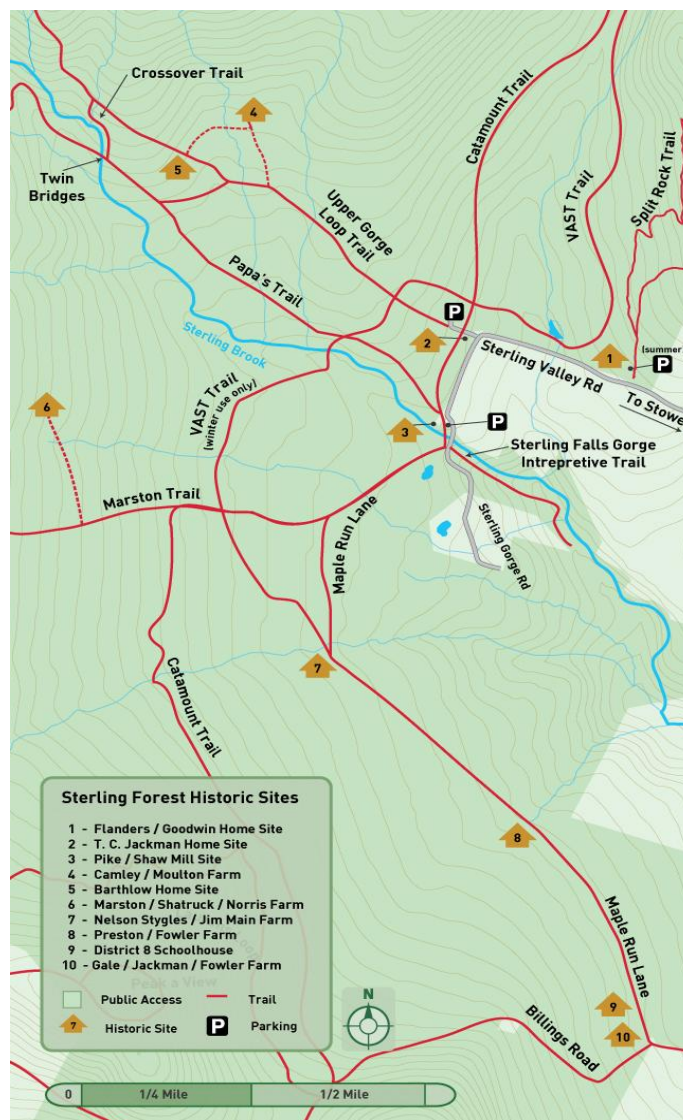
4.1 Management Objectives

The historic resources of Sterling Forest should be protected, preserved and promoted for their educational value.

4.2 Conditions and Current Activities

See section C.6 for information on cultural and land use history.

In 2012, the Town of Stowe received a Certified Local Government grant to identify and map historic sites, mostly cellar holes, in Sterling Forest. Seven former homesteads and farm houses have been identified in Sterling Forest as well as a schoolhouse and the original Pike/Shaw Mill site and Boarding House, located on adjacent private conserved land with public access. The location of these sites is identified in the map below.



4.3 Management Guidelines

To preserve the character of the historic sites, timber harvest activities are prohibited within a 50-foot buffer area surrounding the center of all identified historic sites. Within this buffer area there shall be no activities (e.g., timber cutting, road or trail building, earth moving, etc.) which would jeopardize the integrity of the site. Use of the existing roads and trails, within the 50-foot buffer, will be permitted, but improvements to any road or trail must not have a negative impact on the historic resources. To the extent possible, timber harvest activities should be scheduled during the winter when the ground is thoroughly frozen to minimize site disturbance. This buffer zone will control human induced alterations and allow natural forest succession to occur.

In recognition of the educational benefit of these historic sites, the Town of Stowe has made the sites more visible and accessible to the public. The sites have been mapped and interpretive panels have been installed at each site. A Historic Sites brochure has also been developed that documents the history of Sterling Forest as part of the former Town of Sterling.

4.4 Recommendation

Monitor and maintain the integrity of the historic sites.



5. Water Resources

5.1 Management Objectives

The waterways and watersheds of Sterling Forest provide habitat for all the plants and animals which reside there. They also provide recreational opportunities and serve as water storage areas. While their importance is great their sensitivity to change is high; protecting them is important.

5.2 Conditions

There are five perennial streams found on the Sterling Forest property. These streams all run from the northwest and drain to the southeast. Sterling Brook is the largest stream found on the property.

The soils and slope of Sterling Forest make it a classic montane drainage basin. Soils on the upper slope are very steep and drain extremely well and soils in the middle of the property occur on moderate slopes and drain well to extremely well. Water flows through these two associations of soils into the third association of soil found in the lower or eastern side of the property.

This association has variable drainage and slope. Although these characteristics seem to indicate the possibility of standing water, site visits show that there is little standing water on the property.

Drainage is completed by the five perennial streams in the forest for most of the year. During the spring months, however, several seasonal streams develop to compensate for the excess water produced from snow melt. These streams seem to develop in the paths of old logging roads that run down-slope on the property. Site visits conducted on this property in the months of March, April and May have illustrated this increase in runoff. Two examples of spring runoff flowing down roads occur on the section of Maple Run Lane within Sterling Forest and on the old logging road off of Sterling Valley Road currently part of the Upper Gorge Loop on which ditching and the installation of forty culverts has assisted the water in flowing to Sterling Brook while maintaining a dry former road bed for recreational trail use.

5.3 Management Guidelines

To maintain the pristine character of the waterways in Sterling Forest protective measures should be instituted during all management activities (timber harvesting, road and trail building/maintenance, etc.). Also, existing conditions which may be having a negative effect should be corrected and measures taken to guard against future damage.

To protect the quality of the water resources in Sterling Forest during timber harvesting, guidelines developed by the Vermont Department of Forests, Parks, and Recreation (VT FP&R) and outlined in the Vermont Acceptable Management Practices (AMP) handbook should be followed as minimum standards. Silvicultural activities in wetlands are regulated by the Vermont Wetlands Rules. Specific details regarding these rules can be acquired from the State Division of Water Quality.

Sterling Brook and its associated basin, streams, and gorges deserve specific mention. The main stream channel courses through a deep ravine (the upper gorge) with very steep slopes on either

bank. This area is especially sensitive to erosion and increases in sedimentation during logging and/or trail and road construction activities.

5.4 Recommendations

There are a number of washed out and/ or improperly functioning culverts where trails and roads cross Sterling Brook and other streams on the forest. All stream crossings should be inspected regularly and action should be taken to remedy problems quickly. Failed culverts should be replaced with small wooden bridges or replaced with properly designed and installed culverts.

C. Additional Information

6. History

6.1 Cultural History

Brief Life of a Town

The Sterling Forest area was originally part of the township of Sterling, chartered by the then Republic of Vermont in 1782. Many of the first land owners, called proprietors, were veterans of the Revolutionary War, but none of them actually settled in Sterling. The first settlers came to the area in 1799. Sterling Forest itself was not inhabited year-round until the 1820's.

At various times the town of Sterling had as many as five school districts, and several sawmills, but no post office, church-meeting house or store. The mountain ridges kept travel and contact with neighboring towns to a minimum.

In 1828, the western section of Sterling was incorporated into the adjoining township of Cambridge, as the settlers could not easily get to town meetings on the east side of the mountains.

By the early 1850's it became evident that the mountainous topography was an obstacle to further development of Sterling. In 1855, the Vermont legislature divided the remaining land among Johnson, Morristown, and Stowe.

The Stowe section had one school from about 1828-1908, which it shared with the Morristown section.

The Pike / Shaw Mill

During the summer of 1860, Paphro Pike bought some frontage along Sterling Brook upon which he built a sawmill. Pike co-managed the mill with Elias Merritt until 1862, when he entered the Civil War. Upon his return in 1865, he purchased Merritt's interests. Subsequently the mill was owned by Albert Robinson, Carlos Shaw, and Joel Perkins. The 1888 bill of sale to Ezra Gregg describes the sawmill as containing a waterwheel, a slab saw, a circular saw and other machines.

In 1899, a 32-year old entrepreneur named Howard E. Shaw, founder of present day Shaw's General Store, purchased the mill from Joe Jelly. Shaw would eventually accumulate more than 2,000 acres of forest and farm land for his lumbering and agricultural enterprises in the Sterling area.

The Mill House, which served as housing for the mill workers, burned in 1909, while being managed by Will Camley. Commercial logging in the Sterling area continued, but milling had ceased by 1920. Whole logs were now being shipped to the Stowe Butter Tub Company, later known as Stoware, in Stowe's Lower Village, which Shaw had purchased after the Mill House had been destroyed.

Decline of Settlement

In the 1920's, the supply of spruce and hemlock that were used in butter tubs and cheese boxes had been nearly exhausted and the demand for butter tubs was dying.

Dairy farming had now become a dominant commercial endeavor in the region, but the Sterling area did not contain suitable land for dairying. People were working on, but not living on the remaining farms. Sterling was a bit too far to travel from populated areas for daily work.

By the early 1930's, the remaining farmers drifted out of the valley. The last deed to a member of the Shaw family is dated in 1950. In 1966, the Shaw family divested itself of its 2,150 acres of Sterling land to Sterling Valley, Inc, which was controlled by IBM chairman Thomas Watson. The area then became known as "Watson Forest". The Town of Stowe acquired a 1,500-acre portion of the property in 1995 and renamed it as Sterling Forest.

6.2 Land Use History

Prior to the arrival of European descendants to the Sterling Valley was almost completely forested and so it is today. But between then and now, a whole cycle of human history came and went that included a series of events that changed and manipulated the land, and the landscape, so that today the flora and fauna of the forest may be in fact quite different from what they might have been- had the land not been altered so dramatically, and in such a short period of time. Upon chartering the Town and carving out an existence in Sterling, the newcomers proceeded to clear the land, and then farm and raise animals in the open pastures and fields. Areas too rocky for these endeavors came to be logged as the demand for timber increased in the mid to late 1800s.

The predominance of northern hardwood forests across New England in general, and in the Sterling Forest in particular, is due in part to the clearing of woods for pastures and agricultural land that occurred in the late 1700s and early to mid-1800s. The new residents of Sterling continued the long-held farming traditions they brought with them, clearing and working the land while paying little heed to the steepness of the slopes or the conditions of the soil. Repeated plantings of the same crop, overused pastures, and general lack of knowledge on how to farm sustainably, all eventually augmented the changes in the land.

Sterling's residents finally realized that not only would it be extremely difficult to form a cohesive community across this rough terrain, but they would also have a very hard time surviving trying to farm under the valley's harsh conditions. By the time they moved on, the denigrated land they left behind had been almost completely cleared. This situation was not uncommon, and in fact it was the norm across Vermont as many folks, tired and worn, picked up and left for the richer soils, and easier livelihood they hoped to find further west. This "exodus" occurred all across Vermont, but is dramatically illustrated in places like Sterling where, for a combination of compounding reasons, no one had the wherewithal, the courage, or the tenacity to stick it out.

Had the woods of Sterling Forest not been cleared to the extent they were over the past two centuries, they would most likely be made up more of a mixed hardwood-softwood forest similar to what the first white settlers probably saw when they first arrived in the late 1700s. The forests that grew out of the cleared pastures followed the stages of "secondary succession". In the

Sterling Forest it can be surmised that white pine or red spruce, two of the predominant pioneer species in the region, initially grew up first in the cleared areas. Paper birch, gray birch, and quaking aspen, other pioneer species, also probably colonized other sites where the old forests may have been burned. Since white pine is intolerant of shade, it cannot grow in under itself, rather, more shade-tolerant hardwood species such as sugar maple and American beech grew up in the understory. Eventually, when the white pines had reached harvestable size, they were probably logged, allowing the hardwood understory to prosper, and grow into what is the northern hardwood forest prevalent here today.

Today, differences across the forest between pioneer stands and more mature stands are attributable to the forest being logged at different times throughout the forest's recent history. In several places, red spruce and balsam fir are establishing themselves in the understory, a trend particularly noticeable along the southern side of the Catamount Trail as it heads up to the Edson Hill trails, and along the northern ridge toward Beaver Meadows. Both red spruce and balsam fir are quite shade tolerant, and thus are able to persist in the closed canopy of the understory for a long period of time. Larger pockets of spruce-fir forests might indicate repeated disturbance, in one form or another, natural or otherwise, such as windthrow, pasture, logging, poor soils, high elevations, etc. Spruce-fir tends also to predominate at higher elevations with their poorer soils and harsher climate.

7. Forest Types and Natural Communities

Much of the current landscape of Sterling Forest is an expression of the history of human use that has occurred in Sterling Valley. The settlers of what was once the Town of Sterling, more recent logging endeavors, and current recreation use have all shaped and influenced what the forest is today.

Most of the property is comprised of northern hardwood forest, the forest cover type most common throughout New England. This type of forest is generally dominated by sugar maple, American beech, and yellow birch and tends to be supplemented with striped, mountain, and red maple, black and pin cherry, white and gray birch, aspen/ white ash, basswood, red spruce and balsam fir. All of these species are well represented, in various concentrations and locations, within Sterling Forest.

Previous pasture land, located in the lower reaches of the forest near Maple Run Lane and Sterling Valley Road, has reverted to tree species which succeed in competing for available light and nutrients. These early successional or pioneer species may facilitate the growth of more shade tolerant middle and late successional species in older stands.

The intermediate location of the main "basin," which is a bowl that lies cradled between the lowlands further down the valley to the east, the highlands of the main spine of the Green Mountains to the west, and the ridge that separates Sterling Forest from Beaver Meadows area to the north- lends itself to relatively deep, well-drained soils that promote northern hardwood forests. Northern hardwood species are represented throughout Sterling Forest, but vary according to local growing conditions and successional stage of particular stands. Early to middle successional hardwoods include: aspen (*Populus*), white birch (*Betula papyrifera*, *Betula*

populifolia), cherry (*Prunus serotina*) and red maple (*Acer rubrum*). These are found in the now overgrown former pastures near Maple Run Lane.

Much of the northern stands within Sterling Forest are mixed stands of hardwoods and softwoods. Pockets of spruce (*Picea*), fir (*Abies*) and hemlock (*Tsuga*) can be found within the early successional stands. Further upslope, in the middle of the forest, beech (*Fagus grandifolia*) and sugar maple (*Acer saccharum*) dominate in late successional stands. Younger stands, those logged more recently, may have more red maple and white birch. High elevations of the forest near 2,500 feet, and the state-owned ridges above, boast a gradual transformation toward predominance of spruce-fir stands. In addition to red spruce and balsam fir, these upper elevations host white birch, gray birch, mountain maple, and mountain ash.

An entire report could be written describing pathogens which affect the health of the Sterling Forest. While many of these organisms may be inconspicuous in appearance, their impact on forest health can be glaring. Given the concern with bear habitat, the impact of pathogens on beech trees is noteworthy, especially since the thin bark of beech trees makes it vulnerable to disease.

More than 70 species of decay fungi have been reported for beech, a record for hardwood trees. The most serious problem is "beech bark disease", which occurs when the beech scale (*Cryptococcus fagisuga*) attacks the bark and renders it susceptible to bark canker fungi (*Nectria*). Beech bark disease has the potential to kill mature trees in large numbers. Evidence of the disease was apparent on some trees in the Sterling Forest, but lack of expertise in this field prevented confirmation of the extent of infestation. Further study of the forest by a qualified forester would clarify the impact of this disease and the numerous other pathogens which probably exist in the forest.

A timber cruise by consulting forester Galen Hutchison in 1994 indicated that there are 1,133 acres of northern hardwood forest below 2,500 feet. Many of these stands were logged about 1960. There are about 160 acres of spruce-fir or mixed stands (25% softwood). There are 362 acres from abandoned farm land; these stands have the most varied cover and species composition, and it appears the most wildlife use. Cover in these areas varies from open sedge meadows to dense softwood clumps and apple trees, mountain ash (*Fraxinus*), service berry (*Ilex amelanchar*), black cherry, and other plants of value to wildlife are prevalent. Additionally, there may be rare apple tree species.

The Vermont Nongame and Natural Heritage Program has defined natural communities as groups or assemblages of plants and animals that occur naturally together/ and are found repeatedly across the landscape. There are 80 different types of wetland and upland natural communities in Vermont, which are classified to help in identifying natural areas for conservation or protection.

For this plan, natural communities were determined using the 1994 timber cruise by Galen Hutchison, 1992 aerial infrared photographs, 1978 orthographic photographs, and limited field observation. The communities identified in Sterling Forest include, but are not limited to: high-elevation hardwoods-spruce forest, mesic northern hardwood forest, hemlock forest, and sedge meadow. There may also be pockets or inclusions of alluvial shrub swamp/woodland, northern/high-elevation talus woodland, white pine-northern hardwood forest (very small, mostly on private land), montane spruce-fir forest, and rich northern hardwood forest. Due to the time of

year when the fieldwork was conducted and lack of spring herbaceous plants, useful for identifying these areas, positive identification of all of these communities was not possible.

While the natural community system does not address early successional stages, we have identified two "pioneer communities." Both are early to middle successional mesic hardwood communities; one has a preponderance of spruce-fir inclusions, the other has hemlock inclusions in addition to the spruce-fir. Future timber cruise data will be extremely helpful in identifying the composition of these areas more specifically.

The following text elaborates on the more distinguishable communities found in Sterling Forest.

7.1 High-Elevation Hardwoods-Spruce Forest

This community is dominated by white birch (*Betula papyrifera*), with red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) also present. This community tends to be found between 2,000 and 3,000 feet along the band between the northern hardwoods, which make up the heart of the forest, and the higher elevation montane spruce-fir. Spanning the upper elevations of the forest, there is a much lower diversity of both plant and animal species than in communities found at lower elevations.

7.2 Mesic Northern Hardwood Forest

This broadly defined community type comprises the vast majority of the Sterling Forest, and is the most common forest type found in Vermont. Generally located below 2,500 feet, these forests are dominated in the canopy by sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and American beech (*Fagus grandifolia*). Other species found in abundance throughout the Sterling Forest that are characteristic of this natural community include: white ash (*Fraxinus americana*), white birch (*Betula papyrifera*), red maple (*Acer rubrum*), and black cherry (*Prunus serotina*). Hobblebush (*Viburnum alnifolium*) and striped maple (*Acer pensylvanicum*) are very common in the shrub layer, with red-berried elder (*Sambucus pubens*) present but less predominant.

Spring ephemerals are very common of this forest type, but because of the amount of snow still on the ground most were yet to be seen when field work was completed. Typical herbs are evergreen woodfern (*Dryopteris intermedia*), Canada mayflower (*Maianthemum canadense*), Christmas fern (*Polystichum acrostichoides*), shining clubmoss (*Lycopodium lucidulum*), sarsaparilla (*Aralia nudicaulis*), red trillium (*Trillium erectum*), and white wood aster (*Aster acuminatus*).

In Sterling Forest, variations in the mesic northern hardwood community are quite abundant. For instance, there is a much higher incidence of

7.3 Hemlock Forest

This community, in which the stately hemlock (*Tsuga canadensis*) dominates, occurs in microsites along steeply sloping cool sites where soil is thin and in seepage areas within northern hardwood forests. These small communities are present in isolated clumps along the Sterling Brook ravine and in a larger area to the west of Maple Run Land and south of the Catamount Trail as it heads toward Edson Hill.

7.4 Sedge Meadow

Shallow organic soils are found in this community that is seasonally flooded and/ or permanently saturated. Tussock sedge (*Carex stricta*) is the dominant species, blue-joint grass (*Calamagrostis canadensis*), joe pye weed (*Eupatorium*), and bulrushes (*Scripus spp.*) are other common species. Around the edges of the small meadow that lies near Maple Run Lane, identified by Hutchison, are willow, poplar, apple, birch, and fir trees. The areas on either side of the Catamount Trail, after it bottoms out but before it reaches the Anderson house, are abandoned farmland with still nearly open sections, and although not technically meadow, sedges, grass, apple, mountain ash, aspen, shadbush, alder, and some dense spruce-fir clumps are scattered throughout this area as well.

7.5 Communities which may exist as inclusions within larger communities:

7.5.1 Rich Northern Hardwood Forest

This community is similar to the beech-birch-maple forests, but accumulations of deep soil in combination with mineral-rich bedrock or till provide more nutrients than in ordinary hardwood forests. These sites tend to be lower slopes which collect nutrients, and sometimes quite steep and are most common in areas of calcareous till or topographically induced enrichment, also generally found at elevations below 2,500 feet. Given the generally sloping character of the Sterling Forest it would not be surprising that this type of community would be found here, but none have been positively identified. General indicators evident in the Sterling Forest are increased numbers of black cherry (*Prunus serotina*) and white ash (*Fraxinus americana*).

The herbs of this community type are perhaps the most indicative, which will unfortunately probably not be seen before this project is completed. Typical of a rich northern hardwood forest, but which have not been confirmed, include: Dutchman's breeches (*Dicentra cucullaria*), hepatica (*Hepatica spp.*), Canada violet (*Viola canadensis*), wild ginger (*Aserum canadense*), wood millet (*Millium effusum*), blue cohosh (*Caulophyllum thalictroides*), and early yellow violet (*Viola rotundifolia*). Characteristic ferns, again which are not confirmed, are silvery spleenwort (*Althyrium thelypteroides*), hultbert fern (*Cystopteris bulbifera*), and maidenhair fern (*Adiantum pedatum*).

7.5.2 Montane Spruce-Fir Forest

This community type is most obvious across the State-owned portion of forest, in its upper elevations, but is also present in a small corner section of Town-owned forest at very top of the "bowl" above Sterling Brook's headwaters. Dominated by red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*), with occasional heartleaf birch (*Betula papyrifera var. cordifolia*), white birch (*Betula papyrifera*), and yellow birch (*Betula alleghaniensis*), this high-elevation community is generally found above 2,500 feet where soils are thin and weather extreme.

7.5.3 White Pine-Northern Hardwood Forest

This community type was probably more common in earlier days of the Sterling Forest, after it was initially cleared by the first settlers but before extensive logging efforts that occurred in this century. Given the desirability of white pine in timbering operations, it is understandable that there appears to be very little of it left. Most obvious is the area within the right-of-way of the

old road that heads into the forest from Sterling Valley Road. Present in a mixed stand, other trees that occur in this community include red maple, beech, white ash, and sugar maple.

7.5.4 Northern/High-Elevation Talus Woodland

This community generally tends to be found above 2,500 feet in elevation. Dominated by heart-leaved paper birch (*Betula cordifolia*) and red spruce (*Picea rubens*), rock polypody (*Polypodium virginianum*), skunk-current (*Ribes glandulosum*), and mountain maple (*Acer pensylvanicum*) may be found in abundance in this community as well.

7.5.5 Alluvial Shrub Swamp/Woodland

This community may be found along the perennial streams in the forest, where flat areas are flooded occasionally during spring runoff. Black willow (*Salix nigra*) and other willows (*Salix spp.*) are especially adapted to colonizing the edges of streams, rivers, and other wet areas- and were found sporadically in these locations in Sterling Forest. Like dogwoods (*Cornus spp.*), the willow genus has many species that are shrubs in the northern part of this country, which often dominate the moist land surrounding meadow streams.

8. Geology

8.1 Bedrock

Bedrock underlying Sterling Forest is typical of the mountain spine and foothills of central and northern Vermont. Upper reaches of the forest are underlain by the Underhill Formation. The Underhill Formation is a silvery, gray-green schist that contains numerous minerals. The chemical structure of minerals has significant influence on formation of soil type. Bedrock with calcium-containing minerals, (for example, will likely contribute to formation of a rich soil, one which could support a broad range of vegetation). The primary minerals in the Underhill formation are quartz, sericite, albite, chlorite, and biotite; these minerals contain silica, potassium, sodium, magnesium, and iron. Although none of the primary minerals contain substantial calcium, other calcium-containing minerals may exist in small pockets within the bedrock.

Lower elevations of Sterling Forest are underlain by a different grade of schist, known as Hazen's Notch Formation. The composition of this schist is slightly different than the Underhill Formation, likely due to differences in the source of the rock and to the intensity of metamorphism. One huge erratic boulder was discovered on conservation land just below Sterling Falls Gorge.

8.2 Surficial

Glacial ice and water are responsible for the surficial geology of Sterling Forest. Overlying the bedrock throughout the forest is till. Till is the jumble of rocks, pebbles, sand, and clay that was eroded and subsequently transported and deposited by ice. The till underlying Sterling Forest was likely plastered onto bedrock surfaces to form a hard coating; this coating of till has been exposed by erosion on some of the logging roads.

While the Surficial Geology Map for Vermont shows only till beneath Sterling Forest, the small gravel pit (in which the parking lot was built) is evidence of other processes related to glacial ice. Gravel suggests that water played an important role when the material was deposited. The gravel pit may have been deposited at the edge of melting ice, called a kame deposit.

8.3 Maps

Field work for the State of Vermont Bedrock and Surficial Geology maps was done in the 1960s. Using the original maps (15-minute USGS quadrangle base) and field notes, Information and Visualization Services, Inc. in

Burlington has digitized bedrock and surficial geology for the entire state. As of March 1996, these digital are available for a fee of \$60.00 per feature (bedrock or surficial) for a 15-minute USGS topographic quadrangle. Digital geologic data for the Town of Stowe could be incorporated into the Geographic Information System at the Lamoille County Planning Commission and would thereafter be available for use by the Town.

According to the State Geologist's Office, more recent bedrock mapping has occurred on the west side of Mount Mansfield, but none has been conducted on the east side.

9. Soils

The soils of Sterling Forest have derived from debris left behind by the recession of the last glacial ice sheet over 10,000 years ago. Glacial till, the material deposited by glacial ice, forms the parent material of the upland soils found on the property. Outwash sand and gravel deposited by glacial melt water make up the parent material of the upland valley soils.

The Natural Resource Conservation Service, previously the Soil Conservation Service, has categorized the soils in Sterling Forest into three general types. An explanation of these three general soil types is given below. The general categories are divided further into 19 map units according to specific soil characteristics such as slope, depth to bedrock, and water-holding capacity.

Berkshire-Ivlarlow-Peru Association the type of soil found in the lower, eastern piece of the property. This association is found on broad slopes and in depressions on slopes. It occupies 34% of all the land in Lamoille County. The soils found in this association are deep, loamy soils and are found in variable topographic and drainage conditions. These soils are good for farming, especially when growing hay, silage and corn. They are also well suited for pastures. Hardpan in the Marlow and Peru soils and the steep slopes of the Berkshire soils limit community development on soils in this association. These soils are suitable for woodland, wildlife area and recreational development.

Lyman-Turnbridge Association is the classification given to the soils that fall in the middle section of the Sterling Forest property. The area of the property covered by this classification is a corridor that runs from the south property boundary to the north property boundary. Generally, these soils are found on the foothills and the middle parts of the Green Mountains and the surface can have exposed bedrock. This association covers 41% of all the land in Lamoille County. These soils range from shallow to moderately deep, gently sloping to steep, and well drained to

somewhat excessively drained. These loamy soils have bedrock at a depth of forty inches or less. Slope and depth to bedrock limit these soils for both farming and community development.

These soils are suitable for wildlife and woodland development although the use of harvesting equipment could be limited.

Londonderry-Stratton-Ricker Association is the classification given to the soils found on the top or western piece of the property. Generally, these soils are found on the upper slopes of the Green Mountains. This association covers 4% of Lamoille County. These are shallow, steep, well-drained, loamy soils. Depth to bedrock of the soils in this association can range from seven to twenty inches. The lower slopes of these soils are used for recreation and woodland production. Depth to bedrock and the location of soils limit any other uses of these soils.

10. Wildlife Habitat and Species

A broad array of amphibians, birds, mammals, and reptiles live within the varying successional stages of the northern hardwoods that comprise Sterling Forest. Evidence and sign of only a small portion of wildlife that potentially inhabit the parcel's forests, streams, and wetland were identified, including that of pileated, hairy, and downy woodpecker, ruffed grouse, white-tailed deer, moose, red fox, gray and red squirrel, snowshoe hare, cottontail, coyote, black bear, and possibly bobcat and fisher. As this document is not meant to be a substitute for an "animal encyclopedia", the discussion of wildlife below is based on observations of tracks and other signs of just a few of the common animals of this property. It does not address all the smaller organisms, including insects, fungi, and bacteria, which make up the ecosystems that comprise the forest.

Wildlife habitat specialist, Susan Morse of Jericho, Vermont was hired in January 1997 to assess wildlife habitat conditions in several specific locations within Sterling Forest and make management recommendations. Her assessment was limited to six specific habitats: the wetland, the Maple Run corridor, the gravel parking site, the upper gorge and the Sterling Brook watercourse, the bear-scarred beech stand, and the high elevation spruce-fir- birch-ledges zone. Her report is included in the Appendix and her management recommendations are incorporated within Parts III and IV of this plan.

One of the most often asked about and intriguing animals that inhabits Sterling Forest is the black bear (*Ursus americanus*). Black bear prefer mixed deciduous, coniferous woodlands with a thick understory. The greatest bear activity tends to occur where there are later successional hardwoods with a high density of beech, as occurs in the heart of the Sterling Forest. Bear sign, mainly claw markings on beech trees, was observed primarily in these later successional hardwoods. Den sites are often located in hollow logs, rock ledges, fallen trees, and slash piles.

Black bears are solitary animals that establish individual "home ranges". They are usually intolerant of each other and do not overlap ranges, except when the males travel during breeding season, or if there is a particularly important food source that can sustain a number of bears. The size of the ranges are dependent on how remote they are, how adequate the cover is, and the availability of food throughout the various seasons. (Their need for food varies dramatically depending on the time of year.)

Bears are instinctively extremely wary animals, thus preferring seclusion, and avoiding human interaction and intrusion such as development and roads. (Of course, they can and are influenced and taunted by easily accessible food, resulting in their increasing preference for and dependence on human scraps at dumps and campsites in many places.) They like "cover" which can mean the nearly impenetrable spruce-fir growth on mountain ridges, some of which occurs in the higher reaches of the Sterling Forest, heavy vegetation along streams and wetlands, which is common throughout the forest, or thick undergrowth in timbered woods, also prevalent in the forest. Cover provides bears with the privacy and protection they need and prefer.

Although an omnivorous feeder, plant materials are the black bears' main source of food. They also eat grubs, ants, mice, frogs, and fish. Berries are sought after as soon as they ripen in the summer, and as fall approaches, apples (such as those that dot the lower reaches of the forest), and chokecherries are a common source of food. Just prior to denning they need to locate a concentrated food source in New England this fall food is generally what is called "hard mast," which consists primarily of nuts, usually beechnuts here in Vermont. From September until November- denning time - bears will consume massive amounts of beechnuts to build up their fat reserves for hibernation. They'll actually go into what's called a "feeding frenzy" and eat around the clock for several days.

Because food is so important to their livelihood, as it is with all animals, the routes they travel throughout the year are critical links to obtaining the various food sources. These "travel corridors" are also important during breeding season and when young bears disperse to find their own home ranges. Human settlement patterns/ ever-increasing development and agriculture's general dominance of lower altitudes place bears' home range into the higher elevations of the Green Mountains, and in the expansive forests of the Northeast Kingdom. Given the Sterling Forest's close proximity to other large, undisturbed tracts of lands continuing to protect what is potentially a critical bear habitat region is vital to their survival.

The bear is at the top of the food chain and hierarchy of habitat requirements in the Northeast. Bears need the largest chunks of land, making forest fragmentation and development very real threats to their well being and ability to sustain a sizable population. The dependence of a bear's reproduction and survival rate on its habitat makes it very sensitive to changes in that habitat. This is the premise that spawned the term "indicator species" among biologists- an animal that is so sensitive to an environmental parameter that an alteration to that parameter causes biological or behavioral changes. Bear is an indicator species for Vermont wildlife habitat.

Moose (*Alces alces*) prefer a habitat of second-growth boreal forests mixed with open areas and wetlands, although only one wetland is documented in the Sterling Forest that potentially offers aquatic plant life for summertime feeding (which provides relief from mosquitoes and flies as well). Moose rubbings and browse are found throughout the forest on young striped maple, indicating that the forest seems to be a preferred habitat (at least in winter). Their winter diet appears to be limited to hardwood bark, the foliage of evergreens/ and the minerals and salts they receive from scraping at the small trunks of young striped maple. Favorite foods include balsam fir, hemlock/ willow, aspen, and alder/ all of which are found within the boundaries of Sterling Forest. Their summer eating habits often find them near shorelines the wetland in Sterling Forest is probably a prime summer stomping ground - and in clearings such as the old apple orchards where there is an abundance of tender leaves/ twigs, bark, fruit, and other vegetation. They also graze on grasses, lichens, mosses, mushrooms, and herbaceous plants.

White tailed deer (*Odocoileus virginianus*) are very common throughout all of New England. Their habitat consists of forest edges, fields, and areas with woodland openings. The winter months/ when snow fall greatly limits the range of deer, force the animals to create "yards" in stands of earlier successional conifers where they can build resting areas on packed snow, and where they are somewhat shielded from the weather. Such deer yards are located in spruce/fir regions of Sterling Forest. They depend on the twigs and young bark of a variety of woody, deciduous plants and some coniferous growth. Grasses, herbs, mushrooms, grubs/ and roots are also food sources for deer.

Cottontail (*Sylvilagus floridanus*) and snowshoe hare (*Lepus americanus*) eat buds and twigs of sapling trees or shrubs in winter, and also chew off bark of apple and other trees. Both animals have winter ranges of just a few acres and tend to re-use their trails so much that they wear hardened paths in the snow- many of which are seen across the Sterling Forest.

Although coyote (*Canis latrans* variety) tracks and scat were not definitely confirmed, as they so closely resemble those of small domestic dogs, it is highly probable that a few of these extremely cunning animals make the Sterling Forest their home. They tend to feed on small rodents, carrion deer, unfinished prey of other predators, and fruits and berries. An individual's range is generally between 30 and 50 square miles, and may overlap with those of other coyotes. Although upland hardwood forests are not their prime habitat; coyotes go where the deer are, and an abundance of deer tracks and scat was found within the forest.

11. Legal Considerations

11.1 Vermont Land Trust Conservation Easement

A Conservation Easement on the original Sterling Forest 1,500 acres is held by Vermont Land Trust.

"The protected property shall be used for habitat protection, non-commercial recreation, forestry, and open space purposes only. No residential, commercial 1 industrial, or mining activities shall be permitted, and no building, structure/ or appurtenant facility or improvement shall be constructed, created! installed! erected, or moved onto the protected property, except as specified under this deed."

This section is meant to be a general guide to explain the legal considerations involved in the management of Sterling Forest. When specific decisions are to be made involving legal considerations and the forest, the deed must be referenced to obtain specific legal guidance.

On July 61, 1995, Vermont Land Trust transferred ownership of 1,500 acres of the Watson Forest to the Town of Stowe.

The following legal considerations are expressed in the deed documenting the land transfer: rights reserved by Vermont Land Trust with regard to the property; the purpose of the conservation easement placed on the property in this property transfer; uses restricted on the property; uses permitted on the property; the need for public access to the property; the right of

re-entry retained by the Vermont Land Trust; and the right-of-way across the property granted to the state. The purpose of this section is to explain how these legal considerations might affect the management of Sterling Forest in the future.

There are five rights reserved by Vermont Land Trust regarding the Sterling Forest parcel. First, Vermont Land Trust retains all development rights in the property. If the Town of Stowe wishes to develop on the parcel, it must receive approval from Vermont Land Trust. Second, Vermont Land Trust reserves the right to enforce the conservation easement placed on the property as a result of this deed. Third, Vermont Land Trust reserves the right to enforce the public access easement placed on the parcel. Fourth, the land trust reserves the right to re-enter the property under the conditions set forth in section five of the deed. Fifth, Vermont Land Trust accepts the right-of-way issued to the State of Vermont's Forests, Parks and Recreation Department in section six of the deed.

The purposes of the conservation easement placed on the Sterling Forest parcel are threefold. The first is to help implement the State of Vermont's policies to conserve the state's wildlife habitats and other natural resources, as well as sound agricultural and forestry practices- through planning, regulation, land acquisition and tax incentive programs. Conservation of wildlife habitats, non-commercial public recreational opportunities, forestry values and scenic resources for present and future generations is the second purpose of the easement. These two objectives will be achieved through a variety of features explained in the deed. Explanation of these features is the third purpose of the conservation easement.

There are eight restricted uses as explained in the deed of the Sterling Forest parcel. The Town of Stowe cannot take part in the following activities on the Sterling Forest property (except as specifically stated in the easement and outlined below as "permitted uses"):

- a. Except as permitted below, the property cannot be used for residential, commercial, industrial, or mining activities. Also, the Town cannot build or move any facility on to the property;
- b. No rights of way are allowed on the property, unless specifically mentioned in the deed; the Town may apply to the Vermont Land Trust for a permit to obtain a right-of way easement for the Sterling Forest;
- c. There will be no signs, billboards, or outdoor advertising constructed in the forest, unless specified in the deed as acceptable;
- d. The placement, collection, or storage of trash, human waste, or any unsightly or offensive material is restricted in the parcel;
- e. Disturbance of the surface, including but not limited to filling, excavation, removal of topsoil, sand, gravel rocks, or minerals, or change of the topography of the land in any manner is restricted by the deed;
- f. The property cannot be subdivided or conveyed into separate parcels by the Town of Stowe;
- g. Operation of motorized vehicles is prohibited on the property, unless specified as an allowed use in the deed (all-terrain vehicles, four-wheelers, trucks, etc. are prohibited, but snowmobiles can be used on designated trails; and motorized equipment is allowed for emergency and forest management use.)

- h. Manipulation of natural water courses, marshes, or other water bodies and activities detrimental to water quality are prohibited in the Sterling Forest.

There are nine permitted uses of Sterling Forest explained in the deed. These are uses the Town of Stowe can carry out on the property:

- a. The property can be used for any non-motorized recreational activities, (for example hunting, trapping, bird watching, walking and cross-country skiing);
- b. Special-use permits to allow for commercial or non-commercial recreational, educational, agricultural, or research purposes is allowed. These permits must not conflict with restricted uses explained in the deed;
- c. The right to create parking facilities on the parcel is allowed; written permission must be received from Vermont Land Trust by the Town of Stowe before a parking facility is built; these facilities must be reasonable in order to get written permission.
- d. The re-establishment, maintenance and use of cultivated fields, orchards, and pastures found on the property is allowed;
- e. Maple sugaring operations, the harvesting of timber and other wood products and the right to construct roads to carry out these activities is allowed on the parcel; however, strict rules must be followed when carrying out these activities (these rules are documented in the deed);
- f. The Town of Stowe has the right to clear, construct, and maintain trails for walking, horseback riding, cross-country skiing and other non-motorized recreational activities on and across the parcel (mountain biking may be permitted at the discretion of the Town of Stowe);
- g. Establishment of dispersed tent sites and rustic shelters is an allowed use on the Sterling Forest. However, strict rules must be adhered to before either sites or shelters are established and written permission must be received by the Town of Stowe from the Vermont Land Trust before doing such an activity;
- h. The right to extract sand and gravel for use on the property is allowed, but strict rules must be followed when carrying out such an activity. These rules are listed in the deed;
- i. All uses not specifically mentioned, but consistent with the purposes of the conservation easement in the deed, are permitted; prior written notice must be given to the Vermont Land Trust by the Town of Stowe if such activities are going to be carried out.

The Town of Stowe must allow public access to Sterling Forest for all types of non-motorized, dispersed recreational activities. If allowing such access limits or restricts the Town of Stowe's ability to implement the requirements of the deed, it may limit access accordingly. (For example, trails may be closed during mud season to limit damage.)

11.2 Stowe Land Trust Conservation Easement

In 2008, Stowe Land Trust purchased a 30-acre parcel adjacent to Sterling Forest and donated it to the Town of Stowe, which incorporated it into Sterling Forest. Stowe Land Trust holds a conservation easement on this portion of the property that is very similar in nature to the Vermont Land Trust Easement.

11.3 Other Legal Constraints

There is an easement deed to Vermont Electric Cooperative for an underground power line dated 30 April 1982;

There is a right-of-way easement to Vermont Electric Cooperative from Sterling Valley, Inc., dated 30 March 1987;

There is an easement for a right-of-way conveyed to the State of Vermont, Department of Forests, Parks and Recreation, 6 July 1995.

Right of Way easements have also been provided to both the Catamount Trail Association and the Vermont Association of Snow Travelers (VAST) for the portion of their trails passing through Sterling Forest.