



*Woodland Management Services  
Green Certified Resource Managers*

## **MID-MAINE FORESTRY**

**Barbara E. Brusila • Mitchell W. Kihn**  
**Licensed Professional Foresters**

**1320 Western Road • Warren, Maine 04864**  
**(207) 273-4046**

midmaineforestry@gmail.com – Mitch  
midmaineforestry2@gmail.com – Barrie

# **FOREST MANAGEMENT PLAN**

## **for Camden Snow Bowl**

Landon Fake, General Manager  
P.O. Box 1207  
Camden, Maine 04843  
(207) 230-0490, ext. 104; <lfake@camdenmaine.gov>

property located at 20 Barnestown Rd.  
Camden, Knox County, Maine

Camden Tax Map 227, Lots 6, 7, 8, 64, 66 & 67  
Camden Tax Map 228, Lots 3, 5, 6, 7  
Rockport Tax Map 37, Lot 110

240 acres (179 wooded acres)

Prepared by:

Mitchell Kihn  
LPF #3206

February 20, 2014

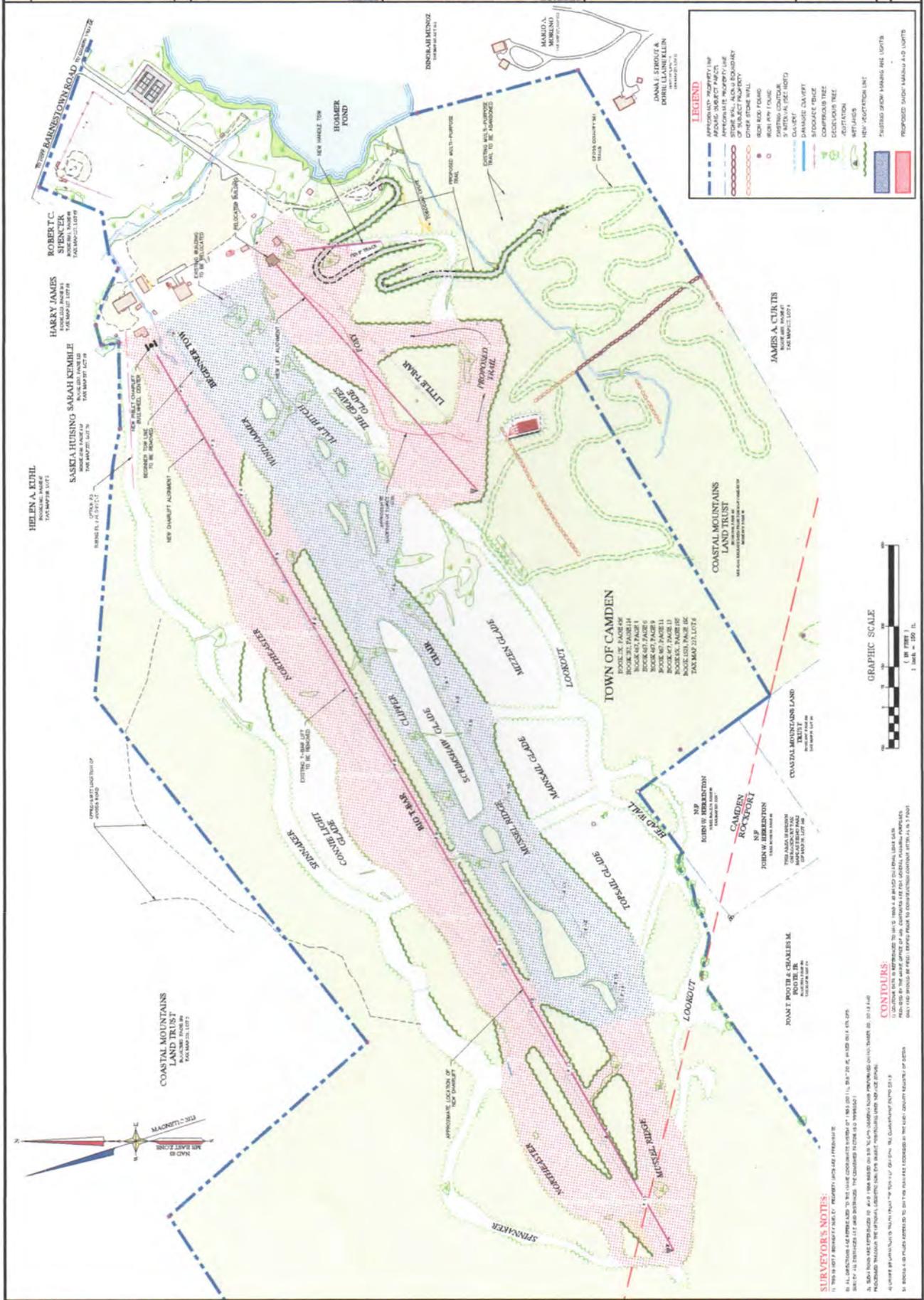
DATE	
NO.	
REVISION	

DATE: JANUARY 30, 2014  
 COUNTY: KNOX  
 TOWN: CAMDEN  
 PROJECT: RECREATION CENTER  
 SHEET TITLE: BASE PLAN  
 SCALE: 1" = 100'

TOWN OF CAMDEN  
 RECREATION CENTER  
 CAMDEN, MAINE

**Garley & Dorsky**  
 ENGINEERING & SURVEYING  
 115 STATE STREET, SUITE 200  
 CAMDEN, MAINE 04923  
 TEL: 603-753-0000  
 FAX: 603-753-0001

**ADVANCE COPY**  
 DRAWING: 2013-019  
 C-1



HELEN A. KUHL  
 HARRY JAMES  
 SARAH HIRSHING SARAH KEMBLE  
 ROBERT C.

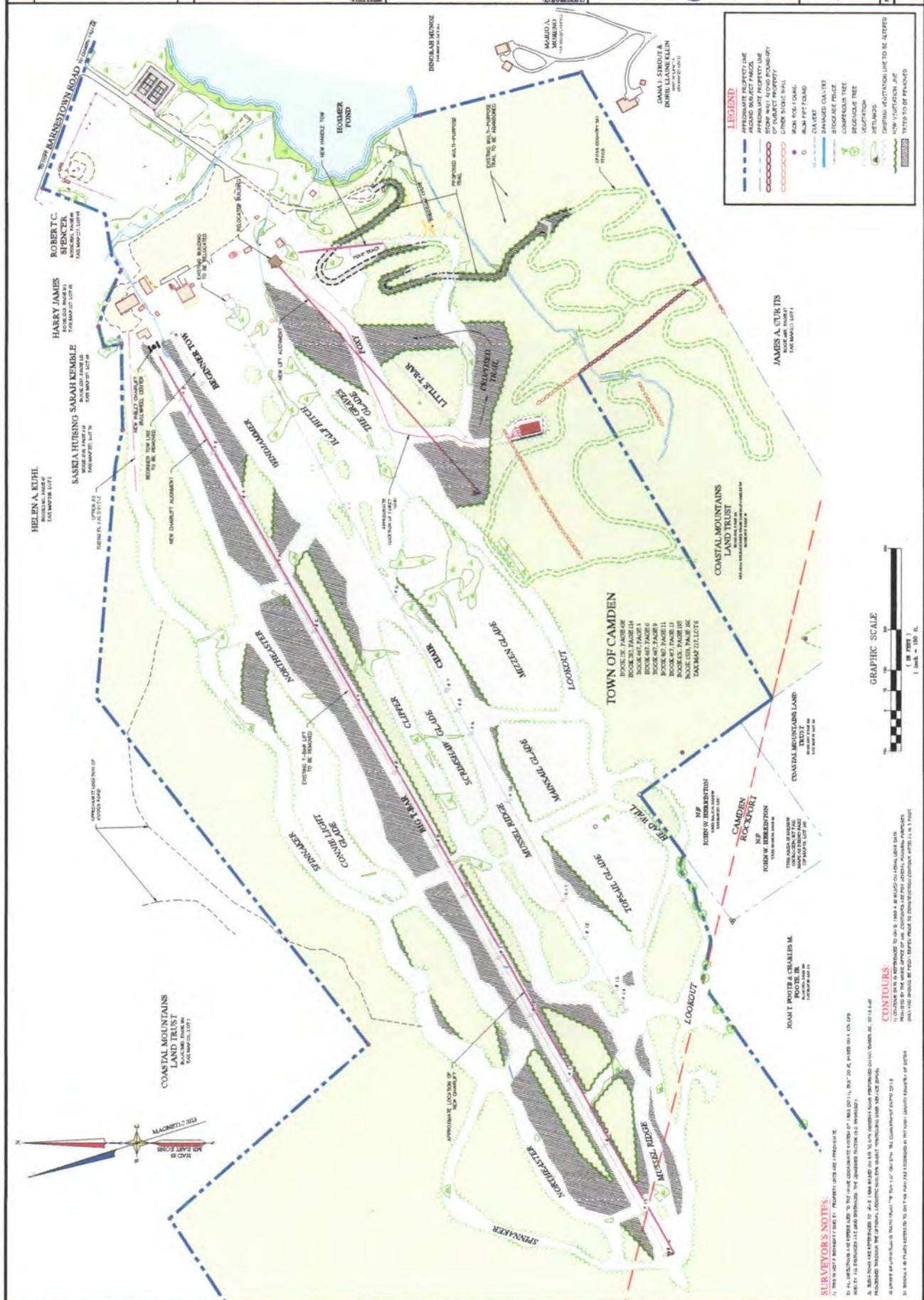
JAMES A. CURTIS  
 COASTAL MOUNTAINS LAND TRUST  
 TOWN OF CAMDEN

ROBERT C. CURTIS  
 HARRY JAMES  
 SARAH HIRSHING SARAH KEMBLE  
 ROBERT C.

**SURVEYOR'S NOTES:**  
 1. THIS IS NOT A RECREATION CENTER.  
 2. ALL DIMENSIONS ARE PERPENDICULAR TO THE LINE UNLESS OTHERWISE NOTED.  
 3. ALL DIMENSIONS ARE PERPENDICULAR TO THE LINE UNLESS OTHERWISE NOTED.  
 4. ALL DIMENSIONS ARE PERPENDICULAR TO THE LINE UNLESS OTHERWISE NOTED.  
 5. ALL DIMENSIONS ARE PERPENDICULAR TO THE LINE UNLESS OTHERWISE NOTED.

GRAPHIC SCALE  
 1" = 100'

4d



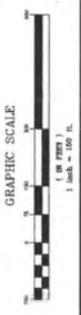
**Garvey & Dorsky ENGINEERING & SURVEYING**

125 Main Street, Suite 207  
 Portland, Maine 04101  
 Tel: 603.759.3800  
 Fax: 603.759.3801  
 www.garveyandorsky.com

**ADVANCE COPY**

PROJECT: 2013-15  
 SHEET: C-2

**LEGEND**  
 - - - - - APPROXIMATE PROPERTY LINE  
 - - - - - STOP-WAY ALONG PROPERTY LINE  
 - - - - - APPROXIMATE PROPERTY LINE  
 - - - - - PROPERTY BOUNDARY  
 - - - - - OTHER PROPERTY BOUNDARY  
 - - - - - SIGN POST FOUND  
 - - - - - SIGN FOUND  
 - - - - - DAMAGED GUY-WIRE  
 - - - - - BROCKAGE POLE  
 - - - - - COMPOSITE TREE  
 - - - - - DECIDUOUS TREE  
 - - - - - CONIFEROUS TREE  
 - - - - - SETBACK  
 - - - - - CENTRAL VENTILATION LINE TO BE ALTERED  
 - - - - - TRAILS TO BE REMOVED



46

**SURVEYOR'S NOTES:**

- THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE APPROXIMATE.
- ALL DIMENSIONS ARE REFERRED TO THE VALUE COORDINATE SYSTEM OF 1983 (NAD 83). THE DATUM IS THE MEAN SEA LEVEL DATUM OF 1983. THE DATUM IS THE MEAN SEA LEVEL DATUM OF 1983.
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# LOCATION / TOPOGRAPHIC MAP

## Camden Snow Bowl Camden & Rockport, Maine

True  
North



1" = 2,000'



# SOILS MAP

## Camden Snow Bowl Camden & Rockport, Maine

Source: *Soil Survey of Knox & Lincoln Counties, Maine*. NRCS, USDA. 1987.

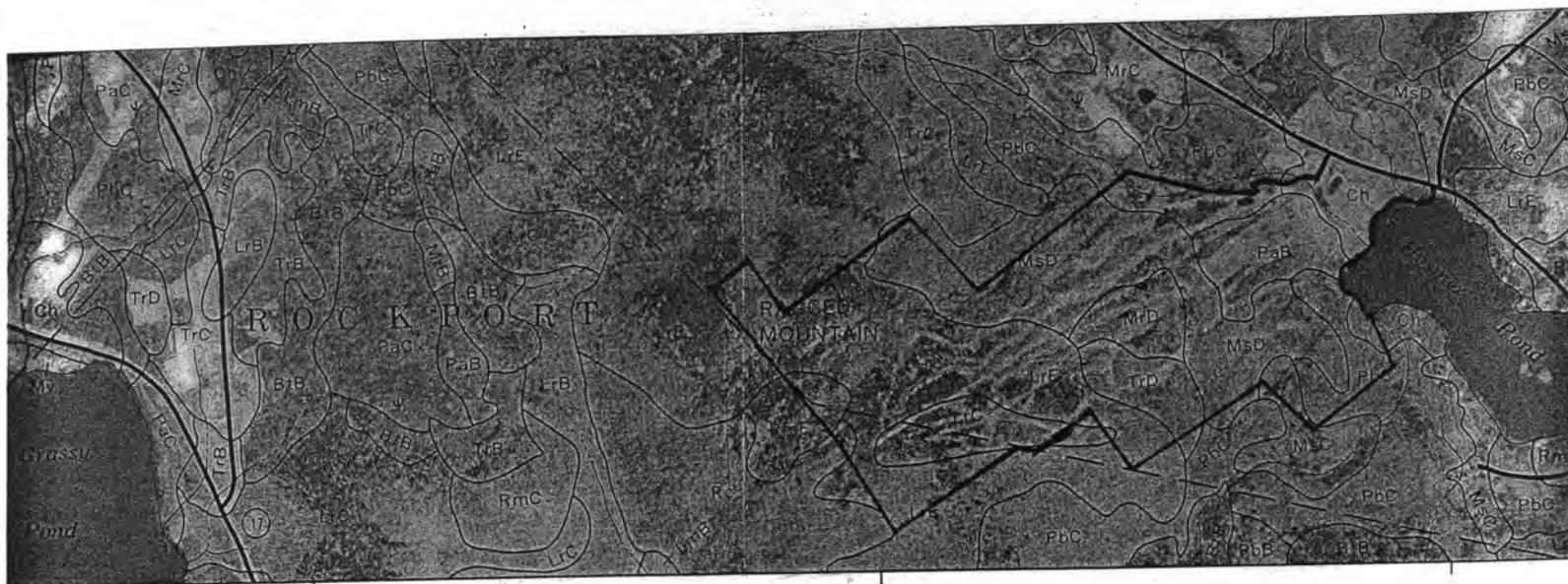
1" = 1,667'

True  
North



### SOILS LEGEND

- Ch - Charles silt loam; nearly level; deep; poorly drained; seasonal high water table.
- LrC - Lyman - Rock outcrop - Tunbridge complex, 8-15% slopes; moderately deep to shallow to bedrock; well drained to somewhat excessively drained.
- LrE - Lyman - Rock outcrop - Tunbridge complex, 15-45% slopes; moderately deep to shallow to bedrock; well drained to somewhat excessively drained.
- MrD - Marlow fine sandy loam, 15-25% slopes; deep to hardpan; well drained.
- MsC - Marlow very stony fine sandy loam, 8-15% slopes; deep to hardpan; well drained.
- MsD - Marlow very stony fine sandy loam, 15-25% slopes; deep to hardpan; well drained.
- PaB - Peru fine sandy loam, 3-8% slopes; moderate to hardpan; moderately well drained; seasonal high water table.
- PbC - Peru very stony fine sandy loam, 8-15% slopes; moderate to hardpan; moderately well drained; seasonal high water table.
- RmE - Rock outcrop-Lyman complex, 15-80% slopes, shallow; somewhat excessively drained.
- TrD - Tunbridge - Lyman complex, fine sandy loam, 15-25% slopes; moderately deep to shallow to bedrock; well drained to somewhat excessively drained.



BtB

1 MILE

1 KILOMETER

6a



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240 acres (179 wooded acres)

Prepared by:

Mitchell Kihn  
LPF #3206

February 20, 2014

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## **INTRODUCTION**

This plan presents an evaluation of the Snow Bowl Recreation Area woodlot in Camden, Maine and suggestions for its management. It will inform the reader of the nature of the forest, its various attributes and its potential to achieve expressed ownership objectives. It will discuss management options for different areas and suggest a schedule of activities and suggestions for its management. Forest management is a long-term endeavor. As time passes and the recommendations are implemented, this plan will need updating. This will allow incorporation of changes arising from human and natural, non-human influences. The planning period for this plan is 10 years and its renew date is February 20, 2024.

The plan begins with a statement of objectives. It then provides an overview of the woodlot regarding its history, topography, soils, timber, and wildlife resources. Legal restrictions, if any, on management activities and market conditions are mentioned. Accompanied with a map, forest stands are described in more detail and specific management recommendations are presented. A final table lists the priority activities, with estimates of income and costs. The plan concludes with a glossary of forestry terms and a listing of sources available for further assistance.

## **MANAGEMENT OBJECTIVES**

The mission of the Town of Camden Parks and Recreation Department is “to enhance the quality of life for residents and visitors through recreational opportunities, community events and stewardship of the town’s public lands.”

The highest priority in managing the Snow Bowl is for recreation. There is a moderate desire to offset costs of the pending renovation project with timber revenue. Other moderate priorities include aesthetics, wildlife habitat and soil/water conservation. Except for the stone walls, there are no known cultural or historic features. There is a willikngness to re-invest some income back into the property, such as road/trail improvement, timber stand improvement and wildlife habitat. Any cutting to attain the above objectives should strive to improve upon the growth, health, stocking, and species composition of the forest. Since it is not in the Maine Tree Growth Tax Law, the Snow Bowl is not obligated to manage the forest primarily to grow trees for commercial harvest.

When managed according to this plan and under the direction of Mid-Maine Forestry, the Snow Bowl forest can be green certified under the internationally recognized Forest Stewardship Council (FSC) standards through the Resource Manager program of Scientific Certification Systems (SCS). This certification recognizes forest management practices that effectively sustain timber resources while maintaining the ecological viability of the forest and benefiting the surrounding community. In the long run, products from this forest can be sold as “green certified”, hopefully commanding higher prices as green markets develop. Once enrolled into the FSC certification umbrella, the management of the property must conform to the Principles and Criteria of the FSC.

## SCHEDULE OF ACTIVITIES

SUMMARY OF MANAGEMENT PRIORITIES 2014-2024				
Time Frame	Stand	Activity	Extent	Estimated Income/(cost)
2014-15		Locate and mark the west boundary's south end, the north boundary east of CMLT Preserve and between Head Wall Trail and CMLT Preserve	3,000'	\$60/hr.
2014-15		Blaze/paint non- CMLT boundaries	7,000'	(\$440)
2014	1 & 3	Clearing for renovation; 52 mbf, 440 cords & ? tons	15 acres	\$10,900
	1, 2 & 5	Selection harvest, if desired; 47 mbf, 370 cords & ? tons	73 acres	\$10,000
2024	All	Update management plan.		- -

Staff does routine clearing of blowdowns, overhanging limbs, etc. of the trails, as well as boundary line maintenance. Trail work is done by trained volunteers or contracted to other organizations. Timber harvesting for both the renovation clearing and selection harvest would be contracted out to a professional logging company.

## PROPERTY DESCRIPTION AND LAND USE HISTORY

The property is located on the west side of Barnestown Rd. in the west end of the town of Camden and the northeast part of Rockport, Knox County. It is 3¼ miles west of Camden village on Rt. 1, via Hosmer Pond Rd and Mechanic St. It is also 3 miles north of Rt. 90, Rockport, via Hosmer Pond, Wiley, Main and Cross Rds. It is owned by the town of Camden and run by the Parks & Recreation Department. With 960' of road frontage, it lies on the eastern slope of Ragged Mountain, including its peak. It also borders the north side of Hosmer Pond. Most of the property has been developed as a ski area. Alpine trails, glades and a terrain park are serviced by two T-bars and one chair lift, plus a surface lift in the beginner area. The Nordic "22 Tacks Loop Trail" is in the southeast corner and partly goes across adjacent property owned by the Coastal Mountains Land Trust (CMLT). It also connects with Round The Mountain Trail on other CMLT and private land. A toboggan chute, which runs into the pond, and a snow tubing slope are south of the parking lot. The Snow Bowl has a ski and snowboard school, an active youth racing program and ski patrol. An 800' long driveway leads to a parking lot, ski lodge, equipment rental building and maintenance garage. A ball field and tennis courts are between the town road and the parking lot. A boat access ramp and parking area is south of the driveway on Hosmer Pond, offering fishing, boating and swimming. A year-round recreation area, the Snow Bowl offers hiking, mountain biking and a summer youth rec program. The facilities are available for rentals.

The property consists of ten contiguous town lots in Camden plus one adjacent lot in the town of Rockport. The towns list the total acreage as 230 acre, as recorded in the following table. However, a preliminary measure by Gartley & Dorsky Engineering & Surveying puts the size at 240 acres, 10 acres more than the towns have listed. The 240 acre figure will be used for this report.

<u>Town</u>	<u>Map</u>	<u>Lot</u>	<u>Acres</u>
Camden	227	6	12.8
	227	7	0.66
	227	8	1.6
	227	64	73
	227	66	0.35
	227	67	39
	228	3	9.6
	228	5	21
	228	6	34
	228	7	<u>24</u>
sub-total:			216.01
Rockport	37	110	13.95
Total:			<u>229.96</u>

The open/developed area is approximately 61 acres (parking lot and fields about 16 acres and ski trails about 45 acres). Woodland makes up the 179-acre balance. The upper slopes, roughly above 900' elevation, are considered as non-commercial due to access and operability difficulties (steep and ledgy terrain), as well as low wood volumes. It is about 78 acres. The commercial woodland, therefore, is about 101 acres.

As with most woodland in this area of Maine, the property's lower slope was most likely farmland in the 19<sup>th</sup> century, mostly as pasture. Stone walls and barbed wire are on parts of the north and south boundaries, as well as on the interior of the lower third. The forest doesn't look like it has been harvested in a long time, if ever, since re-establishment 100+ years ago.

The town acquired the property and volunteers built the first lodge and toboggan chute in 1936. The first ski lift was built in 1958. The toboggan chute was rebuilt in 1960 and again in 1990. The lodge burned down in 1967 and the new A-frame lodge was built the following year. The ski area expanded over the years with the clearing of new trails, establishing new lifts and installing snow making equipment. The Ragged Mountain Recreation Foundation was formed in the 1990s to provide funding for improvements to the Snow Bowl. With funding from both the Foundation and a town bond, a renovation is pending for 2014. This will increase alpine trail area, expand snow making capability, add new lights and install new lifts. A new lodge is scheduled for 2015. Proposed snow making and lighting expansion is shown on p. 4a and the proposed wooded areas slated for clearing are shown on p. 4b.

## TOPOGRAPHY AND ACCESSIBILITY

The landform is basically one continuous mountain side. Most of the area consists of moderate slopes. The field is flat and there's a flat wet bench 500' west of the top of the Little T-bar. The upper slopes (above 900' on the north and 500' on the south side) are steeper and ledgier. There are several larger exposed ledges that are devoid of trees and are referred to as "balds". Hosmer Brook is a perennial brook that flows through the northeast corner, through the field and into Hosmer Pond. A seasonal brook flow down through the 22 Track Loop, necessitating three bridges for trail crossings. Another seasonal stream parallels the north boundary's middle section. The upper reaches of a tributary of Hosmer Br. start in the northwest quadrant. Other minor seasonal drainages are present as well, such as a side ditch of the Big T-bar.

The Big T-bar is used as a jeep road/snowmobile route to the top of the lift. Utility poles and wires and an ATV trail continue upslope to a utility shed and antennae on the mountain. A hiking trail veers off and wends itself to the peak of Ragged Mountain. CMLT's Hosmer Brook Trail (for hiking and snowshoeing) heads north from Spinnaker Trail, paralleling Hosmer Br., and crosses onto CMLT's Preserve on the north side of the Snow Bowl. Farther upslope, an old carriage road crosses back over onto the Snow Bowl and joins the ski trail. The Georges River Land Trust's Highland Path hiking trail cuts across the Snow Bowl's northwest corner. A side trail, either older or unofficial, branches off and heads due south to Ragged Mt. summit.

Several obstacles, both natural and man-made, prevent easy access to timber harvesting machines in parts of the property. The two seasonal streams are occasionally in ravines and would have to be circumvented. Existing bridges on the southern one will not accommodate vehicular traffic, so some other crossing strategy is needed, such as temporary timber mats. Future renovation plans may be calling for a truck road to be built to the top of the Little T-bar that would cross the stream twice. Once built, this would allow easy access to the area south of the stream. The northern stream should be crossed near its bottom, probably right where CMLT's trail crosses, before the ravine forms upslope. Hosmer Br. itself, as well as the steep slope on the north side, block off access to the few acres north of the Brook. The toboggan chute blocks access into the lower slope in the southeast corner.

## SOILS

Refer to the soils map on page 5a. The four soils supporting the woodland are commonly found in association of each other. They are fine sandy loams formed in glacial till that was derived from mica schist, gneiss, phyllite or granite. Lyman is shallow to bedrock, very dry and somewhat excessively drained. It is on the upper 1/3 of the property, either in combination with ledge as the Rock-Lyman complex (Rm) or with ledge and Tunbridge soils as the Lyman-Rock-Tunbridge complex (Lr). Tunbridge is a deeper soil than Lyman; it is moderately deep to bedrock and is well drained. It dominates in the Tunbridge-Lyman complex (Tr) in the south-central area. The property's mid-section contains Marlow soil (Mr; and Ms for very stony). It is moderately deep to an impermeable hardpan and is well drained. Peru (Pa; and

Pb for very stony) is along the lower slopes. It is only moderately deep to a hardpan and is a bit wetter than Marlow. It is moderately well drained and has a seasonal high water table. Charles (Ch) underlies the field. It has a shallow depth to a hardpan and is poorly drained.

All of these soils can support tree growth. Because of their good depth and drainage, Tunbridge and Marlow soils are the most productive, especially for the high valued pine and oak. Peru is excellent for pine and oak, too, but less so for other species. Lyman is least productive due to excessive drainage and limited rooting capacity. The thin-soiled Lyman has a high risk of windthrow and moderate risk of seedling mortality. Windthrow risk on the other soils is moderate. Use of equipment is severely limited on the steep Rock-Lyman slope, where the erosion hazard is also high. Though rated as slight, equipment use is a concern on the moist Peru soil, which becomes seasonally wet.

Operability within the woodlot is good to fair. The moderately-steep slopes will provide some challenge in spots. Fortunately, the timber skidding is all downhill. The small areas of ledges or ravines in the commercial woodland would have to be worked around. Areas farther up the mountain are also that much farther away from any yarding area needed for timber harvesting. The combination of ledges and steepness becomes too much of an impediment in the non-commercial section, not to mention the long skid distance. The wet area on the flat should be avoided, especially during the wetter times of year. If the bike trails are to be preserved, they need to be avoided, which will complicate the harvesting logistics.

The following table (from the Soil Survey of Knox and Lincoln Counties, Maine, 1987. USDA) lists the various productivity ratings and factors affecting woodland management for the pertinent soil types. This can be referenced to the map, on which the soil types are delineated. Steepness codes are B = 3-8% slope; C = 8-15%; D = 15-25%; E = 15-80%.

<u>Soil Series</u>	<u>Site Quality</u>			
	<u>White Pine</u>	<u>Red Spruce</u>	<u>Red Oak</u>	<u>Northern Hardwood</u>
Lyman - LrC, LrE, RmE, TrD	fair	poor	--	fair
Marlow - MrD, MsC, MsD	excellent	fair	excellent	excellent
Peru - PaB, PbC	excellent	poor	excellent	good
Tunbridge - TrD	excellent	excellent	excellent	excellent

<u>Soil Series</u>	<u>Factors Affecting Management</u>			
	<u>Erosion Hazard</u>	<u>Equipment Limitation</u>	<u>Seedling Mortality</u>	<u>Windthrow Hazard</u>
Lyman - LrC	slight	slight	slight	moderate
Lyman - LrE, TrD	moderate	moderate	moderate	<i>severe</i>
Lyman - RmE	<i>severe</i>	<i>severe</i>	moderate	<i>severe</i>
Marlow - MrD, MsD	moderate	moderate	slight	moderate
Marlow - MsC	slight	slight	slight	moderate
Peru - PaB, PbC	slight	slight	slight	moderate
Tunbridge - TrD	moderate	moderate	slight	moderate

## **BOUNDARIES**

Gartley & Dorsky Engineering & Surveying is in the process of mapping the property lines, based mostly on piecing together previous surveys on adjacent lots. An Advance Copy of their Base Plan is on p. 7a. Most of the property boundaries are clearly found. The common boundaries with the CMLT's properties both on the north and south sides have been flagged, blazed and painted. CMLT's northern Preserve was surveyed by Landmark Corp., from Rockport, in 2006 (Job No. 02-078). The north boundary's east end along Hosmer Br. is not marked, but all corners are marked by iron pins or 4"x4" granite posts. The finger north of Ragged Mt. peak has old orange blazes and flags along the boundary. Iron pins mark the two northwestern corners. Three additional iron pins are along the west boundary. No further evidence of the line was found south of the pin located a short distance west of Ragged Mt. peak. The south boundary's east end is a stone wall, but the line south of Hosmer Pond is unclear.

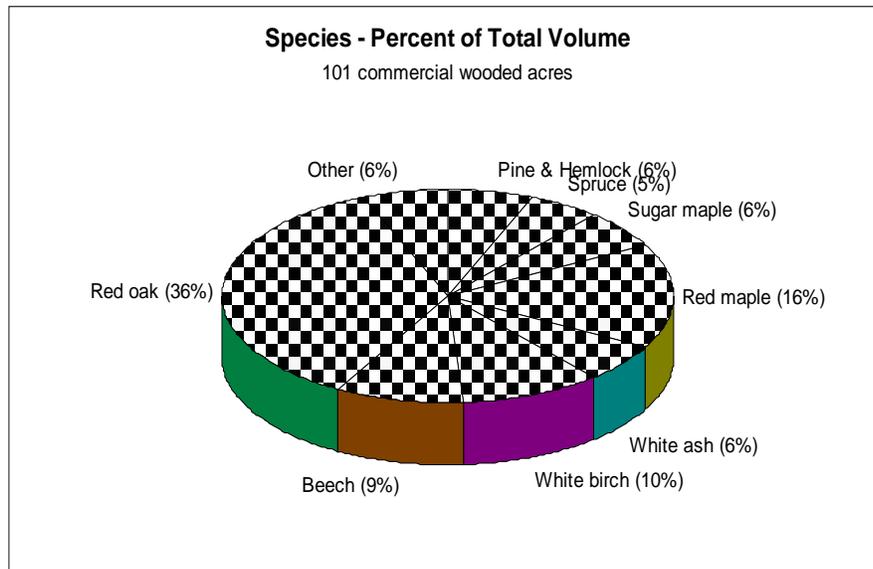
The corner marking the intersection of the section of boundary coinciding with the Camden/Rockport town line and the section running westward on Ragged Mt.'s south slope is a wooden stake and stone pile along the south edge of Lookout Trail. Red blazes mark both lines. The westward line seemed to waver and not stay straight, but was not followed and its condition is unclear. The other line follows the ski trail's south edge, which is right along the town line. After about 150', the boundary continues along the trail edge as it veers away from the town line. After another 300' it cuts across the trail into a tree island, where it corners, crosses the trail again to another corner on the town line and CMLT Preserve property. The town of Camden had always thought that this described triangle belongs to it and even shows it as such on the town tax maps. However, title research done by Gartley & Dorsky uncovered another owner.

Property boundary lines should be permanently delineated, especially before cutting. Ideally, the line is first cleared for unobstructed viewing. Boundary trees are then blazed (scarred with an ax) and/or painted. Boundary lines should be inspected, reblazed and painted every 15± years to preserve current boundary evidence and to protect against timber trespass.

## **TIMBER RESOURCE**

For purposes of describing the forest and setting management priorities, different forest types and stands were identified. These are found in the Stand Description section and on the Property Map. The total wooded acreage is 179. Inventory data was taken in what was deemed as "commercial forest" (based on wood volume and accessibility) at 63 variable radius plots with a 15 BAF prism, laid out roughly parallel to the north & south boundaries. For the 101 acres of commercial woodland, this is a sampling of 1 plot per 1.6 acres. Data was processed using the INVENT Forest Inventory Program from the University of New Hampshire. The overall volume estimate is accurate within ±6% nine times out of ten. However, error is greater for individual species, products, and values. The "non-commercial forest" area of about 78 acres on the mountain's upper slopes did not have a formal inventory; rather a general assessment was made of the forest condition.

Five different stands have been identified in the commercial woodlot based a variety of tree and forest stand characteristics. They range from 3 to 80 acres in size. The Hardwood timber type makes up the lion's share of the area, with 91 acres in three stands. The Mixedwood and Softwood types are represented by one stand each, with 6 and 4 acres, respectively. For commercial size trees (6"+ dbh), red oak contains the most wood volume, with a little more than 1/3 of the total. Red maple has the next highest volume, with 1/6 of the total. White birch and beech each are at 1/10, while white ash, sugar maple and red spruce are each at 1/20. Other species present include yellow birch, white pine, hemlock and aspen, with very small amounts of hophornbeam, red pine and balsam fir.



The woodland is mature with a mostly even-aged canopy that is 80-100 years old. It is made up of poles and sawtimber in various proportions. Saplings up to 30 years old are common in openings caused by some minor mortality or windthrow. All stands are adequately stocked with fully closed canopies. Canopy heights for most of the forest are moderate to tall; the high elevation stand 3 and wet stand 4 are only moderate, while the softwood stand 5 is tall.

The overwhelming percentage of wood is Hardwood; 83% of the sawtimber and 92% of the pulpwood. Red oak has the most sawtimber volume, accounting for 60%, as well as 1/3 of the pulpwood. Other species with significant sawtimber volume includes white pine, white ash, hemlock, white birch, sugar maple, beech and spruce. Sawlogs comprise 22% of the total commercial wood volume, which is above average (the more typical ratio is 18%). A reasonably high percentage could be maintained over time if the good quality small sawtimber is allowed to continue to grow rather than get cut prematurely.

The distribution of wood volume per acre varies among the stands. The Softwood type of stand 5 has twice the volume per acre (equivalent of 54 cords) than high elevation stand 3 (27 cords) or wet stand 4 (22 cords). Stands 1 and 2 have a moderate amount with 37 cords. The estimated total standing volume of wood is 394,000 board feet and 2,960 cords of

pulp/firewood. This is equivalent to an average volume of 3,900 board feet and 29 cords per acre for the 101 commercial acres. The estimated value is \$101,065, or \$1,000 per wooded acre. These figures are high but not unexpected for a forest with as much oak sawtimber as the Snow Bowl.

Tree quality for sawtimber production is very good on the mid and lower slopes, with many trees having nice form. Many of the oaks in particular are quite impressive. Quality drops on the upper slopes due to lower site quality and weather impacts. Some of the hemlocks and spruces have butt seams and/or excessive limbs. The beech is diseased and many of the white birches are declining. Snags, culls and deadfall are not too common on the mid and lower slopes but are on the upper slopes. These cavities, snags and coarse woody debris on the ground are all useful wildlife habitat features. By cutting the poor quality individuals and favoring the better trees will maintain or improve overall tree quality.

Sustainability can be expressed in a variety of spatial and temporal scales. The larger the scales, the easier it is to average the volumes. A clearcut of a 10-acre stand, for example, is not sustainable over 20 years since no commercial wood will have grown back in that time. But it can be sustainable over a period of 60 years (with a thinning for a modest pulpwood harvest). Sustainability levels should be a mid- to long-term proposition. The volume per acre at the recommended stocking level for the respective forest type should be the baseline from which sustainability is measured. Often for a highly stocked stand, the volume recommended for harvest (to reduce stocking from current to recommended levels) exceeds the sustainable amount. A harvest volume in a certain stand in excess of the calculated sustainable volume is certainly justified if it is in an appropriate context of reaching stocking level or regeneration goals. The stand level is, nevertheless, quite small and cumbersome for sustainability concerns, which is more appropriately addressed on a forest ownership basis.

At an average growth rate of  $\frac{1}{4}$  cord per acre per year a sustainable harvest level is 25 cords per year for the 101 wooded acres. For a 20-year cutting cycle, this comes to the equivalent of 505 cords, or 5 cords per acre. This is only a property-wide total and represents 13% of the current total wood volume. Due to variability of age, structure and stocking of the forest types, harvest levels will vary among stands. Some may not be cut at all, while others may possibly experience a heavy regeneration cut.

The density of the tree regeneration depends on light/shade conditions and wetness on the forest floor. It is sparse in the deeper shade and more abundant in the openings. The shade-tolerant beech is the most common species in the regeneration, along with some spruce, fir and hophornbeam. Shrubs are not common in the woods - only striped maple and a little bit of hobblebush. The exposed ledges contain blueberry, huckleberry, ground juniper, as well as reindeer lichen and sphagnum moss.

## **INSECT, DISEASE AND WEATHER INFLUENCES**

Generally, the forest is healthy. The beech has a common disease (*Nectria-scale*, or beech bark disease), which is endemic throughout northeast U.S. and maritime Canada. It slowly degrades the wood while the tree is alive, but is ultimately fatal over the course of several decades. Some of the sugar maples have the common maple borer. Several white birches are suffering from general decline. Trees growing on the mountain's upper slopes are buffeted by harsh weather conditions, specifically wind and heavy ice and snow. Many trees are stunted and/or have dead tops. It was undoubtedly also affected by the '98 Ice Storm, which broke tree tops and upper branches in many hardwoods. Some natural mortality among all species is to be expected throughout the forest, especially in the harsher sites of ledge and wetness. Poor quality trees often contain any one of many fungal infections that slowly rot the wood of the trees. This is sometimes caused by overcrowding, which limits tree growth and vigor and makes them more susceptible to fungal infection.

## **WILDLIFE**

Most of the property is upland forest. The most significant critical habitat is the water element, which is here in the form of Hosmer Pond, Hosmer Brook, the several seasonal streams and seasonal wetland along the south boundary. Woodland adjacent to these water resources are *riparian* forests. They serve several ecological functions: minimize downstream flooding, filtering runoff and protecting water quality, maintaining cool water temperatures for fish, adding biomass for the bottom of the aquatic food chain, and provide logs that create fish and invertebrate cover and substrate for aquatic algae. Riparian forests typically support more animals than areas further away from water, including tree-nesting waterfowl (such as wood duck, merganser, and common goldeneye) and water-based animals (such as beaver, otter, mink and moose). Large pines are potential nesting and loafing sites for bald eagle and osprey. Upland mammals use this area as travel corridors, denning and feeding zones. Soil disturbance and sediment runoff should be avoided when harvesting. To protect water quality and maintain shade, a canopy with >70% crown closure should be left within the first 75'. Buffers >75' provide wildlife travel corridors and buffer aquatic wildlife from human activities in the uplands. Large snags and cavity trees should be retained for wildlife use.

The two most important wildlife foods are oak acorns and beech nuts, which are highly nutritious and are much sought after by a whole host of wildlife, including deer, turkeys and gray squirrels. These two hard mast trees are well represented in the Snow Bowl forest. Seeds of spruce, birch and alder, as well as winterberry, blueberry, raspberries and blackberries and foliage of young hardwood all provide wildlife food. Aspen buds are a favored food of the ruffed grouse (partridge).

During any cutting, certain trees should be retained to benefit wildlife, even though they may not have sawtimber value. These include den trees (cavity trees) and snags, which should not be cut unless they pose a safety hazard during logging. A few poor quality live trees have rotten section and/or cavities, which are useful for birds and rodents. Cavity trees are valuable in providing nesting opportunities for both mammals and birds, as well as a habi-

tat for invertebrates, which are eaten by woodpeckers. Recommendations vary as to how many trees per acre should be left. According to *Biodiversity in the Forests of Maine: Guidelines for Land Management*, recommended practices include retaining a minimum of four wildlife (den or snag) trees per acre, with one exceeding 24" in diameter and three exceeding 14". They do not need to be evenly distributed, but may be clumped into areas such as along rock walls, field edges or swamp. In addition to existing wildlife trees, potential future ones should be identified and allowed to grow old and die. Leaving downed trees on site adds to the coarse woody debris on the forest floor, which is important for nutrient recycling and micro-site habitats for small animals.

Seeding landings and roads after use will improve forage opportunities. Native wild-life trees and shrubs such as mountain ash, highbush cranberry, hawthorne, serviceberry, apples, cherries or staghorn sumac could be planted in openings. Cutting should avoid sensitive habitats and be timed to minimize disruption of important nesting and young rearing seasons in Spring and early Summer. Harvesting will help maintain age and structural diversity within the forest ecosystem.

The Maine Natural Areas Program (MNAP) reports no documentation for this site to contain any rare, threatened and/or endangered plants or animals. However, it does identify the area around the peak of Ragged Mt. as a "Rocky Summit Heath," which is an uncommon natural community. See the map on the next page. It contains patchy vegetation among exposed rocky balds and ledges. Dwarfed shrubs are common, mixed with stunted trees spruce and fir, oak, birch and maple. Tree layer is typically sparse, but will contain interspersed islands of taller trees in protected pockets and deeper soils. See Appendix A for a Fact Sheet. No evidence of threatened or endangered plants or animals was noted during the fieldwork. Should such plants or animals be discovered, appropriate measures should be adopted to ensure protection of their habitat. No Essential habitats have been documented at this site by the Maine Department of Inland Fisheries and Wildlife. A Deer Wintering Area abuts the Snow Bowl's northwest boundary, but does not extend onto Snow Bowl land. Hosmer Pond and its tributaries support populations of brown trout and wild brook trout habitat. These fish prefer cool, well-oxygenated waters that benefit from intact riparian corridors. Any forest management activities planned for riparian zones should closely follow the state's Best Management Practices, including appropriate buffer distances, shade retention, and minimization of sediment runoff. See the Appendix B for Forest Management Recommendations.

The property does *not* provide habitat for lynx. It *is*, however within critical habitat for Atlantic Salmon. For more information, contact U.S. Fish & Wildlife Service Biologist Wende Mahaney at [http://www.fws.gov/mainefieldoffice/Atlantic\\_salmon.html](http://www.fws.gov/mainefieldoffice/Atlantic_salmon.html) or 866-3344, ext. 118. The parcel *does* intersect with a Beginning With Habitat Focus Area, the *Ragged Mountain and Bald Mountain Focus Area*. Additional information on this focus area may be available at <http://www.maine.gov/doc/nrimc/mnap/focusarea/index.htm>. It is *not* targeted by MNAP for inventory.

## **FOREST HEALTH AND ECOLOGICAL FORESTRY**

Barrie Brusila, partner in Mid-Maine Forestry, offers the following essay:

“*Forest health* is an often used, and often abused and misunderstood concept. In terms of forest management, forest health is often defined as growing trees that are vigorous, free of insects and diseases, of good form, of desirable (a.k.a. commercially valuable) species, and at a spacing in the forest that allows them as fast a growth as possible without compromising timber quality. This definition frames health in terms of human (economic) values for wood products. Forest health can also be defined on an ecological basis. Dead, diseased, old, and slow-growing trees of all species naturally occurring on the site are part of a healthy forest from a biodiversity perspective.

“It’s important to remember and acknowledge that we are most often discussing forest health in terms of human values. The forest doesn’t care if a large veneer quality tree dies, rots, or burns. We humans often do. When viewed through a set of ecological values, the number of reasons to justify timber harvesting decrease noticeably. They might include:

- 1) Infestation of an exotic, non-native insect or disease whose spread could be prevented or significantly reduced by harvesting.
- 2) Improving wildlife habitat or maintaining habitat for species that are rare or declining.
- 3) Significant mortality or blowdown resulting from exotic, non-native causes.
- 4) Applying the principles of restoration forestry, as we are beginning to understand them. This might include, for example, addressing years of build-up of fuels due to past human interference with natural fire cycles.

“Silviculture is a practice by which we respectfully remove products from the forest for human use, employing methods that we believe most closely imitate and least impact the “natural” processes occurring there. It is important to acknowledge the distinction between our human and ecological definitions of forest health, and not to use the former to justify creating forests of diminished ecological value.”

In the June 2006 issue of *Forest Wisdom*, newsletter of the Forest Guild (a national forest advocacy organization) Forester Ehrhard Frost identified 5 basic aspects of forests responsible for creating commodities for society: structure, diversity, function, complexity and processes. He argues the forests should be managed for wholeness and complexity rather than for efficiency and simplicity; and that emphasis should be placed on structure, function and process rather than a particular product. The following is a brief listing of basic principles he has developed for ecological forestry:

- Maintain a functioning forest first; all other outcomes will follow.
- Design silvicultural techniques that stimulate the development of species and structures that will naturally evolve over time on a site and reflect natural disturbance patterns.
- Practice multi-aged management.
- When harvesting, base the selection process on tree quality and vigor.
- Always retain some trees that are not suitable for timber, as these serve essential biological functions.
- Incorporate perpetual, variable retention of all stand structures to ensure that the entire range of naturally occurring forest structures is present.

- Identify Legacy Trees that will remain for their natural life cycle, providing a biological legacy for the future, essential elements of stand structure and continued function of the forest.
- Attempt to maintain the naturally occurring species composition of all plants and animals.
- Maintain soil structure and productivity.
- Relax utilization standards.

The Northern Forest Lands Council came out with “Principles of Sustainability” in 1994, which are worth keeping in mind:

- Maintenance of soil productivity.
- Conservation of water quality, wetlands and riparian zones.
- Maintenance or creation of a healthy balance of forest age classes.
- Continuous flow of timber, pulpwood and other forest products.
- Improvement of the overall quality of the timber resource.
- Aesthetics and scenic quality.
- Habitats that support a full range of native flora and fauna.
- Protection of unique or fragile areas.
- Continuation of opportunities for traditional recreation.

## **RECREATION AND AESTHETICS**

Recreation is the primary use of the Snow Bowl property. Activities include alpine and Nordic skiing, snowshoeing, snow tubing, mountain biking and hiking. The Hosmer Brook Trail is maintained by CMLT and follows the lower section of Spinnaker Trail before cutting into the woods and crossing over into CMLT’s Preserve on the north side. The 22 Tacks Loop Trail connects with CMLT’s Nordic Ski Loop and Round the Mountain Trail on their Preserve to the south side of the Snow Bowl. See the “Gateway to the Mountains Winter Trail Map” on the next page. The mountain bike trails have been built and maintained in partnership with the Midcoast Chapter of the New England Mountain Bike Association. GRLT’s Georges Highland Path crosses over the Snow Bowl’s northwest corner. Another hiking trail heads up to Ragged Mt. Summit from the top of the Big T-bar. Ball games are played on the recreation field and a boat ramp affords access to the pond. The property is not posted and may be visited by hunters.

The property’s aesthetic features include the mountain peak and ledges and the vistas seen from them, the pond and streams and big trees. The big pines and hemlock, in particular, are impressive. Many of the larger trees along “22 Tacks” Trail were tagged with numbered metal discs by the Conservation Committee for retention back when the trail was built. Wildflowers on the open ski trails are desired. The visual impact of forestry activities can communicate a lot about stewardship. Efforts to maintain a harmonious woodland appearance usually pay off in a greater acceptance of silvicultural practices. For more information on logging aesthetics, contact Sustainable Forestry Initiative at 207-622-9288 or [www.sfmaine.org](http://www.sfmaine.org).

## LONG TERM RESOURCE CONSIDERATIONS

For further information on the topics below, one can also contact the local MFS District Forester. For Knox County, this is Morton Moesswilde, whose office is at 536 Waldoboro Rd., Jefferson, ME 04348, email is [morten.moesswilde@maine.gov](mailto:morten.moesswilde@maine.gov) and cell phone is 441-2895.

**Forest health** - Balanced amounts of dead, down and dying wood are actually a beneficial part of a healthy functioning forest. However, severe weather, insects and diseases or other disturbances sometimes create an imbalance and become a barrier to realizing your goals and objectives. For more information, contact the MFS Division of Forest Health and Monitoring at 207-287-2431 or [www.maine.gov/doc/mfs/idmhome.htm](http://www.maine.gov/doc/mfs/idmhome.htm).

**Wetlands** - Forested wetlands and other kinds such as open marshes, shrub swamps, bogs or beaver ponds provide habitat, flood control and scenic beauty. For more information, see the book *Natural Landscapes of Maine*, available from the Maine Natural Areas Program, 207-287-8044 or <http://www.maine.gov/doc/nrimc/mnap>. Stand 4 is the only wooded wetland identified on the property.

**Historical, cultural & archaeological sites** - Stone walls and old cellar holes or foundations are often found in woodlands, as remnants of previous settlement and agriculture. Most properly conducted forest management activities will not harm these resources. Construction of roads, trails or landings, however, could potentially disturb a significant site. Stone wall form the south boundary's east end, as well as running around the north side of the leach field. For further information contact the Maine Historic Preservation Commission at 207-287-2132 or [www.maine.gov/mhpc](http://www.maine.gov/mhpc).

**Protection from fire** - Wildfire is rare in Maine, but can be quite devastating when it occurs. There is a lot you can do to reduce the risk of a wildfire on your woodlot and near your home. For more information on how you can make your home "Firewise," see [www.maineforestservice.gov](http://www.maineforestservice.gov) or call the Division of Forest Protection at 207-287-4990. Be careful with all outdoor fires and observe all open burning laws. If you see a wildfire or smell smoke during a high fire danger day, call 911 or the Maine Forest Service at 1-800-750-9777.

**Soil & water quality protection** - Activities in the woods that involved roads, log landings and yards or recreational trails can sometimes contribute to rutting, soil movement and pollution of the watershed. Improperly conducted logging operations can also cause damage. Use of appropriate Best Management Practices (BMPs) greatly reduce this risk. For more information, see the booklet entitled *Best Management Practices for Water Quality*, available from the MFS by calling 1-800-367-0223 or [www.maineforestservice.gov](http://www.maineforestservice.gov).

**Biodiversity** - Forested landscapes are homes for more than just trees. No one parcel can provide habitat for all species. However, maintaining or improving existing woodland communities is a desirable goal. For more information, contact the Maine Natural Areas Program at 207-287-8044 or <http://www.maine.gov/doc/nrimc/mnap>.

**Fish & wildlife** - There are no specific landowner goals or concerns regarding fish and wildlife. As part of managing according to Stewardship Principles, maintaining a healthy functioning forest will contribute to maintaining healthy wildlife habitat and fisheries. For more information, contact the Dept. of Inland Fisheries and Wildlife at 287-8000 or [www.maine.gov.ifw](http://www.maine.gov.ifw).

**Protection from pests** - There are many species of invasive plants and insects, both native and exotic, which can affect your woodland and possibly get in the way of meeting your goals and objectives. Monitoring for early detection can reduce negative impacts and reduce the costs of control. For more information, contact the MFS Division of Forest Health and Monitoring at 207-287-2431 or [www.maine.gov/doc/mfs/idmhome.htm](http://www.maine.gov/doc/mfs/idmhome.htm).

**Monitoring** - Landowners, their families and/or designated representatives are encouraged to stay engaged with their woodlands. This can take the form of regularly scheduled boundary line maintenance, recreational activities such as hunting or hiking, or following up after completing silvicultural activities to check results. Keeping in touch with your land can help prevent theft or trespass. It can also be rewarding on many levels.

**Carbon sequestration** - Among the many benefits provided by forests, removing carbon from the atmosphere and storing it in trees may have increasing significance in the years to come. For more information, visit [www.maine.gov/doc/mfs/mfs/topics/carbon](http://www.maine.gov/doc/mfs/mfs/topics/carbon).

## LEGAL RESTRICTIONS

As of Oct. 15, 2012, Camden has accepted the new Statewide Standards for Timber Harvesting and Related Activities in Shoreland Areas. The 250' strip along Hosmer Pond does fall under Shoreland Zone regulations. Harvested volume is limited to no more than 40% of the total timber volume for each acre within the Shoreland Zone in any 10-year period OR a residual stand must contain a basal area of at least 60 ft<sup>2</sup>/acre of woody vegetation 1"+ dbh, of which 40 ft<sup>2</sup>/acre is 4.5"+ dbh. A well-distributed stand of trees must remain, with canopy openings no larger than 250 ft<sup>2</sup> within the first 75'. Beyond 75', cleared openings must not be >14,000 ft<sup>2</sup>. Harvesting activity must not result in ground disturbance. Accumulation of slash is not allowed to be higher than 4' nor within 50' tidal waters. Shoreline integrity must be protected on all streams.

The Snow Bowl is zoned as a "Rural Recreation District". As such, it is exempt from the standards and restrictions for High Elevation Areas (Art. X, Part I, Sec. 2 in the town Zoning Ordinance).

Maine's Natural Resources Protection Act (NRPA) regulates work in and adjacent (within 75') to lakes, streams, freshwater wetlands and tidal wetlands. Activities regulated include disturbing soil, placing fill and building permanent structures in or adjacent to these areas. A permit is required from the DEP for such common work as:

- ◆ Road building, excavating, filling, or otherwise disturbing the soil within 75' of lakes, rivers, streams and wetlands,
- ◆ Building new bridges, fords or installing culverts for road or trail crossings,

- ◆ Building or placing permanent structures in, on or over lakes, rivers, streams, wetlands or fragile mountain areas, and
- ◆ Harvesting operations above 2,700' in elevation.
  - Exempt activities include:
  - ◆ Temporary structures, such as a road crossing using a temporary bridge, that are in place less than 7 months in a protected resource is exempt. However, it is not exempt if fill is used.
  - ◆ Repair, maintenance or replacement of an existing culvert, provided any replacement is not more than 25% longer than that being replaced and not longer than 75'. Erosion control must be used and fish passage may not be blocked.
  - ◆ Forest management, including associated road construction or maintenance, in or adjacent to forested wetlands as long as it:
    - 1) meets minimum stocking requirements under the Forest Practices Act;
    - 2) meets “permit-by-rule” standards for road crossing of a stream, or for soil disturbance adjacent to great pond, river or stream and DEP is notified prior to starting the work;
    - 3) the area is not a forested wetland mapped as a significant wildlife habitat; and
    - 4) the road construction is not used to access development, but is primarily used for forest management activities.

Two permitting programs exist under the NRPA. “Permit-by-rule” is the simpler procedure and covers most minor activities, such as installing bridges and culverts in rivers and streams or disturbing soil 25-75' from a waterbody or wetland, and maintenance and repair of structures. It requires a 1-page notice to the DEP and following applicable construction and erosion control standards. A full NRPA permitting process covers activities with greater potential impacts than those under permit-by-rule.

During a harvest operation, procedures outlined in the Maine Forest Service’s *Best Management Practices for Forestry: Protecting Maine’s Water Quality* (2004) should be followed regarding working in and around wetlands and streams. This will allow the landowner to comply with the Protection and Improvement of Waters Law (sections 413 & 417). Specifically, this law prohibits causing erosion of soil into water bodies and disposing of slash in streams, lakes and tidal waters. For road construction, compliance of the Erosion and Sedimentation Control Law is necessary, which regulates activities involving filling, displacing or exposing soil. Specifically, erosion control practices (such as hay bales, silt fence and hay mulch) are properly installed and maintained whenever filling or soil disturbance occurs.

Before any commercial harvesting occurs, landowners (or their agent) must file a harvest notification form with the Maine Forest Service. Year-end reports of harvested volumes and stumpage prices are a part of this requirement. All boundary lines within 200' of cutting must be clearly marked. All slash from a harvest must be removed at least 25' from adjoining properties if they pose a fire hazard. Landowners who own >100 acres (statewide) must comply with the Forest Practices Act if any clearcuts are >5 acres. This law deals with separation zones between clearcuts and regeneration standards. Harvest plans must be submitted to the Maine Forest Service for proposed clearcuts >20 acres.

## **MARKETS**

All wood greater than 6" dbh is currently marketable. Harvested pulpwood would most likely be trucked to one of five mills - Verso Co. in both Jay (for hardwood) or Bucksport (spruce-fir), SAPPI in Hinckley (hardwood, hemlock and pine), Madison Paper in Madison (low-grade spruce-fir), or New Page in Rumford. Aspen is also bought by the two hardwood mills as a separate higher value pulp product, aka "ground wood". Firewood could be sold to local dealers, homeowners or used domestically. There are quite a few sawmills in the mid-coast area. The largest local sawmill is Robbins Lumber in Searsmont, specializing in white pine. Irving, in Dixfield, is another large pine mill. The N.C. Hunt sawmill, in Jefferson, is a good market for short or low-grade pine and hemlock. The oak and other hardwoods more often than not are sold to wood brokerage companies such as Premium on Route 17 in Cooper's Mills. Oak can also be sold in bolt length (4') to a mill on Bunker Hill in Jefferson. This is a nice little market, since oak boltwood offers 3 times the price for this size wood than if sold for firewood. There are various markets for low-valued wood chips - either sold locally to Robbins for their co-generation system, the pulp mills for pulp production or to a wood-fired electrical generating plant

Wood markets fluctuate in price, product specifications, and demand. Current market conditions should be assessed as part of timber harvests. Since 2004, prices for both hardwood pulp and firewood prices had increased and oak sawlogs have fallen. The economic downturn that began in late 2008 has reduced mill prices on all products except grade white pine. It has bounced back since and stumpage prices are good and stable, except for the current downturn in the price for spruce-fir pulp and the continued soft market for oak logs (which is generally forecast as never to return to the "glory days" of the 1970-1990s).

The value of standing trees diminishes as extraction costs increase. This is the case when dealing with very long skid distances, such as between the upper slopes of the commercial forest area and the base lodge area. The wood beyond 2,000' would need to be discounted by around 25%. This might be avoided if, perchance, a wood yard can be located part way up the slope on some adequately flattish area. Otherwise, the overall stumpage value should be discounted an average of maybe 10%.

## **COMMERCIAL HARVESTS OF WOOD PRODUCTS**

Commercial harvests are one part of an environmentally sound, multiple-use forest management system. Through cutting, a forester manipulates the vegetative structure within a forest stand to attain stated objectives. Sawtimber can still be grown and harvested while enhancing wildlife habitat and recreational opportunities. Typically, low quality and unhealthy trees and/or mature individuals are chosen for removal. This allows for faster growth to occur in the more valuable, vigorous, immature trees. It also favors the release or establishment of natural regeneration of desired species. The regeneration is part of the property's long-term potential. Thus, proper harvesting not only generates immediate income, but, over time, can also improve the health and quality of the timber and wildlife resources of the property.

Commercial harvesting should be conducted on a marked tree or species designation basis and under the supervision of a professional forester. This will ensure that the selection of trees for cutting is in the best short- and long-term interest of the owner, and leaves a desirable residual stocking of trees. In addition, the forester supervises harvesting operations to ensure proper utilization, minimal felling and skidding damage to residual trees, and to help assure accurate payment for harvested wood products.

To realize the best price for the marked trees, sales should be conducted on a competitive bid basis or by direct negotiation with reputable contractors. The timing of specific sales is dependent on economic and silvicultural considerations, as well as seasonal ground conditions. To preserve the integrity of the soil in the wetter areas near the stream, any timber harvesting should be done when ground conditions are stable and able to hold up heavy machinery. This means either dry or frozen ground.

Recreational and aesthetic concerns and wildlife needs are given appropriate emphasis during timber marking and while supervising harvesting jobs. Yards and skid roads are located to minimize soil erosion and visual impact, as well as to improve interior access. Cutting along existing roads, trails, streams and vistas needs to be modified to maintain an aesthetically pleasing appearance. Appropriate numbers of wildlife trees and other critical areas should be left to provide both cover and food.

## **STAND DESCRIPTIONS AND RECOMMENDATIONS**

### **INTRODUCTION**

Six forest stands have been identified on the property (denoted by a number), adding up to 179 acres; 101 commercial acres and 78 non-commercial. Three factors determine forest type of the stands: 1) the dominant tree species or species group in the canopy; 2) canopy height; and 3) canopy density (also referred to as crown closure). Determination of dominance is based on basal area, not the raw number of trees or wood volume. Basal area expresses the amount of growing space a species is utilizing in the stand. The three broad timber types are Hardwood, Softwood and Mixedwood (where neither hardwood nor softwood is >25% of the basal area). Average tree diameter is that of only the canopy trees (the “featured” stand). The stocking level, too, is determined by the basal area per acre, # trees per acre and average tree diameter of only the canopy trees (the “featured” stand). Therefore, the suppressed trees in the understory are excluded, usually the saplings less than 5" in diameter (except for when saplings are part of the featured stand). However, it is the total basal area in the pie chart depicting species as percentages of basal area. Recommended stocking levels are from various pamphlets issued by Forest Experiment Stations of the US Forest Service. They represent the minimum density for maximum growth and wood production and varies among timber type groups. It is a basal area of 70 ft<sup>2</sup>/acre for Hardwood, 100 ft<sup>2</sup>/acre for Mixedwood and 120 ft<sup>2</sup>/acre for Softwood. They are not necessarily the ideal levels if stand objectives are other than rapid timber production.

Canopy height is classified into 3 levels: 1 = low = <30'; 2 = moderate = 30-60'; and 3 = high >60'. Canopy density also comes in 3 levels: A = high = >70% crown closure; B = moderate = 40-70%; and C = low = 10-40%. An area with less than 10% crown closure is not considered a forested stand. Growth rate is expressed as volume per acre per year. Volumes are expressed as board feet for sawtimber stands or as cords for poletimber stands. The standard conversion between board feet and cords is 1,000 board feet (1 mbf) = 2 cords. All numbers are estimates, so the "about" qualifier will not be used.

## LONG-TERM GOAL

The primary goal for the property is to maintain a productive and healthy forest that is aesthetically attractive and recreationally useful. Maintain a fully stocked forest with many large, mature trees. If and when harvesting occurs, one should strive to improve residual tree quality, as well as its value and growth. In addition to harvesting some large mature trees, high risk, declining and/or poor quality trees should also be removed. However, appropriate measures should be taken to retain some snags and cavity trees for wildlife. Favor to leave the better quality trees of the more commercially valuable species of oak and pine. The thinning will allow these residual trees to expand their crowns over time and maintain vigor. Small openings that may occur will also allow new trees to regenerate. Minimize damage to residual tree trunks and roots by managing impacts of heavy equipment.

Minimize soil disturbance to maintain high water quality. Restrict heavy equipment from wet ground. All applicable Best Management Practices should be observed for erosion control. The number of stream crossings should be minimal and done when the ground is stable (frozen or dry). Maintain a 75' riparian buffer strip along the streams and wetlands in which canopy cover is kept at >70%. They will protect water quality, stream temperature and aquatic habitat, and serve as travel corridors for wildlife.

After harvests, selected skid roads can be utilized as trails for recreational use. Maintain them, if desired, through periodic clearing of deadfall and in-growth.

## ESTIMATES OF TIMBER VOLUMES AND VALUE BY SPECIES

Camden Snow Bowl - Camden, Maine  
January 10, 2014

Products, Species	Volume <sup>1,2</sup>	Stumpage <sup>3</sup> Rate	Value <sup>4</sup>
Sawtimber:	<u>mbf</u>	<u>\$ per mbf</u>	
White pine, grade	36	\$140	\$5,040
White pine, pallet	4	50	200
Hemlock	22	55	1,210
Spruce	5	100	500
Red oak	240	175	42,000
White ash	28	120	3,360
White birch	13	120	1,560
Red maple	10	80	800
Sugar maple	8	180	1,440
Yellow birch	2	180	360
Beech	8	60	480
Hardwood pallet	18	40	720
	<hr/> 394 mbf		<hr/> \$57,670
Pulpwood:	<u>cords</u>	<u>\$ per cord</u>	
White pine	25	\$8	\$200
Hemlock	40	12	480
Spruce/Fir	165	15	2,475
Aspen, ground wood	80	20	1,600
Hardwood pulp	1,510	12	18,120
Firewood	1,140	18	20,520
	<hr/> 2,960 cords		<hr/> \$43,395

Total Estimated Stumpage Value\* = \$101,065

<sup>1</sup> Total timber volume estimate is  $\pm 6\%$  nine times in ten. Error is greater for individual species or products.

<sup>2</sup> Pulpwood volumes include topwood from sawtimber trees. Does not include chipwood volume.

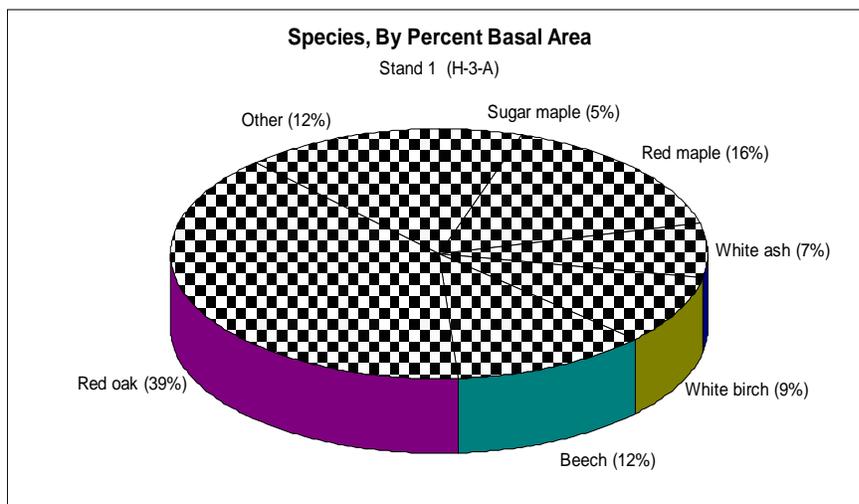
<sup>3</sup> Stumpage price estimates based on recent local averages, Winter, 2014. They are gross values and do not include the cost of forestry services.

<sup>4</sup> Represents the "liquidation value" if the entire property was cleared. This is presented for illustrative purposes only and is not recommended.

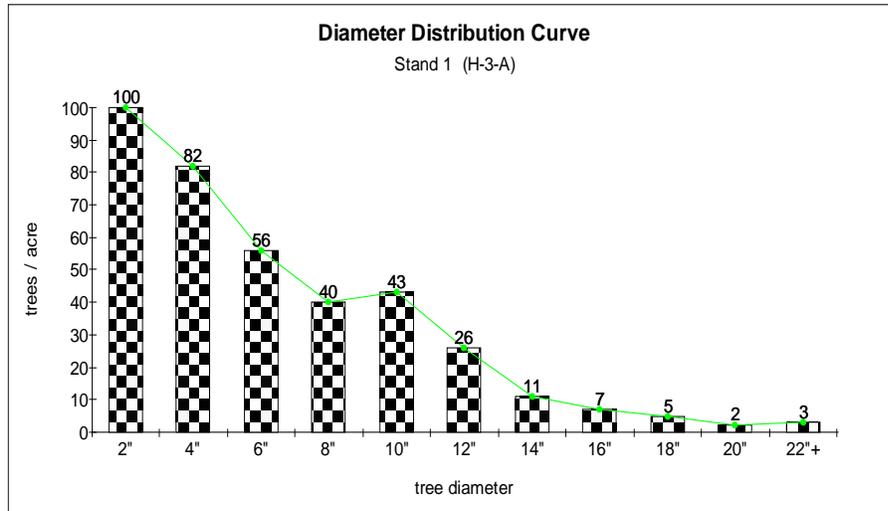
\* Discount by 10% if wood yard cannot be located part way up the slope to shorten skidding distance. Does not include chipwood value.

Stand 1 takes up nearly all the woodland on the lower and middle slopes, including the islands among the ski trails. Much of it is easily accessible from the ski trails, all of which end downhill at the ski lodge and adjacent parking lot, which would serve as a convenient wood yard. Access to the small area on the ridge adjacent to the northeast boundary is blocked by Hosmer Br. and a steep slope. The stream flowing through the Nordic trails and the toboggan chute are obstacles to access that southeast corner. Although it has three bridges for the trails, they are insufficient to support logging equipment. Temporary bridge mats can be laid down for stream crossing. A small stream in a moderate ravine blocks easy access to the thin area between it and the north boundary. It would be best to cross it near the bottom by the Hosmer Br. trail. The alpine and Nordic trails themselves should not be trashed and need to be used with care and repaired if disturbed. The integrity of the mountain bike trails near Spinnaker are also a concern. An old carriage road swings north off Spinnaker following the Hosmer Br. trail onto CMLT land and back. Permission to use it is unlikely. A septic and leach field is near the south boundary, just above the top of the Little T-bar.

Slopes are mostly moderate, with the north and upper slopes a bit steeper. A particularly steep area is just west of the western leg of the Nordic trail that includes some ledge. The terrain is more gentle about 900' up from the lodge, starting just beyond the top of the Little T-bar and the terrain park, south of the Big T-bar. Soils vary based on slope location. The lower ¼ is moderately well drained and seasonally wet. The middle ½ is well drained and drier. Soils on the upper ¼ are generally shallower to bedrock and are somewhat excessively drained. Ledge outcrops are only occasional and not as common as further upslope. Operability with machines is good to fair, depending on slope and presence of natural (streams and ledge) and man-made (trails, lifts, chute, leach field) obstacles. Except for trail-side maintenance and clearing for a new southern lift line, no timber cutting has occurred, at least in the last 30 years ago.



Stand 1 is a hardwood stand that is dominated by red oak, which makes up 4/10 of the growing space. Associates include red maple, beech, white birch, white ash and sugar maple. Less common species include yellow birch, aspen, spruce, hophornbeam, white pine and fir. It is an even-aged stand of poles and sawtimber, though sawtimber size trees take up more of the growing space. The oaks especially have a high percentage of sawtimber stems, where it makes up 80% of the growing space. Tree diameters range up to 40" in diameter (an old pasture-grown ash) and average 10". The average basal area is 112 ft<sup>2</sup>/acre. Stocking is adequate but high for hardwoods, near the over-stocked level. Canopy height is tall and crown closure is full.



Tree quality for sawtimber production is good, especially the oak. Even some red maple and beech have good form. Some of the white birches are declining and have dying tops or have died altogether. The large aspens are also declining. Most beeches are infected with beech bark disease and some are cull, containing no merchantable wood. Snags and dead-fall/blowdowns are not common. The growth rate is on the low side due to crowding, ¼ cord per acre per year. Volume per acre is high, with 4.0 mbf of sawtimber and 30 cords of pulpwood. The proportion of sawtimber volume, which is 75% oak, is above average with 21% of the total volume. Tree regeneration is limited to the shade tolerant beech and the weedy striped maple. Some spruce, fir and hophornbeam are also sparsely present. Shrubs are not common, though some hobblebush is present mid-slope.

### RECOMMENDATIONS

There is certainly quite a bit of mature sawtimber that can be harvested, as well as poorer formed trees that could be removed as an improvement cut. Other factors besides strict silvicultural considerations will play into any decision about timber harvesting. Aesthetics should probably dictate that residual stocking be kept higher than the usual recommended 70 ft<sup>2</sup>/acre of basal area. Instead of cutting 40 ft<sup>2</sup>/acre of basal area (36%), maybe reduce by half the amount to remove. If 20 ft<sup>2</sup>/acre of basal area is cut, that would yield approximately 45 mbf of sawtimber and 360 cords of pulpwood, worth \$10,000. Pending ski area renovation

plans call for clearing the islands along the north side of the Big T-bar, as well as portions of some others and a proposed trail around the Little T-bar. This adds up to around 12 acres. Just this clearing will yield approximately 49 mbf of sawtimber and 370 cords of pulpwood, also worth about \$10,000. Since the clearings are a sub-set of the stand-wide harvest area, the harvest figures are not additive. Subtracting out the 12 acres, the selection harvest estimate would then become 37 mbf of sawtimber and 300 cords of pulpwood, worth about \$8,200. If, then, additional light harvesting occurs throughout stand 1 in addition to the trailside clearings, the total yield would be 86 mbf and 670 cords, worth \$18,200. The harvesting will include the removal of the tops, which will be chipped and sold. This is a necessary component of the clearing phase, along with cutting the stems <5" that are not big enough for pulpwood even if the extensive selection cut is not done. This will yield several hundred tons worth, worth \$1,000±.

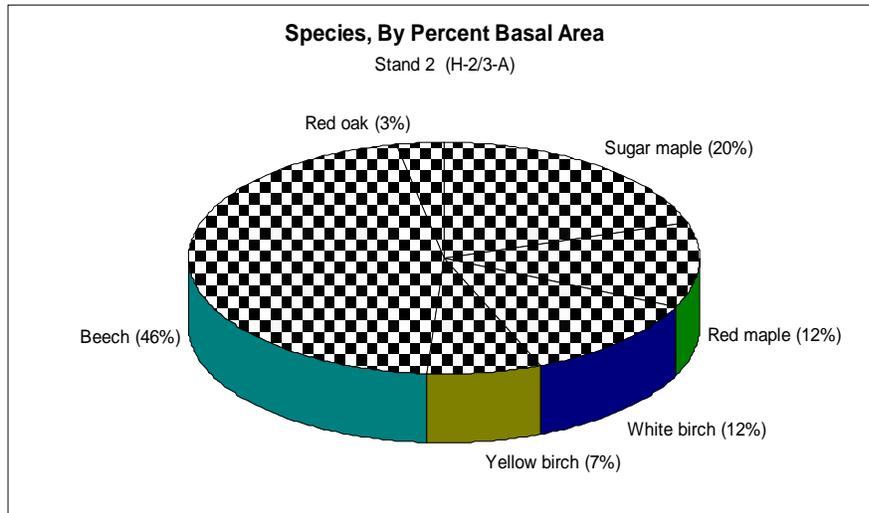
The island clearing called for in the 2014 renovation plan will be logistical awkward since the timeline calls for it to occur early Spring as one of the first stages of the project. This is the worst time of year due to wetness and soft ground, especially on the lower slopes. A seasonal stream flows down through the islands on the Big T-bar's north side. Erosion control will be a major concern and will require measures above and beyond normal logging. It'll be more akin to a construction site with silt fences and hay bales, etc. The more ideal time of year for this type of work is late summer when the ground is driest.

Wood can be yarded in or near the parking lot, where there is plenty of room. If the logistics can be worked out regarding slope, ground firmness and erosion control, establishing a yarding area further upslope would benefit the economics of harvesting trees on the upper slopes of the stand (a lessening of skid distances will shorten skid times and therefore will reduce cost and increase stumpage value).

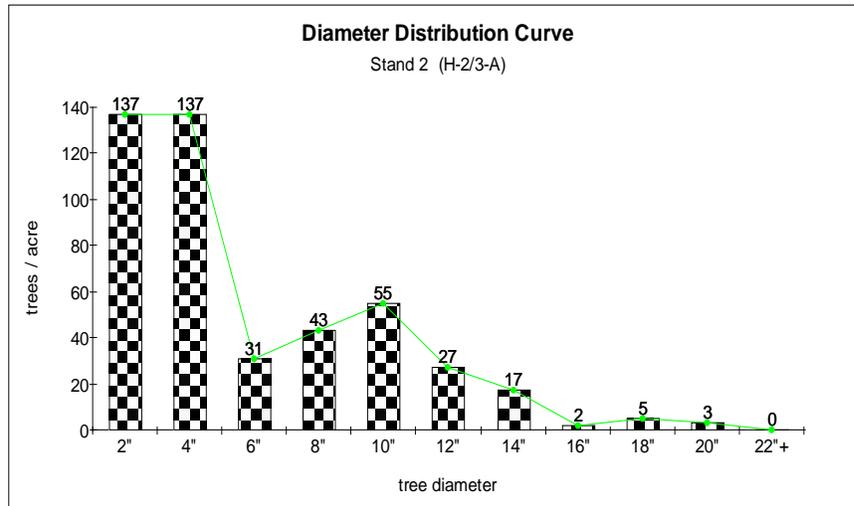
STAND 2 - HARDWOOD POLE/SAWTIMBER (H-2/3-A)

8 acres

Stand 2 is north of stand 1, outside the ski area. It lies along the north boundary and is adjacent to CMLT land. It is in the upper end of the mid-slope, at the same elevation of stand 1's upper edge. It is accessed through stand 1. Two seasonal streams are in its south end and would need to be crossed to reach farther north in the stand. The slope is moderate and the soil is well drained. Operability within the stand is good, but skidding distance to the bottom of the hill is a long ½ mile.



Like stand 1, this is also a hardwood stand. The significant difference, though, is that it is dominated by beech (½ of the stocking) and sugar maple (1/5 of the stocking) whereas oak is only a minor presence. Significant associates are red maple, white birch and yellow birch. This combination of species profiles the sub-type “northern hardwood”, though is lacking other typical species such as white ash and basswood. It is a mature stand of poles and sawtimber. Trees range up to 20" in diameter and average 10". Younger saplings are also in gaps and in the understory. Stocking is similar to stand 1; with an average basal area of 108 ft<sup>2</sup>/acre, stocking is adequate. Canopy height is tall and crown closure is full.



Tree quality for sawtimber production is fair. Most, but not all, of the beech are diseased. The sugar maple borer is rendering some of the sugar maples unacceptable growing stock. Some red maples and birches are surprisingly nice, however. The growth rate is  $\frac{1}{4}$  cord per acre per year. Volume per acre is average, with 2.0 mbf of sawtimber and 31 cords of pulpwood. The proportion of sawtimber volume is below average, with 11% of the total volume. Tree regeneration is limited to the shade tolerant beech and the weedy striped maple, plus just a few spruce.

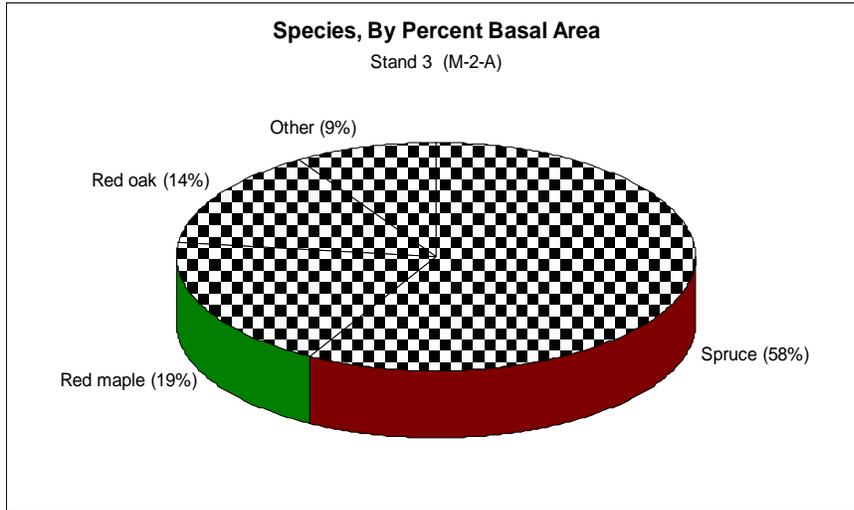
### *RECOMMENDATIONS*

The recommended residual stocking for canopy trees is 70-80 ft<sup>2</sup>/acre of basal area. The stand can certainly be thinned, if desired. The far skid distance lowers the financial value of the trees. Typically, one would harvest the larger mature trees as well as the lower quality individuals. The poorer quality trees are good for only low-valued pulpwood and may not be worth a logger's effort to retrieve these pulpwood trees. There are a few mature sawtimber trees that could be added to the offer. Assuming a 25% reduction in stocking, expected yield is 4 mbf and 60 cords, worth \$900. Any harvesting would need to be in conjunction with other harvesting in stand 1. Yarding of wood will be at the base of the slope, in or near the parking lot, or preferably uphill on a relatively flat area, if possible.

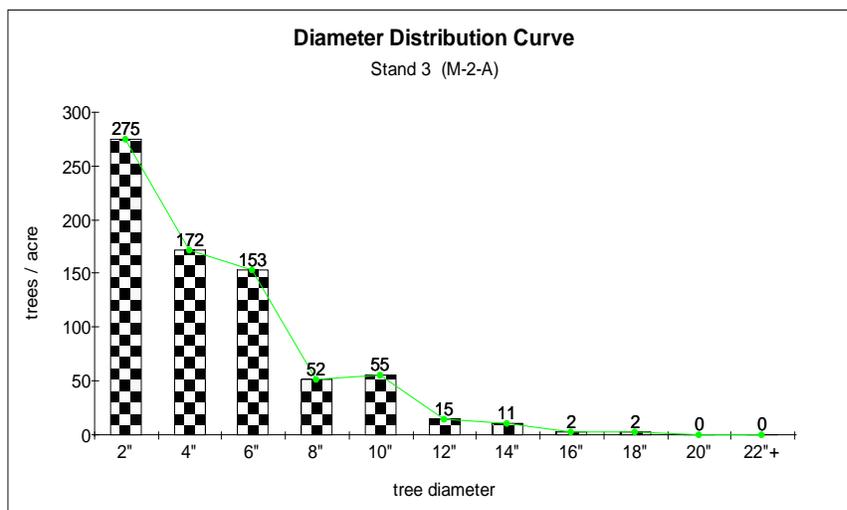
STAND 3 - MIXEDWOOD POLE/SAWTIMBER (M-2-A)

6 acres

Stand 3 includes several ski trail islands south of Northeast, at the uppermost end of the ski area. The Big T-bar runs up through it. It is accessible only through stand 1, which lies downslope. Slopes are moderate. Soils are generally somewhat excessively drained and shallow to ledge with ledge outcrops common. Operability is fair to good.



Red spruce becomes more prevalent at this higher elevation (860'+). It dominates this Mixedwood stand with about 6/10 of the growing stock. Red maple and oak are significant associates, with fir, white and yellow birch having a minor presence. It has both poles and sawtimber, though more of the stocking is poletimber. Tree diameters range up to 18" with an average of 8". With a basal area of 105 ft<sup>2</sup>/acre, stocking is adequate for a mixed stand. The crown closure is full with some small gaps of scrubby saplings. Canopy height is moderate.



Tree quality for sawtimber production is fair. Although some small sawtimber is present, most trees are poor. The growth rate is fair at 0.3 cord per acre per year. Volume per

acre is moderately low, with 1.1 mbf of sawtimber and 25 cords of pulpwood. Spruce makes up  $\frac{3}{4}$  of the sawtimber and red maple is  $\frac{1}{4}$ . The proportion of sawtimber is low, representing only 9% of the commercial wood volume. Regeneration consists of spruce and fir with some striped maple.

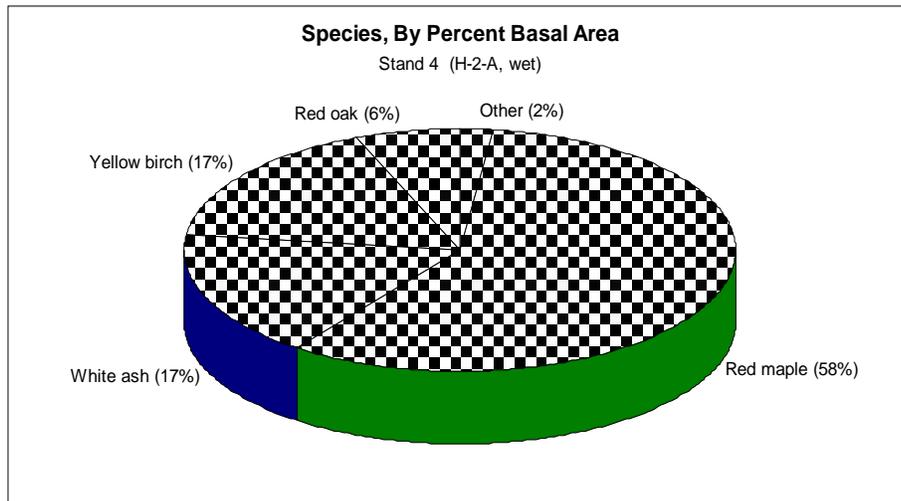
### *RECOMMENDATIONS*

Current stocking is very close to the recommended 100 ft<sup>2</sup>/acre of basal area. Therefore, no harvesting is needed. However, most of the island north of the Big T-bar and some edges along Mussel Ridge are slated for clearing as part of the pending renovation. These 3 acres will yield an estimated 3.3 mbf of sawtimber and 75 cords of pulp, plus an unknown amount of tons of chipwood, worth \$900. This is slated to get cut in 2014.

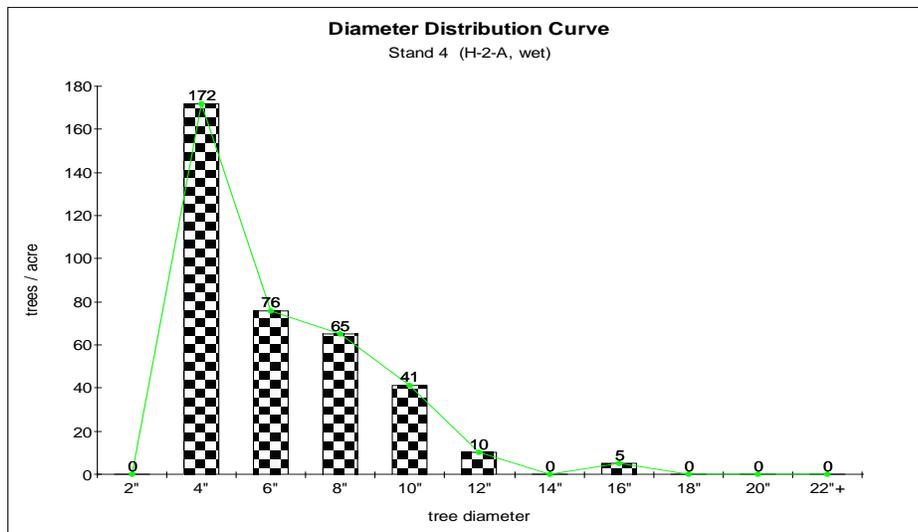
STAND 4 - HARDWOOD POLETIMBER (H-2-A)

3 acres

Stand 4 is a small wooded wetland stretching between the southern boundary and Lookout Trail and extending into Muzzen Glade. It is 200' west of the septic field. It is accessed from both the ski trail and stand 1. The Nordic ski trail also cuts through it, as well as a stone wall. Situated on a flat bench, soils are poorly drained and wet, making it a sensitive area. Operability with machines is poor due to wetness. It has not been cut recently.



Stand 4 is a hardwood pole stand that is dominated by red maple, which makes up 6/10 of the stocking. Associates are white ash, yellow birch and red oak, plus a few white birch. Trees range up to 16" in diameter and average 8". With an average basal area of 75 ft<sup>2</sup>/acre, stocking is adequate. Canopy closure is full and height is moderate.



Tree quality for potential sawtimber production is poor to fair. Except for a few maples, the stems are unacceptable. Many of the ashes south of Lookout Trail are declining and have dying tops. Birch and aspen snags are present. The Lookout Trail seems to have been built up and may have altered the drainage. The growth rate is fair at 0.2 cord per acre per year. Volume per acre is moderate, with 22 cords of pulpwood but no sawtimber. Tree regeneration is lacking in the wetter core, but beech, fir and hophornbeam are along the drier margins. Wet-loving winterberry and alder shrubs are present, thick in spots in the middle.

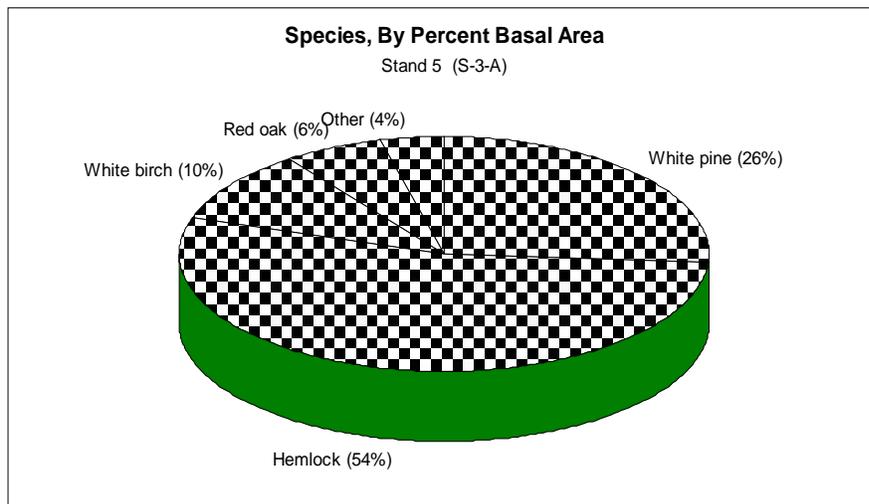
#### *RECOMMENDATIONS*

Current stocking is at the recommended level of 70-80 ft<sup>2</sup>/acre basal area. No cutting is recommended. This wetland should be protected and avoided anyway because of its sensitive nature. Leave alone.

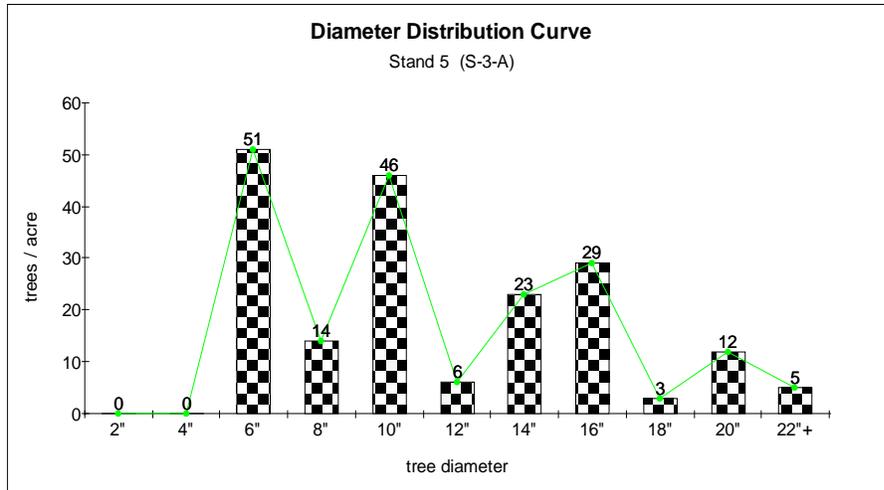
STAND 5 - SOFTWOOD SAWTIMBER (S-3-A)

4 acres

Stand 5 is in the southeast corner. Divided by Spinnaker Trail, part is on the eastern half of a tree island south of the trail and the other part straddling Hosmer Br. The island section is easily accessible from both Spinnaker and Northeaster Trails. The brook renders the east bank inaccessible. However, due to the thinness of this area, trees can be felled downhill and then cabled across the brook. It is within the riparian zone of Hosmer Br. and is therefore sensitive regarding wildlife use and soil/water conservation. It is a short skid distance to the base of the ski slope. The island section and the east bank are fairly steep. The soil is moderately well drained and seasonally wet. Operability is difficult due to steepness. Fortunately, the island isn't too wide and skidder cables can reach felled trees. No recent cutting has taken place.



Stand 5 is dominated by softwoods, which comprise 8/10 of the growing stock. Hemlock (dominates north of Hosmer Br.) and white pine (dominates in the island) are the two most common trees. White birch and red oak are associates, with small amounts of yellow birch and red pine (in a small island at the junction of the two trails. It is a mature sawtimber stand with some big trees (both in girth and height). Tree diameters range up to 28" and average 12". With an average basal area of 155 ft<sup>2</sup>/acre, stocking is adequate for softwood. The canopy height is tall and fully closed.



Tree quality for sawtimber production is quite good. Except for some larger hemlocks that are rough and limby, most of the softwood would make decent sawlogs. With the closed canopy, growth rate is relatively slow at  $\frac{1}{2}$  per acre per year. Volume per acre is high, with 16.0 mbf of sawtimber and 20 cords of pulpwood. Sawtimber volume, roughly split in half between the pine and hemlock, represents a very high proportion of the total volume with 62%. Tree regeneration is lacking.

### *RECOMMENDATIONS*

The recommended stocking level of both the hemlock-dominated bank and the white pine-dominated island section is 130  $\text{ft}^2/\text{acre}$  basal area. Due to its riparian values, it is not recommended to harvest along the brook. The pine can be lightly thinned, if desired. Reducing the stocking by 30  $\text{ft}^2/\text{acre}$  basal area, expected yield would be 5 $\frac{1}{2}$  mbf and 10 cords, worth \$900. Maintain good spacing of the residual stems, allowing increased sunlight to the crowns. Remove the lower quality stems as a priority and favor to retain the better-formed trees. Maintain the even-aged structure, but small openings will allow new regeneration to start.

Stand 6 covers the upper (eastern) slope and summit of Ragged Mountain. This is roughly the land above 900' elevation, except for stand 3. It also includes a separate section along the southern boundary and west of stand 1. It is accessible from the upper ski trails (Lookout, Spinnaker and Northeaster) and from stand 2. Soils are thin and are somewhat excessively drained. The terrain is steep and quite rough with ledge outcrops north of the trails and in the southwest corner. Balds (non-treed ledges) are common. This renders operability and access with machines poor to impossible. A jeep/ATV road does, however, cut up to a utility shed near the western boundary that services the antennae on the mountain. It doubles as a hiking trail that ends up at the summit, which affords a wonderful eastward vista of Penobscot Bay. The Georges River Land Trust's Highland Path cuts across the northwest corner. A side trail, either older or unofficial, branches off and heads due south to Ragged Mt. summit. Except for trail building, no cutting occurs here.

This is a mixedwood stand dominated by hardwoods with scattered softwood patches. It is a mix of red maple, white and yellow birch, red oak, beech and red spruce. Poles are the most common tree size, with scattered small spruce sawtimber and sapling patches. Stand 6 is considered to be non-commercial forest because of its rough terrain and access, low volume and poor quality of wood. No formal inventory was taken here - only a general assessment of the forest condition with spot measurement of stocking. With an average basal area of 80 ft<sup>2</sup>/acre, stocking is sub-optimal for mixedwood (though adequate for hardwood). The crown closure is mostly full, except in the larger ledge outcrops and balds, where the canopy opens up. Canopy height is moderate.

Tree quality for sawtimber production is poor. Except for some protected pockets, the site is generally poor and unproductive and the weather conditions are harsh. Trees are generally stunted and have broken or dead tops. It was significantly impacted from the '98 ice Storm. Snags and culls are common. The growth rate is poor. Volume per acre is low with only 8 cords of pulpwood and minimal sawtimber. Regeneration is mostly spruce and beech, with some striped maple, fir and oak. Exposed ledges contain blueberry, huckleberry, ground juniper, reindeer lichen and sphagnum moss.

The ridge of Ragged Mountain above 1,100' elevation is classified as a "Rocky Summit Heath," which is an uncommon natural community. It contains patchy vegetation among exposed rocky balds and ledges. Dwarfed shrubs are common, mixed with stunted trees spruce and fir, oak, birch and maple. Tree layer is typically sparse, but will contain interspersed islands of taller trees in protected pockets and deeper soils. See Appendix A for a Fact Sheet.

### *RECOMMENDATIONS*

MNAP recommends minimizing impacts by avoiding harvest on any exposed areas near the summit. Stand 6 is not to be managed for commercial wood products. Therefore, recommended stocking levels are meaningless. It will continue to be used for recreation, mostly the existing hiking trails leading to vistas. Otherwise, it will be left alone as a wild natural area.

## CONCLUSIONS

The Snow Bowl property's commercial woodland has excellent long-term potential for timber production while being used for recreation, maintaining an aesthetically pleasing woodland and protecting wetlands. The upper slope/summit and wetlands are deemed to be non-commercial. Ski trails serve as an excellent basis to access most of the lower slopes.

The chart at the beginning of the plan lists the various activities in selected stands that could be performed over the next 10 years. It is a guide and is flexible regarding cutting intensity and operational timing. Typically, the thrust is to harvest the mature trees, remove the poorly formed and declining trees while thinning trees to give room for crown expansion on the favored crop trees. Even if no additional selection harvesting is done in stands 1 and 2, the 15 acres of trailside clearing scheduled as part of the renovation will occur in 2014. If both types of harvest occurs, the estimated wood volume is the equivalent of 1,000 cords, which is 26% of the total standing volume.

## GLOSSARY

Acre – A unit of land 43,560 ft<sup>2</sup> in area. If square-shaped, each side would be 208.5'.

Basal Area (BA) – a) of a tree: the cross-sectional area of the trunk at 4.5' above the ground;  
b) per acre: the sum of the basal areas of all the trees on an acre; a measure of tree density of a forest stand, expressed as square feet per acre, expressing the growing space taken up by the trees.

Blaze – To scar a tree by removing a spot of bark with an ax, making a semi-permanent mark. Commonly painted to indicate boundary lines.

Board Foot – A unit for measuring wood volume in a tree, log, or cut lumber. It is the volume of wood in a board 1' by 1' by 1", equaling 144 cubic inches. The more common unit for forestry use is 1,000 board feet, abbreviated as mbf. 1 mbf = 2 cords.

Browse – Leaves, buds and woody stems used as food by woodland mammals such as deer, moose and snowshoe hare.

Buffer strip – Vegetation left along a stream, lake or wetland to protect aquatic habitat and water quality. Buffer strips filter sediment, debris and pollution, provide food, maintain cool water temperatures and increase diversity in the landscape.

Canopy – The top leafy layer of a forest, formed collectively by tree crowns.

Clearcut – A forest harvest practice in which all, or nearly all, trees are removed in a stand. It is used for maximum income or the regeneration of shade-intolerant tree species.

Commercial Harvest – A harvest operation that results in net landowner income. Harvests control the growth of stands through adjustments in stand density.

Cord – A measure of wood products 4' high, 4' wide and 8' long, equaling 128 cubic feet. It is the equivalent of 85 cubic feet of solid wood.

Crop tree – Trees chosen to live their full commercial lives, usually the highest quality and value of all the trees. Harvests/thinnings remove trees that compete with crop trees.

Cull – A tree that has no current or potential market value.

DBH – Tree diameter at breast height, measured at 4.5' above the ground.

Den Tree – A tree with a cavity used by wildlife.

Epicormic Branching – The sprouting of dormant buds on the stem of a hardwood tree, usually as a result of stress and/or sudden release and exposure to sunlight. It can reduce sawlog value due to the formation of branches.

Even-aged – A stand of trees of the same age class (within 15-20 years of each other).

Forest management – The application of sound forestry principles and practices to achieve certain stated objectives.

Growing stock, Acceptable – Trees capable of producing at least one 12' sawlog now or in the future.

Habitat – The ecosystem in which a particular wildlife species or group is commonly found.

Hardpan – A compact layer of soil that is impermeable to water and restricts soil drainage and rooting depth. Its depth below the soil surface is a significant influence on the site's quality.

Highgrading – Selective removal of the most economically valuable trees without regards to improving the residual forest for future value.

Improvement cut – Cutting in a stand to improve composition and quality by removing less desirable trees

Mast – Nuts, seeds or fruits produced by woody plants and consumed by wildlife.

Maturity, biological – The age range in which abundant seed is produced, typically starting at about 40 years of age.

Maturity, financial – The condition of optimal tree value, before significant decline.

Merchantable – Any forest product that can be harvested and sold, including portions of trees.

Operability – Ease with which logging machinery could work a site. Limitations include excessive rockiness, steep slopes, or wetness

Overmature – The age range during which significant physical decline occurs

Overstory removal – Removing the overstory trees releasing established regeneration.

Overtopped/Suppressed tree – A tree whose crown is entirely below the general level of the crown cover, receiving no direct light either from above or from the sides.

Pioneers – Trees that are quick to seed or sprout in abandoned fields.

Pasture pine – An open-grown pine that has a wide full crown, multiple stems and large lower limbs. It usually has little commercial value – maybe some short and/or low-grade logs and pulpwood.

Poles – Trees between 5" and 9" dbh.

Pruning – Removal of tree limbs, branches or tops to improve tree form, shape or health and increase quality or growth.

Quality (of a tree) – Expressed relative to a tree's potential to become a high-value product

Regeneration – Seedlings or sprouts of commercial tree species, or artificially by planting.

Residual Stand – Those trees remaining uncut following a harvest operation.

Riparian – The forest edge along rivers and streams and around lakes, Lakes and wetlands.

Saplings – Trees between 1" and 4" dbh.

Sawtimber – Trees larger than 10" dbh for softwood and 12" dbh for hardwoods and contain log quality wood. Logs are 8 - 16' long and straight and can be sawn into lumber.

Seedlings – Trees less than 1" dbh or 3' high.

Seed Tree Harvest – An even-aged management system in which a most trees are cut but a few scattered mature trees are left as sources of seed to establish a new forest.

Selection Harvest – The removal of individual or small groups of trees at regular intervals to maintain an uneven-aged stand. Used as a management tool to ensure continuous establishment of regeneration of species that do not require full sunlight to grow well.

Shelterwood Harvest – An even-aged management system involving 2 or more cuts and in which the new age class of trees develops beneath the partial shade of residual trees.

Silviculture – The art and science of controlling the establishment, growth, composition, health and quality of forests. It entails the manipulation of forest vegetation in stands and across landscapes to meet the needs and values of particular landowners as well as society on a sustainable basis.

Slash – The tops, branches and non-merchantable parts of trees left on the ground after logging, pruning or brush cutting.

Snags – Dead standing trees, often with tops broken off, which serve as home, forage site, perches or lookouts for wildlife.

Structure (of a forest) – The physical arrangement of a forest's vegetation.

Stand – A contiguous, homogenous unit of forestland, delineated because it supports trees of common species, size, age, potential, etc.

Stocking – The number and density of trees in a forest stand, compared to the optimum it could support.

Stumpage – The value of standing, uncut trees.

Timber stand Improvement (TSI) – An activity which improves the value of a stand for producing quality wood products; this includes pre- or non-commercial thinning, weeding, pruning and/or crop tree release

Thinning – Removal of some trees to reduce density in an even-aged stand, primarily to improve growth and enhance forest health.

Type – A unit of forestland, which may be composed of one or more individual stands which are homogenous but geographically separate

Uneven-aged – A stand of trees of 3 or more age classes

Weeding – The removal of poor quality or low value trees, as well as those that are diseased or damaged.

Wildlife Habitat – An area in which a wildlife species can satisfy its particular requirements of the 4 components of habitat – food, water, cover and space.

Wood Yard – A place where merchantable wood harvested from the forest is brought and assembled for loading onto trucks for mill delivery.

## ADDITIONAL SOURCES OF ASSISTANCE

- 1) Mid-Maine Forestry: We can assist with all phases of implementation of this forest management plan, including marking trees for harvest, selection of competent loggers, and harvest administration and supervision. We also maintain boundary lines, administer forestry cost-share programs, as well as supervise TSI, tree planting, trail building, and wildlife habitat enhancement practices. Please contact us for further assistance.
- 2) Maine Forest Service: A good source of educational material and information, including taxation and utilization expertise.  
State House Station #22, Augusta, ME 04330. 1-800-367-0223 (in Maine) or 1-207-287-2791. Website: <http://www.state.me.us/doc/mfs/mfshome.htm>.
- 3) University of Maine Cooperative Extension (UMCE): A good source of educational materials and information. Website: [www.umaine.edu/umext/forestry/](http://www.umaine.edu/umext/forestry/).
- 4) Small Woodland Owners Association of Maine (SWOAM): A statewide non-profit organization that promotes long-term management of private woodland. It publishes a monthly newsletter and sponsors educational programs on a variety of issues relating to forest management and ownership. Website: [www.swoam.org](http://www.swoam.org).  
P.O. Box 926, Augusta, ME 04330. 1-207-626-0005.
- 5) Natural Resources Conservation Service (NRCS), formerly Soil Conservation Service: Information on, and technical assistance with, conservation and erosion control practices, as well as applications for Federal forestry cost-share programs, such as tree planting, weeding, pruning, and erosion control. Aerial photographs.  
Mary Thompson, Soil Conservationist; email: [mary.thompson@me.usda.gov](mailto:mary.thompson@me.usda.gov)  
Waldo County NRCS, USDA Service Center, 266 Waterville Road, Belfast, ME 04915. Tel. (207) 338-1964, X3.
- 6) Knox-Lincoln County Soil and Water Conservation District (SWCD): Advice and educational outreach about conservation issues.  
893 West St., West Rockport, ME 04865. (207) 596-2040.  
Website: [www.Knox-Lincoln.org](http://www.Knox-Lincoln.org).
- 7) Coastal Mountains Land Trust (CMLT): The local land trust, established in 1987, whose mission is to “permanently conserve land to benefit the natural and human communities of western Penobscot Bay.”  
Jackie Stratton, Conservation Project Manager; email: [jackies@coastalmountains.org](mailto:jackies@coastalmountains.org)  
101 Mt. Battie St. Camden, ME 04843; (207) 236-7091.  
Website: [www.coastalmountains.org](http://www.coastalmountains.org).

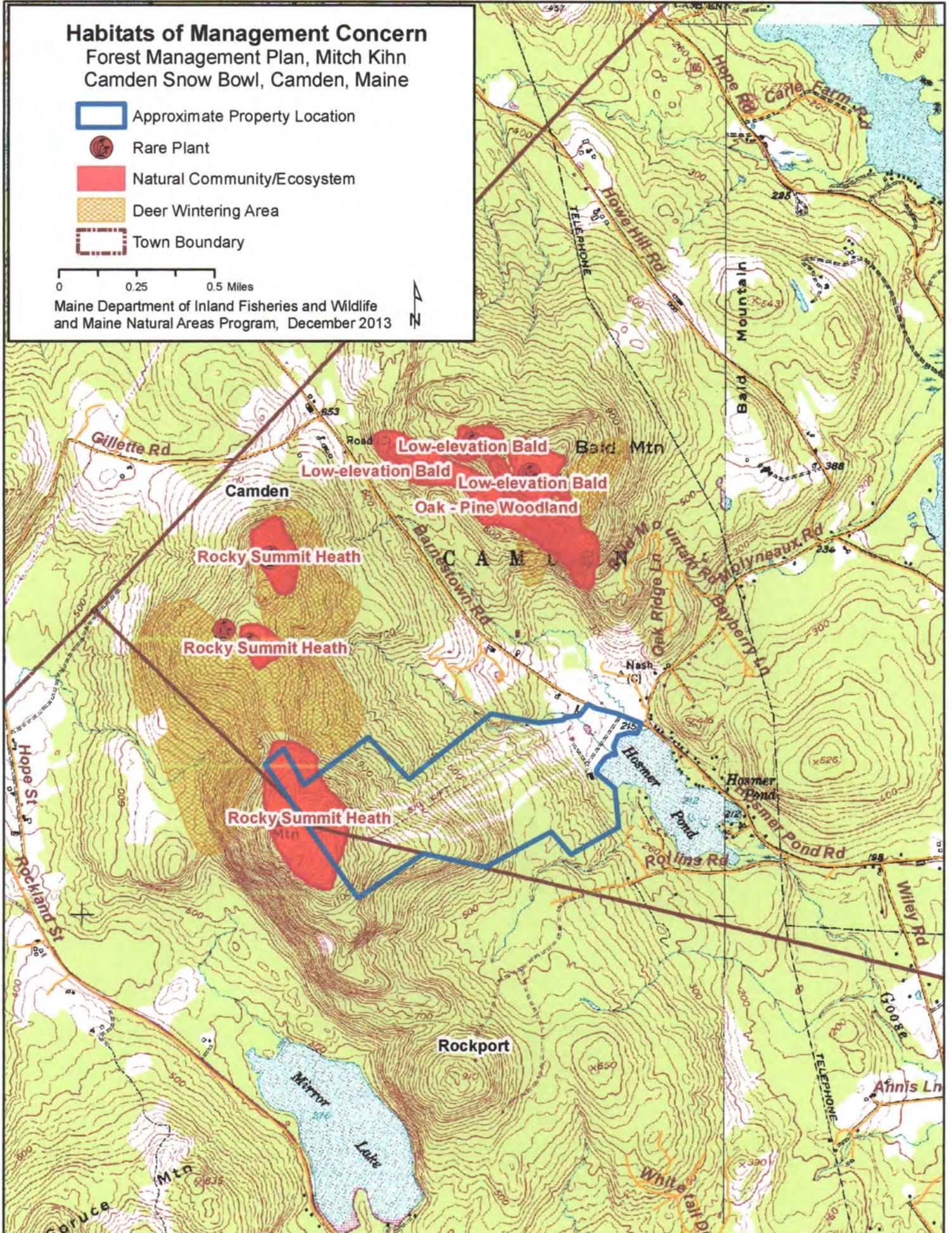
# Habitats of Management Concern

Forest Management Plan, Mitch Kihn  
Camden Snow Bowl, Camden, Maine

-  Approximate Property Location
-  Rare Plant
-  Natural Community/Ecosystem
-  Deer Wintering Area
-  Town Boundary

0 0.25 0.5 Miles

Maine Department of Inland Fisheries and Wildlife  
and Maine Natural Areas Program, December 2013



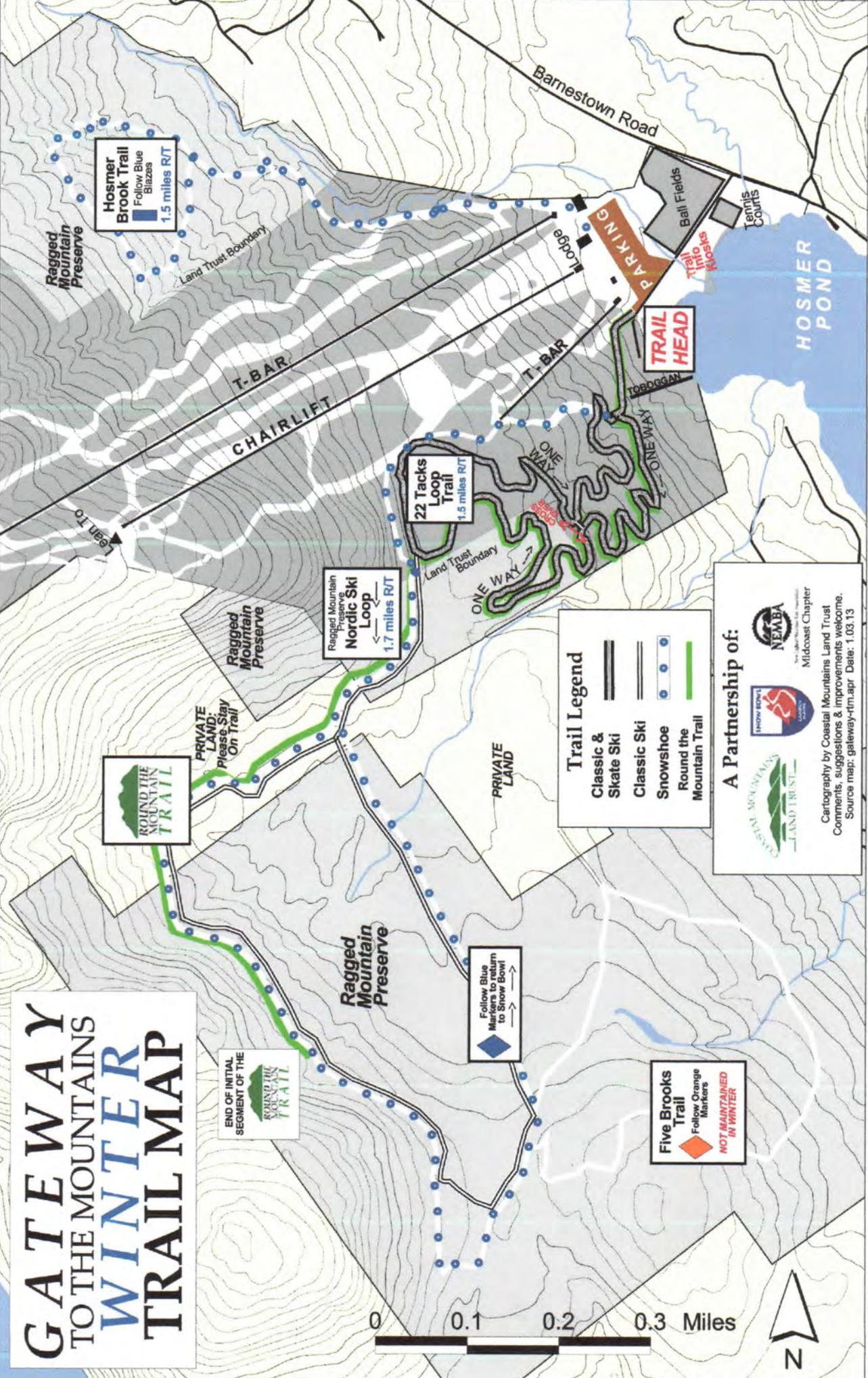
# GATEWAY TO THE MOUNTAINS WINTER TRAIL MAP

END OF INITIAL  
SEGMENT OF THE  
ROUND THE MOUNTAIN  
TRAIL

Follow Blue  
Markers to  
Snow Bowl

**Five Brooks  
Trail**  
Follow Orange  
Markers  
**NOT MAINTAINED  
IN WINTER**

0 0.1 0.2 0.3 Miles



**Hosmer  
Brook Trail**  
Follow Blue  
Blazes  
1.5 miles RT

**Nordic Ski  
Loop**  
1.7 miles RT

**22 Tacks  
Loop Trail**  
1.5 miles RT

**Trail Legend**

- Classic & Skate Ski
- Classic Ski
- Snowshoe
- Round the Mountain Trail

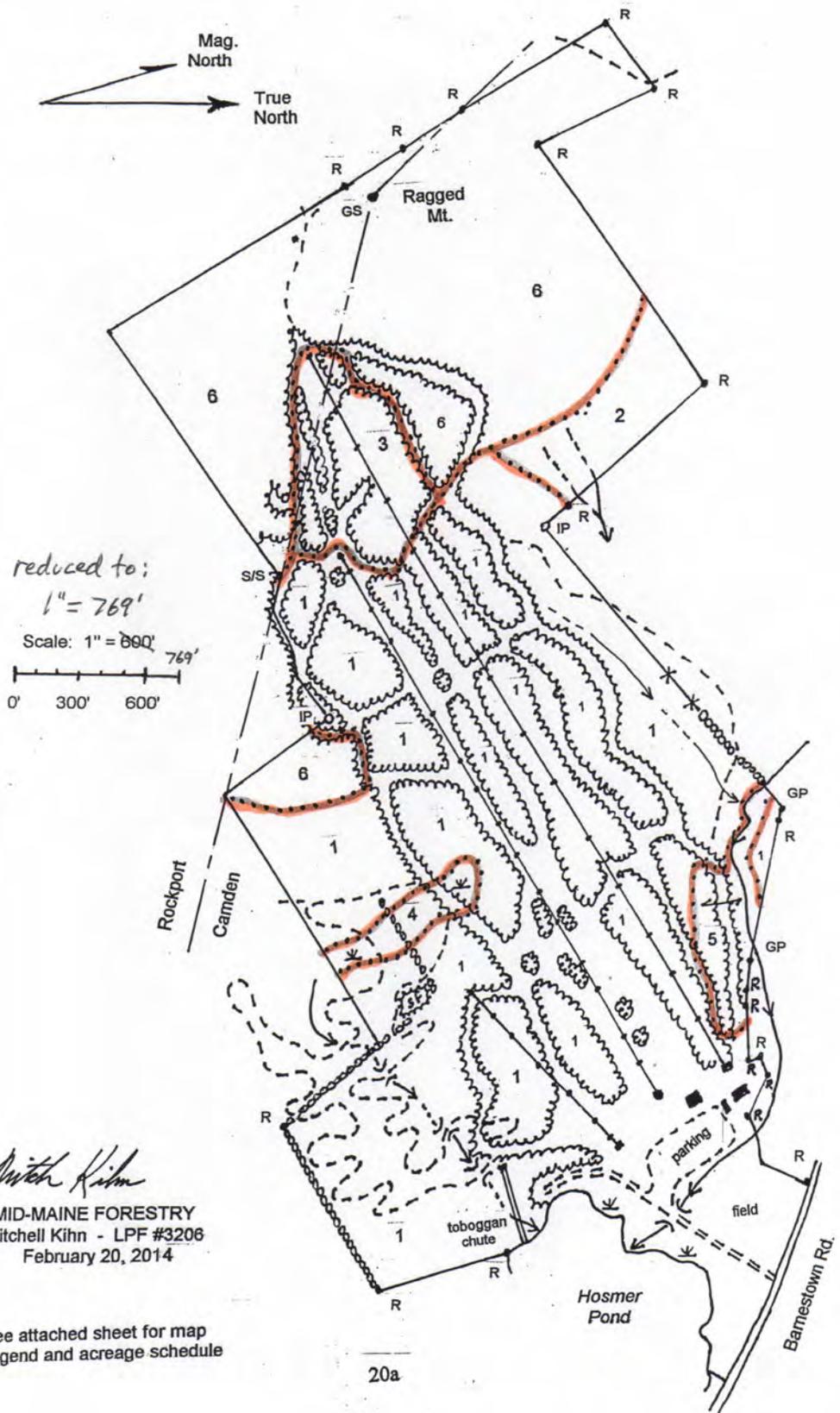
**A Partnership of:**

- NEMBA
- SNOW BOWL
- COASTAL MOUNTAINS LAND TRUST
- RAGGED MOUNTAIN PRESERVE

Midcoast Chapter  
Comments, suggestions & improvements welcome.  
Source map: gateway-rim.apr Date: 1.03.13

# PROPERTY MAP

## Camden Snow Bowl Camden & Rockport, Maine



reduced to:  
1" = 769'  
Scale: 1" = 890'  
769'  
0' 300' 600'

*Mitch Kihn*  
MID-MAINE FORESTRY  
Mitchell Kihn - LPF #3206  
February 20, 2014

see attached sheet for map  
legend and acreage schedule

# MAP LEGEND and ACREAGE SCHEDULE

## Camden Snow Bowl Camden & Rockport, Maine

<u>LEGEND</u>	
Stand number & boundary	2 .....
Woods' edge	~~~~~
Building	■
Town line	— — — — —
Survey rod / Iron pipe	• R / IP •
Granite post	GP •
Stake & Stones	S/S •
Geodesic Survey	GS •
Stone wall	oooooooooooo
Barbed wire remnants	-x-----x-
Stream, seasonal	- - - - ->
Stream, perennial	—————>
Trail & Bridge	- - - ( ) - - -
Wetland	∇
Septic field	sf
Lift	←-----→

<u>FOREST TYPES</u>			
Stand	Type		Acres
1	*H-2/3-A	pole/sawtimber	80
2	H-2/3-A	poles/sawtimber	8
3	M-2-A	poles/sawtimber	6
4	H-2-A	poletimber	3
5	S-3-A	sawtimber	4
		Commercial woodland	101 acres
6	M-2-A	Non-commercial	78
TOTAL WOODLAND			= 179 acres
NON-WOODED			= 61 acres
TOTAL PROPERTY			= 240 acres

**\*Codes:**

H = 75%+ Hardwood; S = 75%+ Softwood; M = Mixedwood  
 1 = 0-30' height; 2 = 30-60'; 3 = 60'+  
 A = 70-100% crown cover; B = 40-70%; C = 15-40%

sawtimber = 12"+ diameter for hardwoods;  
 10"+ for softwoods & white birch  
 poletimber = 5-9" softwood/birch; 5-11" hardwoods  
 saplings = 1-4"; seedlings <1"

MID-MAINE FORESTRY  
 Mitchell Kihn - LPF #3206  
 February 20, 2014

Map details are approximate; based on 2013 preliminary Base Plan of Gartley & Dorsky Engineering & Surveying, town tax map, topographic and soils map, GPS and field reconnaissance Dec., 2013 & Jan., 2014. **For forest management purposes - not a legal boundary survey.**

# Rocky Summit Heath

State Rank S4

## Community Description

Dwarf shrubs and stunted spruce or fir are the dominant features of this patchy vegetation. The tree layer is sparse (<25% cover) and includes balsam fir, red or black spruce, and (especially near the coast) northern white cedar. Dwarf shrub dominants vary and include Labrador tea, blueberries, and mountain cranberries. Interspersed islands of taller shrubs and stunted, wind flagged trees (<2 m tall) may grade to krummholz form. Herbs are patchy and less extensive than shrubs; three-toothed cinquefoil is usually present and often prominent. The bryoid layer is usually sparse (<30% cover), but may be more extensive in moist bedrock depressions. In these low spots, peat mosses are typical; otherwise, lichens are the dominant bryoids.

## Soil and Site Characteristics

Sites occupy upper slopes and ridges near the coast or mid-elevation balds (2,000'-3,000' inland). Soils are patchy, in bedrock pockets, consist of a thin layer (5-25 cm deep) of organic duff mixed with sand or rock fragments, and are acidic (pH 4.8-5.0) and excessively well drained, except in localized peaty pockets.

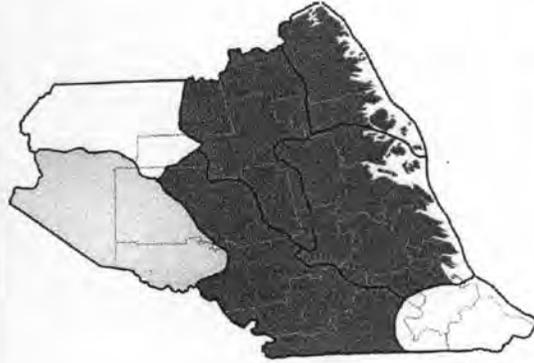
## Diagnostics

Tree cover is sparse, stunted, and patchy (<25% cover); balsam fir and heart-leaved paper birch are typical; red oak may occur at some coastal locations. Shrub cover is typically 10-50% at lower elevation sites or in pockets at higher elevations. Dwarf shrub cover exceeds herb cover, with lowbush blueberry or mountain cranberry prominent.

## Similar Types

Crowberry - Bilberry Summit Balds occur at higher elevations but lack tree cover and feature crowberry, bilberry, and/or highland rush. Three-toothed Cinquefoil - Blueberry Low Summit Balds occur at similar elevations and may co-occur with Rocky Summit Heaths, but the former usually have herbaceous species exceeding dwarf shrub species in the herb layer. Other open summit communities occur at higher elevations and feature at least some strictly alpine species such as Bigelow's sedge, highland rush, diapensia, Lapland rosebay, etc. Red Spruce - Mixed Conifer Woodlands are floristically similar and may co-occur but have >25% tree cover.

## Location Map



Community is known from this Ecoregion  
Community may occur in this Ecoregion  
Bailey's Ecoregion  
County

## Rocky Summit Heath

### Conservation, Wildlife, and Management Considerations

Because this community type is usually associated with nice views, many sites have moderate to heavy hiker use. Off trail traffic can seriously degrade the vegetation, but at most sites the relatively dense shrub and conifer vegetation does not invite off trail wanderings. This type is well represented on public lands and private conservation lands.

Coniferous forest specialists like blackpoll warblers and spruce grouse are common associates in this community.

### Distribution

Western and coastal Maine (New England - Adirondack and Laurentian Mixed Forest Provinces), extending west into northern New England and New York and east into the Canadian Maritimes.

Landscape Pattern: Small Patch

### Examples on Conservation Lands You Can Visit

- Bald Mountain, Little Concord Pond Public Lands - Oxford Co.
- Black Mountain, Donnell Pond Public Lands - Hancock Co.
- Blueberry Mountain, White Mountain National Forest - Oxford Co.
- Cadillac Mountain, Acadia National Park - Hancock Co.

## Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

### Canopy

Balsam fir\*

### Sapling/shrub

Balsam fir\*  
Gray birch\*  
Mountain holly\*  
Northern white cedar\*

Red spruce\*

Shadbush\*

Wild-raisin\*

Winterberry holly\*

### Dwarf Shrub

Black huckleberry\*  
Labrador tea\*  
Lowbush blueberry\*  
Mountain cranberry\*  
Rhodora\*  
Sheep laurel\*

### Herb

Balsam fir\*

Three-toothed cinquefoil

### Bryoid

Reindeer lichen  
Sphagnum mosses\*

## Associated Rare Plants

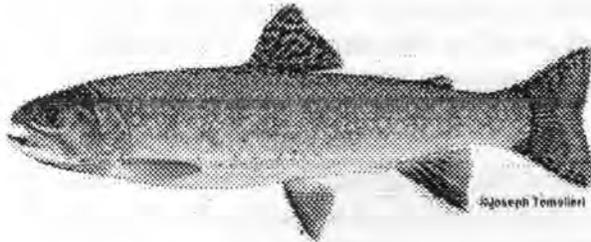
Alpine blueberry  
Alpine sweetgrass  
Smooth sandwort

## Associated Rare Animals

Bicknell's thrush

- Cold Brook Trail, White Mountain National Forest - Oxford Co.
- Sargent Mountain, Acadia National Park - Hancock Co.
- Tunk Mountain, Donnell Pond Public Lands - Hancock Co.

MAINE DEPARTMENT OF  
INLAND FISHERIES AND WILDLIFE



**Forest Management Recommendations  
for Brook Trout**

**Background**

Brook trout (*Salvelinus fontinalis*), commonly referred to as squaretail, brookie, and speckled trout, are native to Maine and are the most preferred sport fish sought by Maine anglers. Size may vary, depending on water temperature, productivity, and food sources, but 3 year-old brook trout in Maine lakes may range from 7.5 to 17.5 inches long. Stream populations are typically slower growing, and lengths of 6 to 10 inches are more common place, although some populations mature and reproduce at lengths smaller than 6 inches.

Maine is the last stronghold for wild brook trout in the eastern United States. There are more than twice as many watersheds supporting wild populations in Maine than all of the other 16 states within the historical eastern brook trout range combined. Maine is also the only remaining state with extensive intact lake and pond dwelling populations of wild brook trout.

Brook trout require clean, cool, well oxygenated water and are very sensitive to changes in habitat and water quality. Rivers and streams typically provide spawning and nursery habitat. Adults are commonly resident in streams, but migrate throughout and between drainages to meet seasonal life history requirements.

Stream habitat suitability is maintained by the presence of intact, mature wooded riparian corridors that conserve forest soils, provide shade to reduce stream warming, protect stream water quality, provide cover for fish, and provide a source of woody debris and leaf litter from mature trees that maintain in-stream habitat for fish and the aquatic insects they feed upon. Floodplain and fringe wetlands associated with streams can be a significant source of springs and groundwater discharge that maintain stream flows and cool temperatures during warm low flow summer periods. Protection of these important riparian and wetland functions ensures that the overall health of the stream habitat and watershed is maintained.

Maine brook trout fisheries are unique and highly valuable, but they are vulnerable to habitat alteration that may be caused by poorly planned and implemented land management activities. Well planned forestry operations can protect habitat and help ensure that forests remain as forest; a compatible land use for brook trout and many other fish and wildlife.

### ***Forest Management Recommendations***

Brook trout are not afforded any special state or federal regulatory protection for forestry operations, and as such management recommendations are advisory.

The MDIFW recommends following Best Management Practices (BMPs) during all road and trail building activities, as well as timber harvesting. BMPs are detailed in the booklet titled *Best Management Practices for Forestry*, which offers guidance on managing and protecting water quality, installing road-stream crossings, and providing fish passage. This booklet is available at: [http://www.maine.gov/doc/mfs/pubs/bmp\\_manual.htm](http://www.maine.gov/doc/mfs/pubs/bmp_manual.htm) or contact the Maine Forest Service at 1-800-367-0223.

Potential harmful impacts to fish and wildlife may be further minimized by designating low impact "riparian management zones" adjacent to streams and stream-associated fringe and floodplain wetlands in forest management and harvest plans. Smaller streams may be greatly influenced by land management practices; these systems benefit the most from well-managed and intact riparian corridors.

The MDIFW also recommends limiting the harvest of trees and alteration of other vegetation within 100 feet of streams and their associated fringe and floodplain wetlands to maintain an intact and stable mature stand of trees, characterized by heavy crown closure (at least 60 – 70%) and resistance to wind-throw. In some situations wider buffers should be considered where severe site conditions (e.g., steep slope, vulnerable soils, poor drainage, etc) increase risk to soil and stand stability. Any harvest within the riparian management zone should be selective with a goal of maintaining relatively uniform crown closure.