Natural Resource Inventory of the Mahoosuc and Rangeley Lakes Region: Mahoosucs

Goose Eye Brook

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for the
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Mahoosuc Unit

Property Description

Featuring dramatic waterfalls and trout streams, the state's second largest Ecological Reserve, and the 'toughest mile on the Appalachian Trail', the Mahoosuc Unit encompasses some of the most spectacular scenery and finest remote hiking in Maine. Together with the adjacent Grafton Notch State Park, the Unit covers over 30,000 acres. The area harbors a number of rare plant and animal populations, several exemplary natural communities, and high quality brook trout streams, with most of these features occurring within the 10,000 acre Mahoosuc Ecological Reserve or on Baldpate mountain. Other portions of the unit are productive forestland managed for timber products by BPL.

Geology and Soils

Many of Mahoosuc's unusual features can be attributed to its geologic history and exposed bedrock. The rugged mountain range resulted from geologic uplift, but the sheer cliffs of Grafton and Mahoosuc Notches were scraped and carved by glacial activity. Talus slopes formed when the freshly carved vertical cliff faces were exposed to the elements. Without vegetation to stabilize the slopes as glaciers retreated, the steepest areas crumbled to form boulder fields that fill some of the valleys such as Mahoosuc and Grafton Notches. Some talus slopes support vigorous moss and lichen communities, while other slopes appear too active to support any substantial vegetation.

Soils in Mahoosuc are dominated by the following soil types, in descending order of importance (adapted from Publicover 2003 and Polak et al 2007):

- Soils of high mountains occur on slopes and ridges primarily above 2500 feet. These soils, consisting of the Enchanted, Saddleback, Surplus, and Ricker series, typically support upper-elevation spruce-fir forests.

- Loamy soils developed from a combination of schist, phyllite, granite and gneiss occur on mid and lower slopes. They are intermediate in material, texture, drainage, acidity and fertility between the granitic soils of the previous group and the slaty soils of the next group. The Lyman, Colonel, and Dixfield series are locally the most common soils in this group.

- Coarse-textured soils developed from granite, gneiss and schist are also found on north-sloping hills, ridges and mountain slopes. Generally well-drained and sandy in texture, they contain many rocks. These soils are very acidic and relatively infertile spodosols. Monadnock, Becket, and Turnbridge series are this group's most common soils in the Mahoosucs.

Peaty soils form a shallow carpet over bedrock on East Baldpate

Hydrology and Water Quality

The Mahoosuc Unit lies within the Androscoggin River drainage. The ridge of Mahoosuc unit separates the watersheds of the Sunday River, Chapman Brook, and Bear Brook to the east and a number of smaller tributaries of the Androscoggin to the west. Streams from the Unit are known to be cool and high energy/high gradient, with many riffles, pools, and scenic waterfalls. Brooks are fed by numerous dispersed mountain seeps, and there are many unmapped headwater streams.

Wetlands

The rugged topography of the Mahoosuc unit does not lend itself to wetland formation. The Unit includes only 84 acres of wetlands (0.2% of the Unit's area) and 6 acres of open water (the 37' deep Speck Pond). Wetland acreage is divided evenly between forested and non-forested types (according to National Wetlands Inventory), with both types occurring wetlands concentrated along beaver meadows and smaller streams.

Ecological Processes

Spruce budworm has played a prominent role in forest disturbance at Mahoosuc. Since balsam fir is the preferred food of the budworm, areas with large amounts of fir become easy targets. By preferentially selecting balsam fir as its host, spruce budworm effectively decreases the amount and quality of fir in the area. The most recent outbreak occurred in the 1980s. Along exposed ridges, budworm damage combines with wind and weather effects to create larger and more frequent gaps.

The forested communities on the unit show evidence of typical small gap disturbances from ice, windthrow, or natural tree mortality. Some higher elevation spruce-fir forests in the Mahoosucs larger patches (a few acres) of blowdowns. Trees on steep slopes and exposed ridges are especially susceptible to this type of disturbance. These gaps increase the complexity of forest structure and add to the diversity of microhabitats in the forest for plants and animals.

See the 'Regional Overview' section for a more detailed description of ecological processes.

Patterns of natural disturbance in high elevation forest, Mahoosucs

Land Use and Harvest History

BPL has gradually acquired the Mahoosuc Unit through a series of transactions that continued through 2008. The largest tracts were purchased from the Brown Paper Company and International Paper in the late 1970s. Lands were managed primarily for forest products prior to state acquisition, with softwood stands presumably harvested more heavily than hardwood stands, in light of the historically higher demand for softwood lumber and pulp. In particular, most of the accessible areas were harvested in the 1960s and 1970s prior to state acquisition (Tom Charles, personal communication).

Since 1984, BPL has conducted selection harvests in most years except 1996-2002 on mid and lower elevation areas outside of the Ecological Reserve. Some small steep, remote, and inaccessible terrain at high elevation may never have been harvested. Most of this terrain, however, is subject to natural disturbance stresses of spruce budworm and heavy wind and weather damage, so true 'old growth' is very scarce on the Unit.

Fisheries and Wildlife

The Mahoosuc Unit provides habitat for many of the wildlife species one would expect to see in large habitat blocks of the western Maine woods, including moose, deer, black bear, fisher, beaver, and bobcat. In particular, Unit's high elevation forests may support species such as the American marten, Blackpoll warbler, Bicknell's thrush, spruce grouse, boreal chickadee, white-winged crossbill, and three-toed woodpecker. Moose tend to winter at higher elevations where they browse on fir, mountain ash, and yellow birch. High elevation ridgelines also serve as important migratory routes for songbirds, raptors, and bats (Polak et al 2007).

Only one Significant Habitat has been mapped by MDIFW within the Mahoosuc Unit – a ~33 acre beaver meadow along White Cap brook north of the Baldpates. It is considered of 'moderate' value.

At Speck Pond, small springs enter the pond from all sides and its outlet, Pond Brook, flows southeast into the Bull Branch of the Sunday River. Water quality in Speck Pond is good for coldwater gamefish. However, spawning and nursery habitat is lacking, and a brook trout fishery is maintained through annual stockings. Trout growth is good with no competition from other species for food and space. The pond is open to fishing with no live fish as bait in the summer and closed to fishing in the winter. (IFW: http://www.state.me.us/ifw/fishing/lakesurvey_maps/oxford/speck_pond.pdf).

The Sunday River supports a fishery that includes both native brook trout and stocked rainbow trout, as well as a number of other native non-game fish including dace, sculpin, and chub (University of Maine PEARL database).

Ecological Reserve

Extending from 1120 feet to 3980 feet, the 9,993-acre Mahoosuc ecological reserve is second among state Reserves to only Bigelow in elevation range, and it is one of the three largest state reserves. Most of the reserve (8,458 acres) has been classified as sub-alpine forest, and 259 acres have been classified as alpine ridge -- the most alpine habitat of any of the thirteen State ecological reserves. This alpine ridge, traversed by the Appalachian Trail, supports numerous populations of rare plants. In 2008, over 30 long term forest monitoring plots were placed throughout the Mahoosuc Reserve in accordance with protocols established by the Ecological Reserve Monitoring Plan. See http://www.maine.gov/doc/nrimc/mnap/reservesys/index.htm#monitoring for details.

Rare Plant and Animal Species

Cutler's goldenrod grows on Goose Eye and West Baldpate

Eleven rare plant species (a total of fifteen occurrences) are known from the Mahoosucs. Most of these occur within the exposed alpine zone of Goose Eye Mountain or the Baldpates. While none of these alpine species are globally rare, they are boreal species that persist only on mountaintops at the southern periphery of their ranges, and their habitats may be threatened by both recreational use and climate change.

There are no extant rare animals known from the Mahoosucs. Peregrines have nested at Eyebrow Ledge on Old Speck within the last decade, and Lightning Ledge on Mt. Hittie is a historic nest site. Although once broadly distributed in North America, this species was lost from much of its historic range, including the eastern United States, by the mid 1960s. In the 1980s Maine joined other states in a large-scale peregrine falcon reintroduction program. With recovery of the species nationwide, the peregrine falcon was taken off the federal endangered species list in 1999, but its breeding population remains listed as endangered in Maine, as its numbers here are still low. Because the cliffs where peregrines nest are often near high-use recreational areas, careful management is necessary to avoid conflicts during the breeding season.

Natural Communities

Sub-alpine slope bog on East Baldpate

Over 8,000 acres of the Mahoosuc Unit lies above 2700' in elevation. Despite the predominance of high elevation forests, more than half (54%) of the acreage of the Unit is hardwood; 22% is classified as mixed wood and 26% is softwood. Hardwood sites are dominated by Beech Birch Maple forests, mixed wood forests are primarily Spruce – Northern Hardwood, and softwood stands are divided among Montane Spruce Fir

Forest and Fir-Heart leaf Birch Subalpine Forest. In general, most of the forests are silviculturally mature (e.g., moderately to well stocked with trees >50 years old), and relatively little forested acreage at the Mahoosucs is early successional.

Ten exemplary natural communities have been mapped within the Mahoosuc Unit. The majority of these exemplary areas occur within the Ecological Reserve, and seven of the ten areas are associated with high elevation mountaintops or ridges at Goose Eye Peak, Mahoosuc Notch, Sunday River Whitecap, and Baldpate Mountain.

200+ year old yellow birch tree in Mahoosuc Notch

One of the most unusual natural communities occurs at Mahoosuc Notch, a striking jumble of car-sized boulders sandwiched between two sheer 400' cliffs. The Appalachian Trail traverses the 25 meter wide notch, in places forcing hikers to scramble among and through boulders. The lack of sunlight, cold air drainage, and abundance of boulders results in ice chunks lasting well into the summer. The Cold Air Talus Woodland vegetation is boreal, with abundant Labrador tea, mountain cranberry, rhodora, and stunted black spruce. Adjacent to the hiking trail in the notch, a dense mat of moss covers the shaded boulders. Upslope the vegetation grades into parts Acidic Cliff (on the steepest sections) and parts Red Spruce Mixed Conifer Woodland (nearer to the summit crest).

Another unusual natural community is the Sub-alpine Slope Bog (also called 'hanging bog') on the north-facing slope of East Baldpate. Two ~1-acre patches of shallow (<1 meter deep) peatland vegetation occur on a 20-50% slope over seepy granite. These patches support bog vegetation of Labrador tea, deer-hair sedge and *Sphagnum* spp. Sub-alpine slope bogs are known from only a few sites in Maine.

Alpine habitat near the summit of Goose Eye Mountain

In addition to the uncommon high elevation natural communities, the Mahoosucs harbor a few remnant patches of late-successional to old growth northern hardwood and mixed wood forest. Just north of Mahoosuc Notch, a small (~25 acre) patch of old growth Beech birch maple forest lies at the headwaters of a small stream. This stand is dominated by large yellow birch, with ~25% spruce and a relatively open understory of hobblebush. Ages of three cored spruces in the canopy were 85, 152, and 285, suggesting an all-aged stand. Numerous very large yellow birch trees were noted, including one 40" in diameter. Another late successional Beech Birch Maple forest occurs on the east side of Grafton Notch along the Appalachian Trail, within the State Park boundary. There are vague signs of harvesting 50+ years ago, with numerous large (50-80 cm dbh) yellow birch trees and moderate abundance of large-diameter coarse woody debris.

The recent acquisition north of Slide Mountain and along Bull Branch also has a few hundred acres of late-successional spruce-fir and mixed forest at high elevation. While some harvesting likely occurred here long ago, the forest structure is largely undisturbed, and cored spruce trees were 127, 165, 180, 196, and 211 years old. Further field work is needed to determine if this meets MNAP standards for "exemplary" size and condition. Three rare plant species were also found along a headwater seep in this area.

References

PEARL database website: http://www.pearl.maine.edu/.

Polak, M., List, J., and K. Siegel. 2007. Mahoosuc Region Resources Report. Volume 1: Resource Values. Mahoosuc Land Trust, Androscoggin River Watershed Council, Tri-County Community Action Program. 146 pp.

Appendix 1: Exemplary Natural Communities and Rare Plant and Animal Species of the Mahoosuc Unit

Fact sheets are available for each of the rare species and natural communities at
http://www.maine.gov/doc/nrimc/mnap/features/index.htm

Exemplary Natural Communities

Feature Name	Location	S-Rank	EO Rank	Last Obs.	Size (ac)
Acidic Cliff	Mahoosuc Notch	S4	A	2008	83.0
Cold Air Talus Woodland	Mahoosuc Notch	S2	B	2008	25.0
Heath Alpine Ridge	Baldpate Mountain	S2	H	1997	22.4
Heath Alpine Ridge	Goose Eye Mountian	S2	B	1997	128.2
Mid-elevation Bald	Sunday River Whitecap	S3	E	2001	11.3
Northern Hardwoods Forest	Grafton Notch State Park	S4	B	2008	290.5
Northern Hardwoods Forest	Mahoosuc Notch	S4	B	1996	20.7
Spruce - Pine Woodland	Mahoosuc Mountain	S4	A	2008	58.6
Subalpine Fir Forest	Baldpate Mtn	S3	B	2005	1,123.6
Subalpine Slope Bog	East Baldpate	S1	A	2009	2.0
Subalpine Fir Forest	Mahoosuc Range	S3	A	2008	5,058.6
Upper Floodplain Hardwood Forest	Sunday River	S3	C	2008	55.0

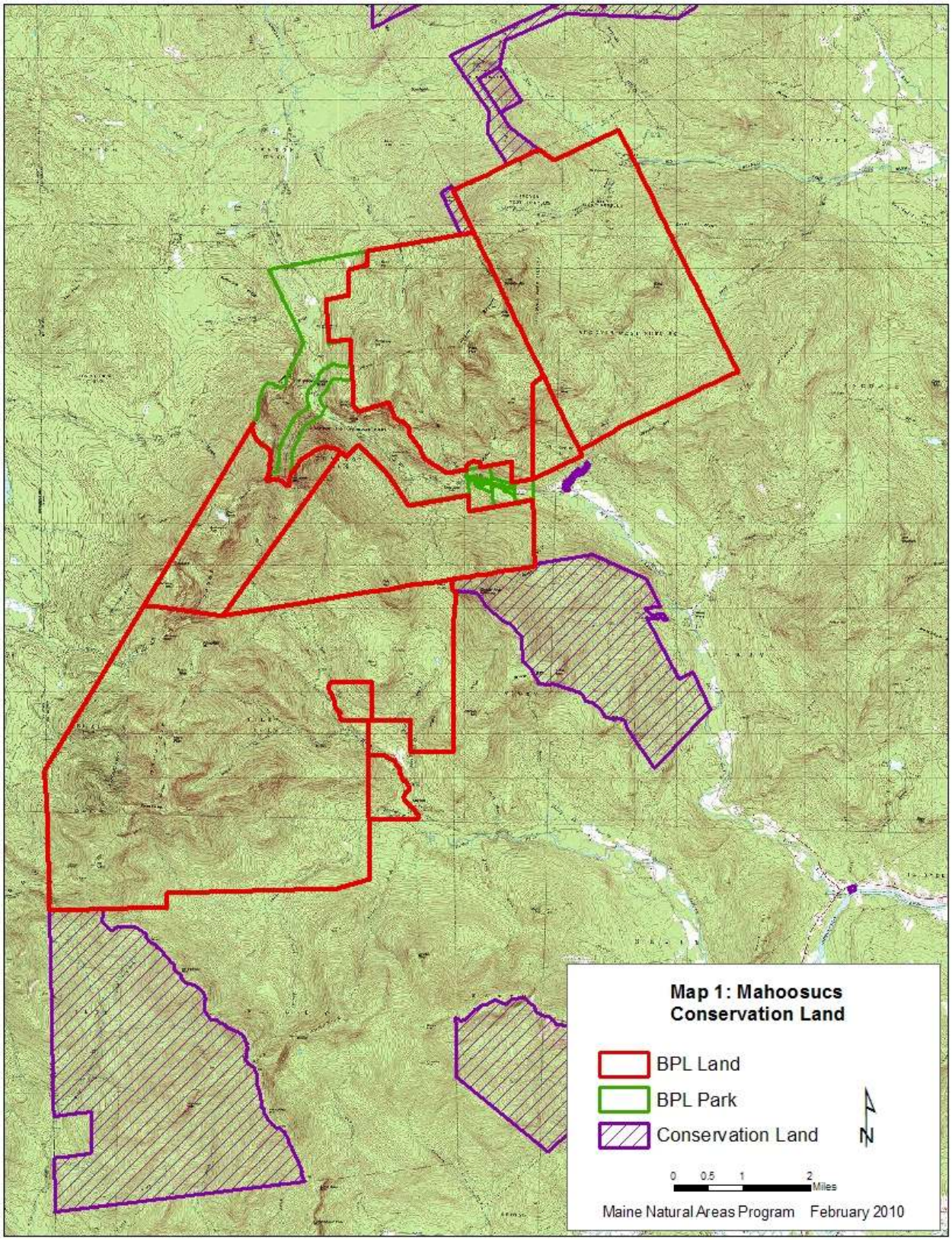
Rare Plants

Feature Name	Location	S-Rank/G-rank	EO Rank	Last Obs.	Size (ac)
Alpine Blueberry	Goose Eye Mtn.	S2/G4	E	2002	Point
Alpine Sweet-grass	Goose Eye Mtn	S1/G5	H	1985	Point
Appalachian Fir-clubmoss	Goose Eye Mtn, Eastern Spur	S2/G4G5	B	2004	Point
Bigelow's Sedge	Goose Eye Mtn, Eastern Spur	S2/G5	BC	2005	Point
Boreal Bentgrass	Goose Eye Mtn, Eastern Spur	S2/G5	C	2004	Point
Cutler's Goldenrod	Baldpate Mountain	S1/G5T4	H	1981	Point
Cutler's Goldenrod	Goose Eye Mtn, Eastern Spur and West Peak	S1/G5T4	C	2004	Point
Dwarf Rattlesnake Root	Goose Eye Mtn	S1/G5	C	2004	Point
Lapland Diapensia	Goose Eye Mtn	S2/G5	B	2004	Point
Mountain Sandwort	East Baldpate Mountain	S3/G5	AB	2006	Point
Mountain Sandwort	Goose Eye Mtn, East and West Peak and Ledges	S3/G5	B	2004	Point
Northern Comandra	Fulling Mill Mtn	S3/G5	H	1982	Point
Northern Comandra	Goose Eye Mountain, Eastern Spur	S3/G5	BC	2005	Point
Silverling	Goose Eye Mountain, East Peak	S1/G4	CD	2005	Point
Silverling	Old Speck Mountain, The Eyebrow	S1/G4	D?	2004	Point

Rare Animals

Feature Name	Location	S-Rank/G-rank	EO Rank	Last Obs.	Size (ac)
Peregrine Falcon	Grafton Notch	S1S2N,S2B/G4	H	Historic	Point
Peregrine Falcon	Lightning Ledge	S1S2N,S2B/G4	H	Historic	Point

Appendix 3: Maps of the Mahoosuc Unit


Map 1: Mahoosucs
Conservation Land
BPL Land
BPL Park
Conservation Land
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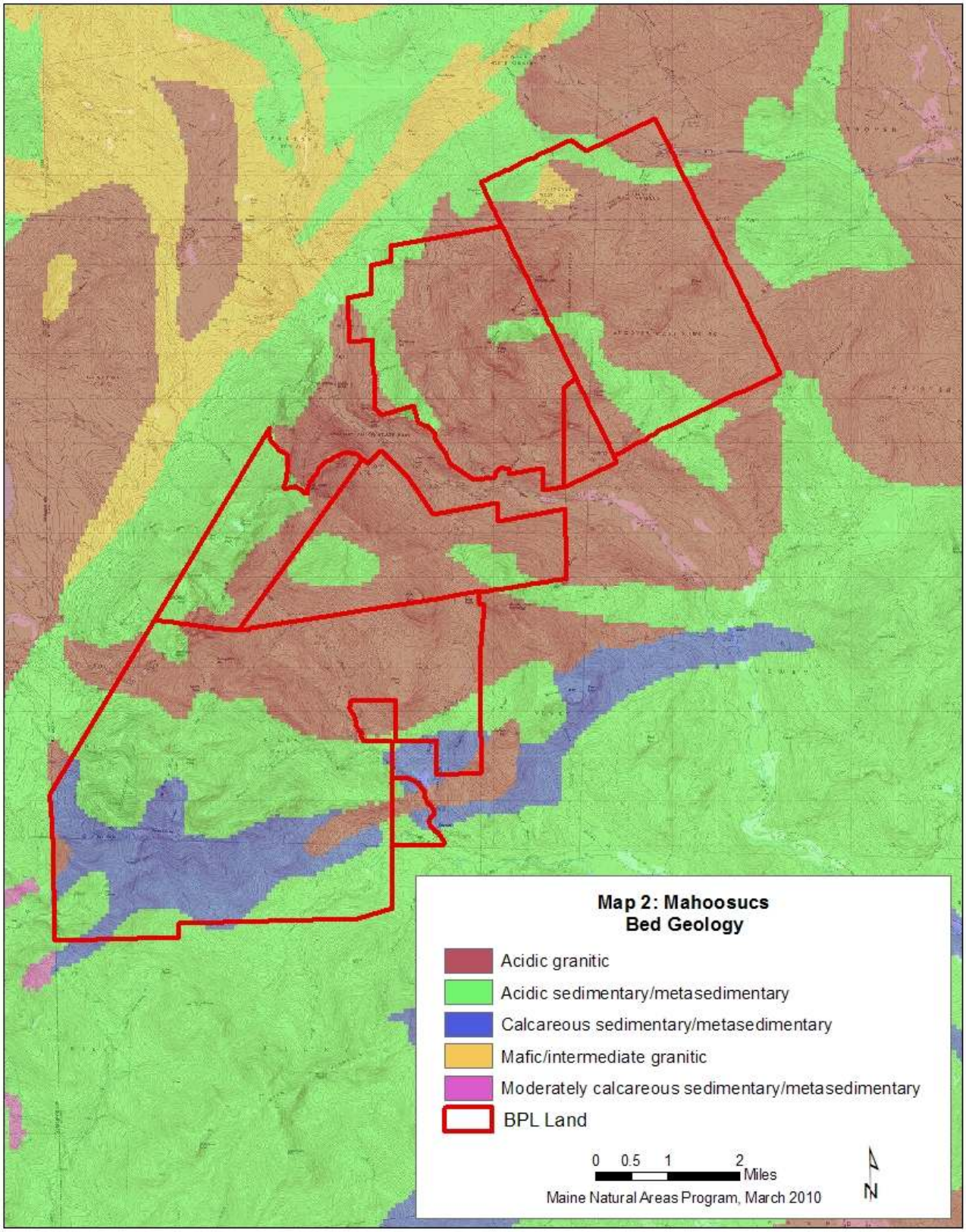
Miles
Maine Natural Areas Program February 2010


Map 2: Mahoosucs
Bed Geology
Acidic granitic
Acidic sedimentary/metasedimentary
Calcareous sedimentary/metasedimentary
Mafic/intermediate granitic
Moderately calcareous sedimentary/metasedimentary
BPL Land
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Maine Natural Areas Program, March 2010
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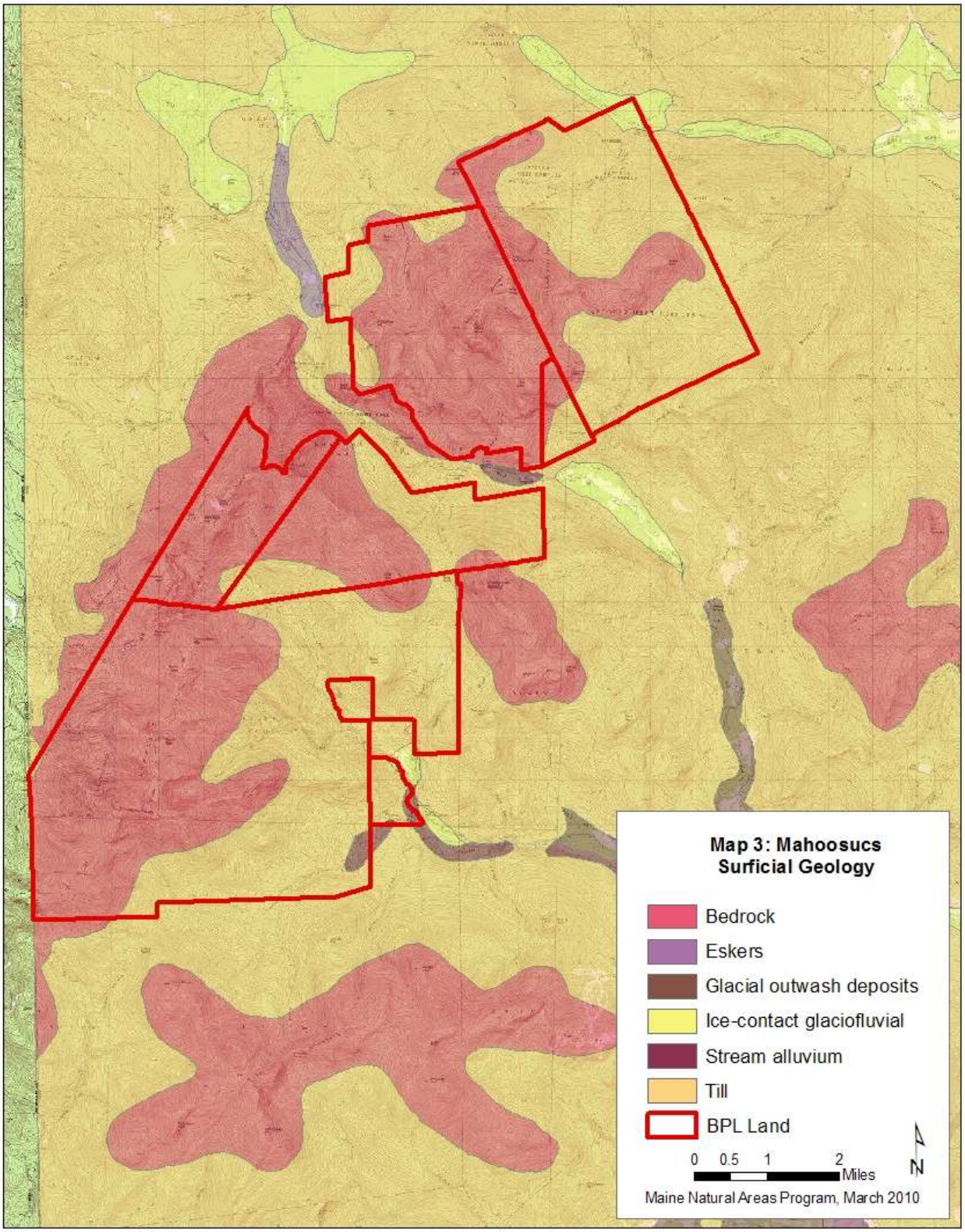
Map 3: Mahoosucs
Surficial Geology
Bedrock
Eskers
Glacial outwash deposits
Ice-contact glaciofluvial
Stream alluvium
Till
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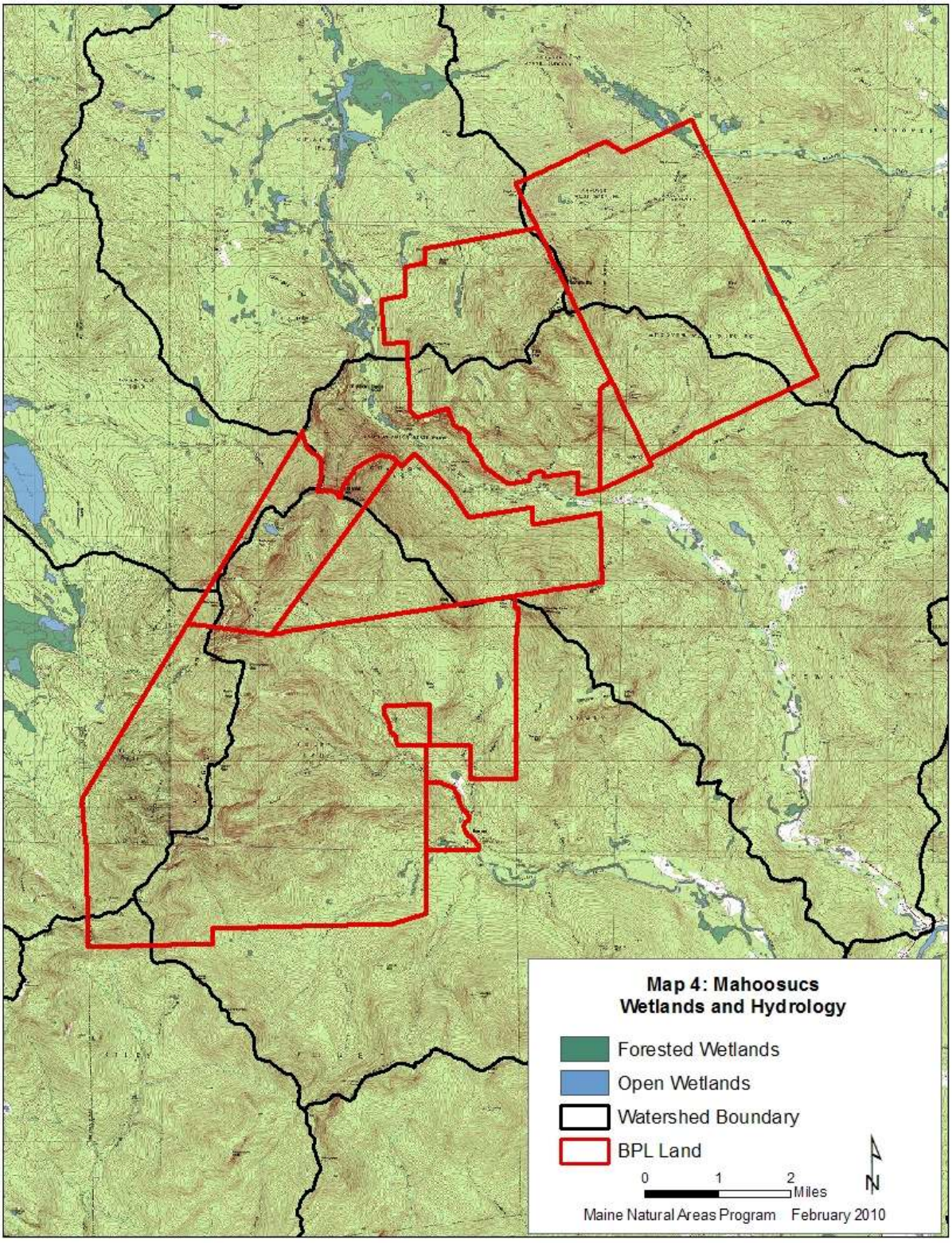
Maine Natural Areas Program, March 2010


Map 4: Mahoosucs
Wetlands and Hydrology
Forested Wetlands
Open Wetlands
Watershed Boundary
BPL Land
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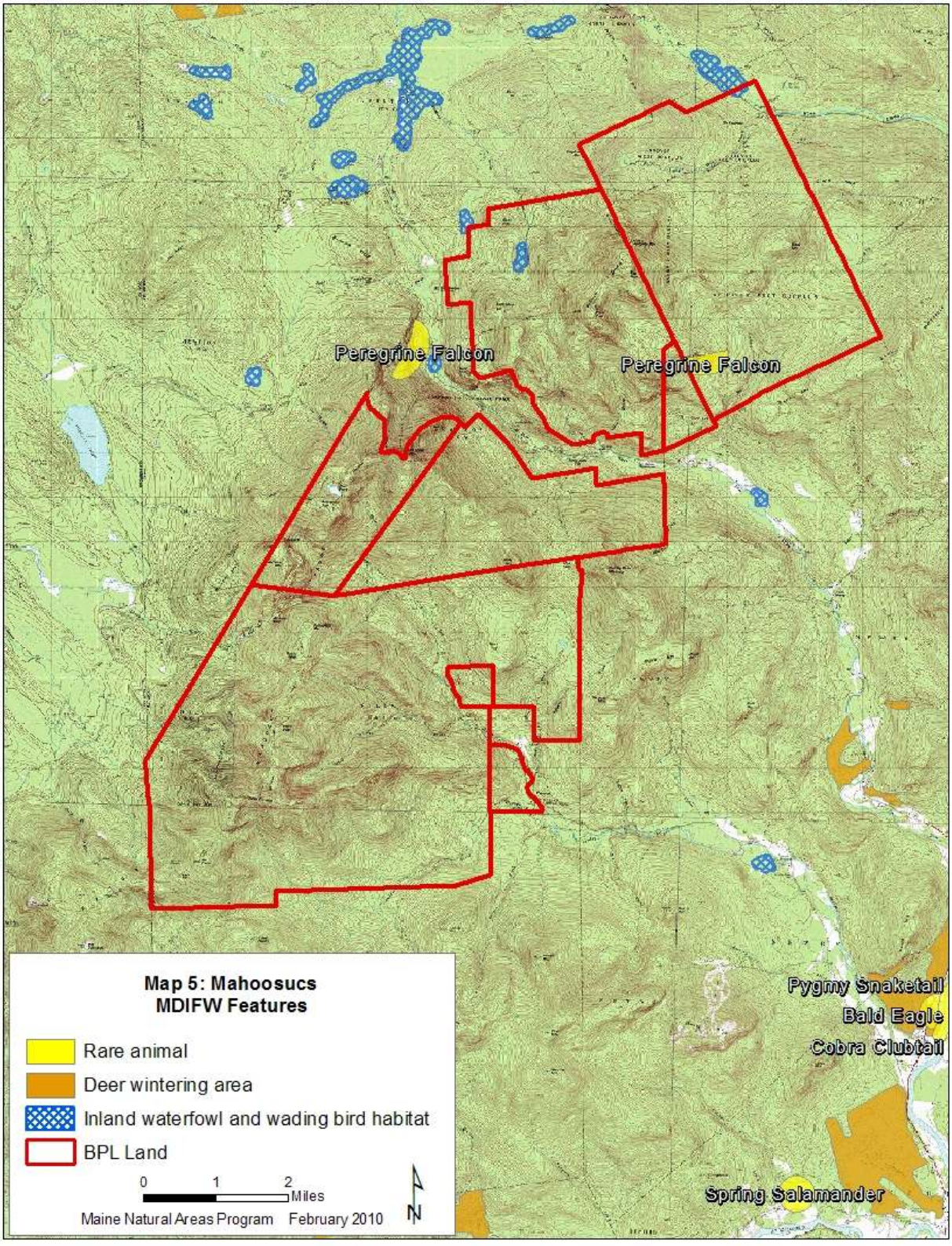
Maine Natural Areas Program February 2010


Peregrine Falcon
Peregrine Falcon
Pygmy Snaketail
Bald Eagle
Cobra Clubtail
Spring Salamander
Map 5: Mahoosucs
MDIFW Features
Rare animal
Deer wintering area
Inland waterfowl and wading bird habitat
BPL Land
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Maine Natural Areas Program February 2010
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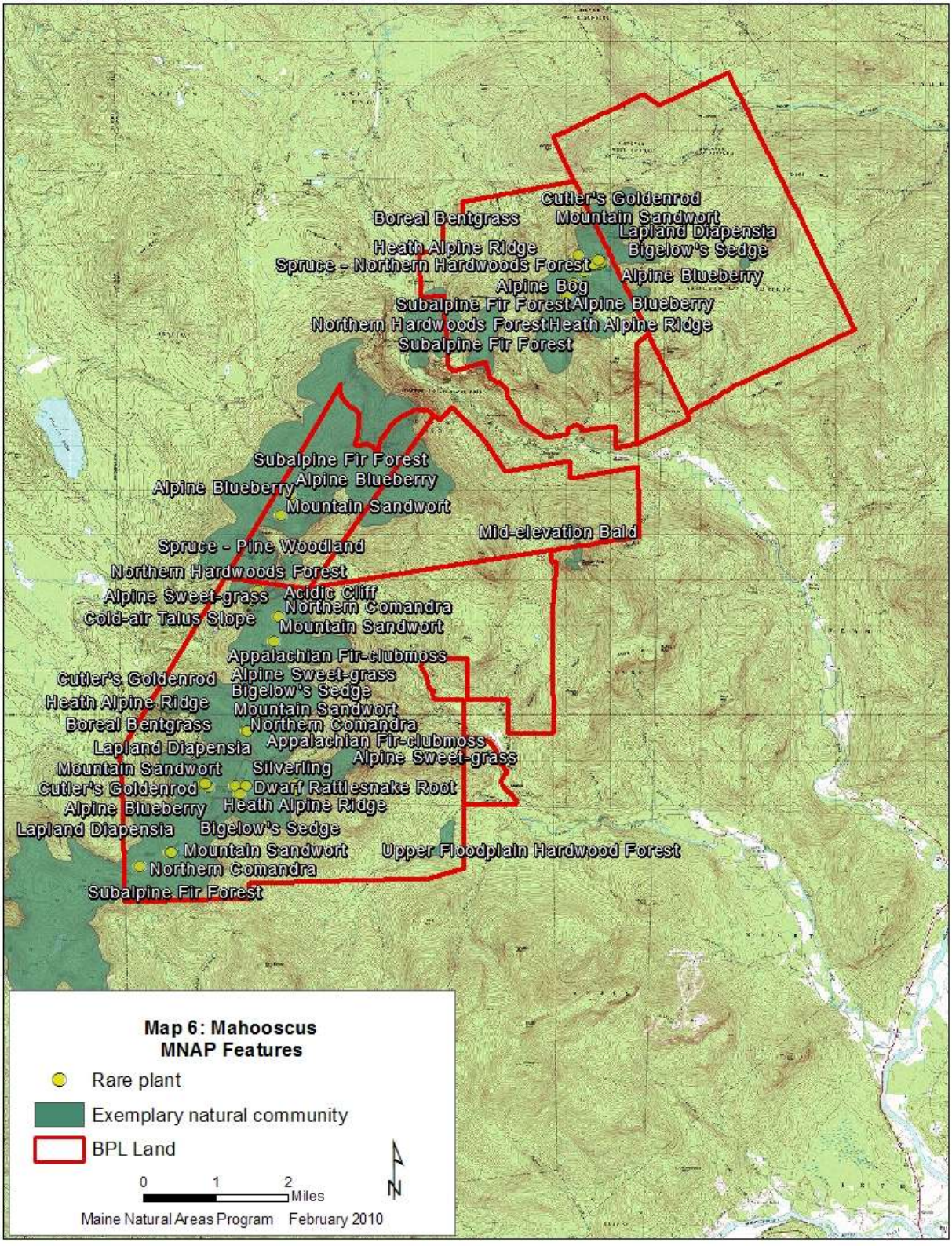
Cutler's Goldenrod
Boreal Bentgrass
Mountain Sandwort
Lapland Diapensia
Heath Alpine Ridge
Bigelow's Sedge
Spruce - Northern Hardwoods Forest
Alpine Blueberry
Alpine Bog
Subalpine Fir Forest
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Northern Hardwoods Forest
Heath Alpine Ridge
Subalpine Fir Forest
Subalpine Fir Forest
Alpine Blueberry
Alpine Blueberry
Mountain Sandwort
Mid-elevation Bald
Spruce - Pine Woodland
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Alpine Sweet-grass
Acidic Cliff
Northern Comandra
Cold-air Talus Slope
Mountain Sandwort
Appalachian Fir-clubmoss
Cutler's Goldenrod
Alpine Sweet-grass
Bigelow's Sedge
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Boreal Bentgrass
Northern Comandra
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Silverling
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Dwarf Rattlesnake Root
Alpine Blueberry
Heath Alpine Ridge
Lapland Diapensia
Bigelow's Sedge
Mountain Sandwort
Upper Floodplain Hardwood Forest
Northern Comandra
Subalpine Fir Forest
Map 6: Mahooscus
MNAP Features
Rare plant
Exemplary natural community
BPL Land
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Miles
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Maine Natural Areas Program February 2010