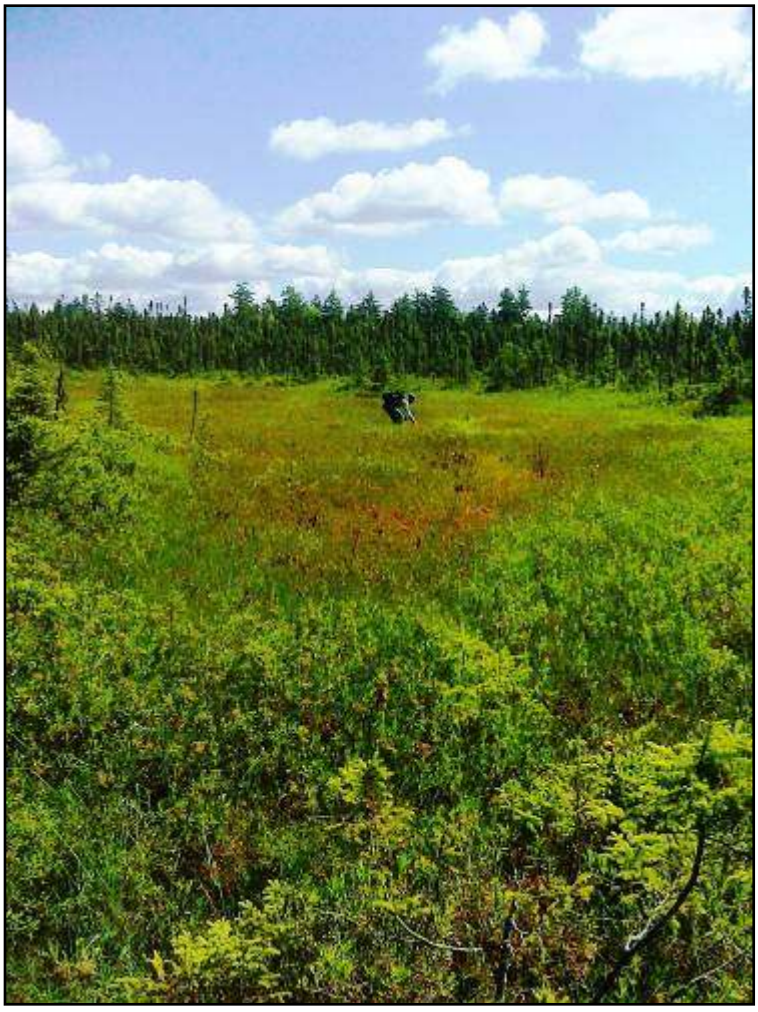
Natural Resource Inventory of the Central Penobscot Region: Seboeis Unit



Open peatland south of Northwest Pond

Prepared by
Maine Natural Areas Program

for the
Bureau of Parks and Lands
August 2012

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Seboeis Unit

Property Description

The 21,369 acres of public lands of the Seboeis Unit encompass the shorelines of Seboeis Lake, Northwest Pond, Turtle Pond, and the southwest shore of Endless Lake. Like many BPL lands, the Seboeis Unit provides productive forestland and wildlife habitat, as well as opportunities for motorized and non-motorized recreation. In addition, the Unit harbors multiple rare natural communities, rare animals and designated wildlife habitat.

Geology and Soils

In contrast to the rugged Nahmakanta Unit, the topography of the Seboeis Unit is gently rolling to level. Many of the features on Seboeis's uplands may be attributed to its geologic history. Bedrock consists of a combination of igneous rocks such as granite and quartz, and metamorphosed pelites, sandstones or dolostones (Map 2). Surficial geologic features include ribbed moraine, till and esker deposits. Ribbed moraines are sub-glacial formations defined by short, small ridges of glacial deposits -- usually till, but sometimes sand and gravel. Till is a sediment composed of unsorted clay, sand, gravel and rocks that blankets much of Maine. Eskers are deposits sand and gravel from sub-glacial streams and rivers, and they are usually deposited in linear patterns (Map 3).

The Seboeis area is generally characterized by the Brayton–Dixfield-Peacham soil Association. These soils are derived from the weathering of glacial till and are typically classified as sandy loams. They are very deep, sometimes poorly drained, and very stony. In areas of glacial outwash (i.e., eskers and sand deposits in ribbed moraines) soils of the Masardis Series occur. This occasional soil formation is a very deep, excessively drained gravelly fine sandy loam.

Hydrology and Water Quality

The Seboeis Unit lies within the Penobscot River drainage. The 4,913-acre Seboeis Lake drains into the 1,493 acre Endless Lake. A dam at the outlet stream of Seboeis Lake is owned and operated by BPL, and the water level of the lake may fluctuate by several feet.

Recent water quality data are not available for Seboeis Lake. However, in a statewide assessment, Seboeis was identified as 'class 1A' lake (the highest ranking) for possessing multiple resources of statewide significance (Maine Department of Conservation 1987). Water quality monitoring data have been collected from Endless Lake since 1989. The information is very limited, but in summary the water quality of Endless Lake is considered to be above average based on measures of transparency, total phosphorus (TP), and chlorophyll-a (Chla) (http://www.lakesofmaine.org.)

Wetlands

The Unit includes 2,740 acres of wetlands (13% of the Unit's area, not including the lakes) according to the National Wetlands Inventory (Map 4). Most of the wetlands (67%) are open rather than forested. The largest wetland complex on the Unit is a series of shrub-scrub wetlands and peatlands west of Northwest Pond that are collectively several hundred acres.

Many of the wetlands in this Unit have been modified from their natural state by past human disturbance. The dam at the outlet to Seboeis Lake, the old railroad grade west of the lake, and various smaller impoundments have altered expanded wetland communities and have flooded areas that were formerly emergent wetlands. For example, Shallow Pond near the inlet to Seboeis was formerly an emergent wetland, and open shrub/scrub wetlands at the inlet to Northwest Pond were formerly cedar swamps (Figure 1).

The old railroad grade has also served as a vector for a small population of common reed (*Phragmites australis*) whose seeds were likely transported in by vehicle and established in a wet ditch near the road. This population should be controlled before it enters larger open wetlands nearby.

Ecological Processes

Approximately 20% of the Unit's forest stands are spruce-fir types (according to BPL's stand type maps) and spruce budworm has played a prominent role in some of these stands. 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.

Figure 1: Extensive open wetlands near Northwest Pond. Dead cedar trees attest to flooding impact from altered drainage.

Beech is one of the most common hardwoods on the Unit, and many of the beech trees have been infected with the beech bark disease. This introduced forest pathogen results when the beech scale insects (*Cryptococcus fagisuga)* create wounds that are later infected by fungi (*Nectria* spp.), causing cankers to form. In badly infested stands, most mature trees are infected, causing significant mortality in forest canopies but not deterring regeneration. Many hardwood stands in the Unit and in the region show signs of beech bark disease, in particular sites on dry or poor soils lacking a healthy complement of maple and yellow birch.

The mature forested communities on the unit show evidence of typical small gap disturbances from ice, windthrow, or natural tree mortality. These gaps increase the complexity of forest structure and add to the diversity of microhabitats in the forest for plants and animals.

Beaver meadows are frequent on streams on the east side of the Unit, particularly along Otter Brook and Roaring Brook (Figure 2). Once the hardwoods within a safe distance of the pond are gone, beavers often abandon their dam and build a new dam in a different location. These abandoned ponds typically slowly fill with sediment and transition from marshy wetlands back to uplands. By creating and abandoning impoundments along the stream course, beavers create a mosaic of habitats for other plant and wildlife species.

Figure 2: Beaver meadow on Otter Brook, east side of Seboeis Unit

Land Use and Harvest History

Timber harvesting records at Seboeis date back to the early 1900s, and for most of the last century (until state acquisition of the majority of the Unit in 1977) the land was owned and managed by forest products companies. Mills were historically located at the outlets of both Endless and Seboeis lakes. Since state acquisition, BPL foresters have sustainably managed the forest to accrue standing volume. The newest addition, 5,700 acres around the south end of the lake, were heavily harvested within the last ten years.

Fisheries and Wildlife

The Seboeis Unit's waters sustain both cold and warm water species. Landlocked salmon, splake, white and yellow perch, smallmouth bass and chain pickerel are caught in Seboeis and Endless lakes. Landlocked salmon and splake are stocked by MDIFW. Brook trout are found in Turtle Pond and several tributary streams that enter Seboeis Lake. A dam at the outlet prevents immigration of fish produced in the lower portions of the Seboeis River drainage. The Bureau of Parks and Lands owns and operate the dam at Seboeis to control water levels for the camps. According to MDIFW, fluctuations of the water level resulting from operation of the dam reduce the production of shore-spawners. If fish spawn when water levels are high, the eggs may be exposed and die if the dam gates are raised and the· water level drops.

In fall, hunters use the Seboeis Public Lands to harvest deer, moose, bear and waterfowl. The relative lack of closed canopy softwood cover may be somewhat limiting for deer. There is one mapped Deer Wintering Area on the Unit, west of Northwest Pond on the west side of the Unit. However, much of this DWA was harvested a few years before the Northwest Pond addition was acquired in 2009.

Seboeis Lake has high numbers of nesting loons. Bald eagles, ospreys, belted kingfishers, mergansers and common terns all rely on the lake's fish as a vital food source. In 2011 the Bureau maintained 14 nest boxes in wetlands near the north end of Seboeis Lake, and 12 were used -- some by tree swallows or other songbirds rather than ducks (Wiley, personal communication 2012). There is also an active bald eagle nest in Bear Brook Cove on the northwest side of the lake. Bald eagles populations have recovered in Maine to the extent that they are no longer listed as rare, but MDIFW continues to monitor nesting sites. Other common wildlife species include snowshoe hare, ruffed grouse, coyote, fox, beaver and otter.

The unit contains several designated Inland Waterfowl and Wading Bird Habitats (IWWH) that together account for 2,825 acres of the Unit, primarily along the northern and western borders of Seboeis Lake and south of Seboeis Lake (Map 5). IWWH's on the Unit include both 'moderate' and 'high' value wetlands, as ranked by MDIFW.

Rare Plant and Animal Species

No rare plant species have been found in the Seboeis Lake Unit. Notable wildlife occurrences include bald eagles and an active nest at the northern end of the lake and a population of Creeper, a freshwater mussel Species of Special Concern, in the eastern end of the lake near the outlet (Map 5). The creeper (*Strophitus undulatus*) is listed as Special Concern and inhabits cool, well oxygenated waters in Maine. It was last documented at this location in 1996, when just two individuals were found, and there have been no surveys for this species since that time. Sound riparian management, involving an intact forested buffer, is appropriate to maintain cool, clean, well oxygenated water in locations where the creeper occurs.

In spring 2012 twelve young stems of American chestnut (*Castanea dentata*) were found on Hammer Island by BPL forester Doug Reed. American chestnut is not listed as rare by the Maine Natural Areas Program, but it is uncommon in Maine -- particularly this far north. Before the species was devastated a century ago by the chestnut blight, a fungal disease, it was one of the most important forest trees throughout its range. No mature live trees were found, although there was one large dead chestnut snag.

Natural Communities

According to BPL stand type maps, the original Seboeis Unit (excluding the 2012 addition at the south end of the Lake) supports mostly pole-sized forest stands, while seedling/sapling and sawtimber sized stands are evenly split at ~15% each. This structure contrasts with the typical forest structure in Piscataquis County, which is somewhat younger -- 36% of the forest in Piscataquis County is in the seedling/sapling class (US Forest Service 2012). The new 5,700 acre addition at the south end of the lake was heavily harvested within the last ten years and consists primarily of regenerating stands. While a number of older forest stands were found on the Unit, no 'old growth' stands were identified.

Spruce- Fir- Northern Hardwoods Forest is a coarse scale classification that describes most of Seboeis's upland forest. This ecosystem type is comprised of numerous upland hardwood and softwood natural communities that are typical to northern Maine and the central mountains. Spruce and fir typically occupy about 20-30%, with white pine, hemlock, sugar maple, yellow birch, red maple, and beech sharing dominance, and cedar frequent along lakeshores and waterways. Patches of softwood are more common on drier knolls and steep slopes, while sugar maple, white ash, and cedar dominate colluvial basins with more soil and moisture. Constituent natural communities found in the Seboeis Unit include Aspen – Birch Forest, Lowland Spruce Fir Forest, Beech – Birch Maple Forest, Cold Air Talus Slope, Hemlock Forest, and Red Pine – White Pine Forest.

Aspen – Birch Forest Complex is the most common early- successional community in the region, and the Seboeis Unit is not an exception. This community occurs following fire or a timber harvesting and may occur as an open-canopy woodland or as closed forest. Most of the examples of this community on the Unit are mid-aged and are in transition to other forest types, most commonly Lowland Spruce - Fir. Examples of this transition include many stands on Leyford Island, where large white pine (20-28" DBH) and big tooth aspen (12-16" DBH) form a super canopy, with red maple, spruce, cedar, and balsam fir regenerating in the understory. Trees here were aged at roughly 80 years old, and the charcoal in the soil suggests that this mature aspen and white pine stand originated from a fire in the early 1900s. There are also signs of past harvesting, estimated at 40-50 years ago based on stumps and growth patterns noted in tree cores.

Lowland Spruce Fir Forest is the most common softwood forest type on the Unit, occupying low lying areas adjacent to streams and wetlands. Most of the observed examples appear to have burned at some point around the turn of the last century and have since displaced aspen/ birch forests. In addition, many areas of this community have been heavily harvested prior to state acquisition. In intact examples of this community, the total canopy cover is approximately 70% to 80%, and the total basal area is 140 ft^2 per acre. Most trees are 10" – 15" in diameter, and mature trees cored in various stands were between 70 and 90 years old. The herbaceous layer is dominated by balsam fir and red spruce, and also includes bracken fern (*Pteridium aquilinum*), starflower (*Trientalis borealis*), red maple, creeping snowberry (*Gaultheria procumbens),* beech, white pine, and painted trillium (*Trillium undulatum).*

Figure 3: Lesser purple fringed orchid, an uncommon flower of rich hardwood stands, found in a hardwood seep west of Otter Brook.

At wetter sites, the similar Spruce- Fir Wet Flat community occurs, and in some small areas next to open bogs, these wet flats have not been recently harvested. These areas contain a heterogeneous mix of red and black spruce, fir and cedar, with a 100% moss cover. Understory species include bunchberry (*Cornus canadensis*), creeping snowberry (*Gaultheria hispidula*), wintergreen (*Gaultheria procumbens*), sheep laurel (*Kalmia angustifolia*) and rattlesnake plantain (*Goodyera tesselata*).

One of the oldest and most intact sections of upland forest within the Unit lies between Otter Brook and the T3 R4 NWP township line. This forest is dominated by spruce, fir, and white pine, and is mature to late-successional, with many trees in the 14-18" diameter range and basal area roughly square feet per acre. The most recent harvesting was a light selective cut over 30 years ago.

Figure 5: Cold Air Talus Slope on the east side of the Seboeis Unit

Beech Birch Maple Forest occurs throughout the Seboeis Unit, but is dominant on the slopes south and east of the lake. In mature examples, canopy closure is 80%, and basal area can be up to 130 ft^2 per acre. Dominant tree species include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), white ash (*Fraxinus americana*), red spruce (*Picea rubens*), northern white cedar, and yellow birch (*Betula allaghaniensis*). Tree are primarily in the 10 to 16" range, with scattered legacy trees in the 20-25" range. At some richer sites, Christmas fern (*Polystichum acrostichoides*) is common in the understory, and orchids including the lesser purple fringed orchid (*Platanthera psycodes*) were found (Figure 3).

Two uncommon upland communities have been identified in the Seboeis Unit – **Cold Air Talus Slope**, and **Red Pine – White Pine Forest**. East of Otter Brook there is a steep talus slope, the base of which hosts a small (~1 acre) Cold Air Talus Slope, a rare (S2) community type in Maine (Figure 5). These communities occur only at the base of steep talus slopes, where cold air drainage creates a cold, boreal microclimate; ice can often be found beneath these boulders year-round. The community east of Otter Brook is very bouldery and has a dense carpet of lichens, sphagnum moss and feather moss. Trees are sparse, but there is a dense layer of shrubs and herbs (95% cover overall) including Labrador tea (*Rhododendron groenlandicum*, 63% cover), velvetleaf blueberry (*Vaccinium myrtilloides*, 19%

Figure 6: Red pine – white pine forest near north end of Seboeis Lake

cover), creeping snowberry (*Gaultheria hispidula*, 19% cover) and sheep laurel (*Kalmia angustifolia*, 9% cover). Treacherous 4-8' clefts in the boulders are hidden by the mat of moss.

A glacial esker formation at the north end of the Seboeis Unit (on either side of the Narrows) hosts an example of a **Red Pine-White Pine Forest**, a rare (S3) community type in Maine (Figure 6). This mature forest is dominated by red pine 10-16' DBH, with a canopy cover of ~80% red pines and ~10% paper birch. The understory is dense and includes huckleberry (*Gaylussacia baccata*), with some bracken fern (*Pteridium aquilinum*), winterberry (*Gaultheria procumbens*) and wild raisin (*Viburnum nudum*). The basal area is 130 sq. ft/acre. Fire history is evident here and is at least partly responsible for the dominance of red pine here.

Numerous wetlands also occur on the Seboeis Unit, including both peatland and mineral soil natural communities. One of the more interesting peatlands is a kettlehole Bog Ecosystem just west of the boat launch at The Inlet (Figure 7). Kettlehole bogs form in depressions left by remnants of melting ice as glaciers retreated from the region over 10,000 years ago. Large chunks of ice were stranded and partially buried by glacial outwash, and formed depressions known as "kettles" when they finally melted (Bennet and Glasser 1997). These depressions typically have no inlet or outlet and host vegetation communities tolerant of highly acidic conditions. At the Seboeis kettlehole bog, open water at the center of the bog is surrounded by distinct vegetation bands that increase in height away from the open water: a narrow (20') Sedge-Leatherleaf Fen Lawn, then a 15' band of Leatherleaf Boggy Fen, which grades into Sheep Laurel-Dwarf Shrub Bog, and finally a ring of Spruce Larch Forested Bog. Characteristic species include: small cranberry (*Vaccinium oxycoccus*), bog rosemary (*Andromeda glaucophylla*), cottongrass (*Eriophorum angustifolium*), leatherleaf (*Chamaedaphne calyculata*), pitcher plant (*Sarracenia purpurea*), sheep laurel (*Kalmia angustifolia*), black spruce (*Picea mariana*) and huckleberry (*Gaylussacia baccata*).

Other, more extensive examples of various peatlands occur west of Northwest Pond and Seboeis Lake. Open peatlands here are dominated by heath shrubs, sedges, and scattered black spruce, with a thick (100%) cover of peat moss. Common species include cottongrass (*Eriophorum angustifolium*), leatherleaf (*Chamaedaphne calyculata*), bog rosemary (*Andromeda glaucophylla*), fewflower sedge (*Carex pauciflora*), pitcher plant (*Sarracenia purpurea*), and small cranberry (*Vaccinium oxycoccos*).

All open peatlands at Seboeis are interspersed with closed-canopy Spruce – Larch Forested Bog. In many areas, stunted black spruce 10-15' tall occur. A dense shrub layer in these stands typically includes Labrador tea (*Rhododendron groenlandicum*), rhodora (*Rhododendron canadense*), lowbush blueberry (*Vaccinium angustifolium* and *V. myrtilloides*), highbush blueberry (*Vaccinium corymbosum*) and mountain holly (*Ilex mucronata*) and sparse herbaceous species including three-seeded sedge (*Carex trisperma var. billingsii*), boreal bog sedge and cottongrass.

At the north end of Seboeis, several other notable natural communities were surveyed. A Lakeshore Beach natural community occurs in Sand Cove, but like most natural lakefront

beaches in Maine this community has been moderately affected by campers and campfires resulting in sparsely vegetated vegetation including containing earth loosestrife (*Lysimachia terrestris*), Canada bluejoint (*Calamagrostis canadensis*), large cranberry (*Vaccinium macrocarpon*), spirea (*Spirea tomentosa*) and reed canarygrass (*Phalaris arundinacea*). Behind the beach is a is a Sweetgale Mixed Shrub Fen. Common plant here include

Figure 7: Kettlehole bog on the west side of the Seboeis Unit near the boat launch at The Inlet.

sweetgale (*Myrica gale*), woolyfruit sedge (*Carex lasiocarpa*), spikerushes (*Eleocharis sp.*), leatherleaf (*Chamaedaphne calyculata*), star sedge (*Carex echinata*), large cranberry (*Vaccinium macrocarpon*), silvery sedge (*Carex canescens*), and cottongrass (*Eriophorum tenellum*).
Shallow waters on the Unit, especially in the northern arm of Seboeis Lake, feature extensive Waterlily- Aquatic Bed communities. Yellow pond-lily (*Nuphar variegatum*) is dominant and associated with the small yellow pond-lily (*Nuphar microphylla*), little floating heart (*Nymphoides cordata*) and fragrant water-lily (*Nymphaea odorata*).

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http://apps.fs.fed.us/Evalidator/
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Appendix 1: Exemplary Natural Communities and Rare Species of the Seboeis 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

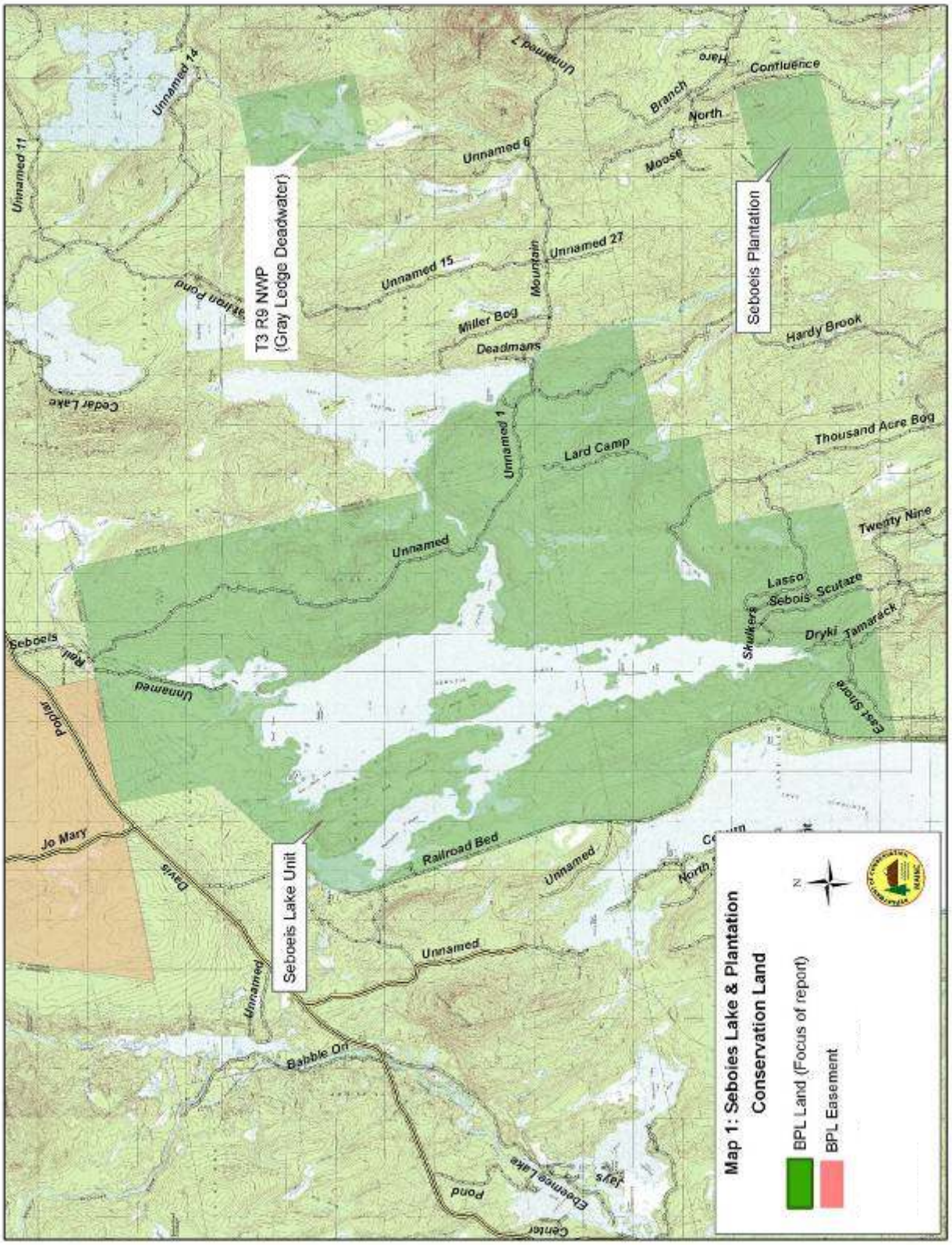
Exemplary Natural Communities

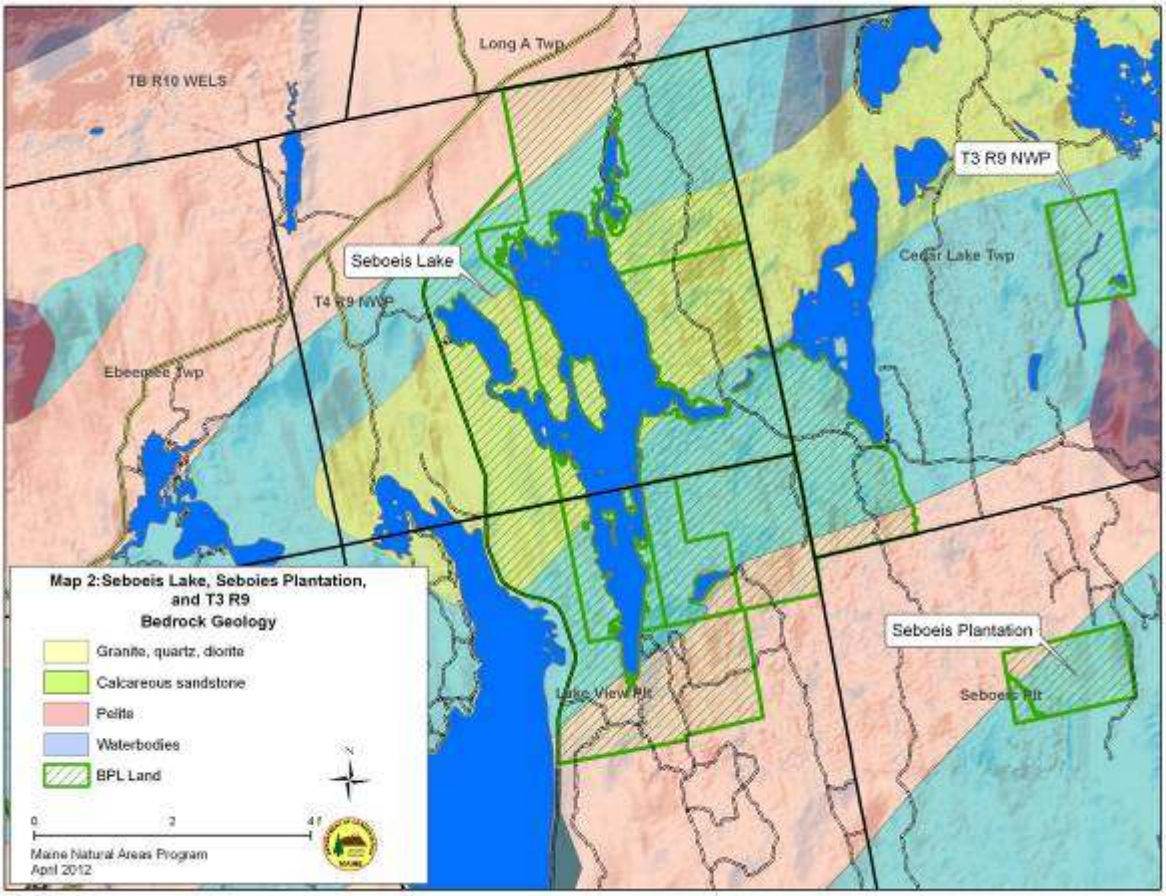
Feature Name	Location	S-Rank	EO Rank	Last Obs.	Size (ac)
Red Pine – White Pine Forest	North end of Seboeis Lake	S3	C	6/2010	15
Cold Air Talus Slope	East of Otter Brook	S2	B	7/2011	1

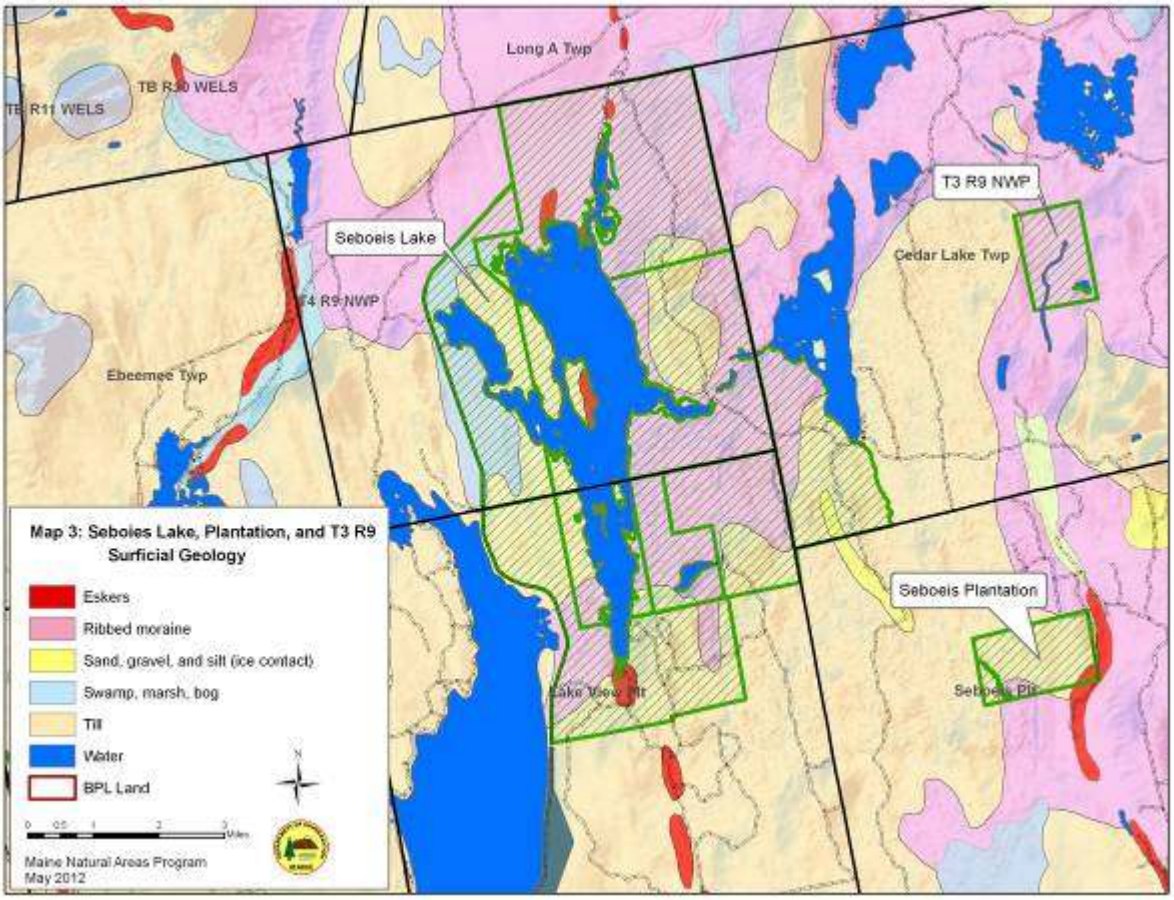
Rare Animals

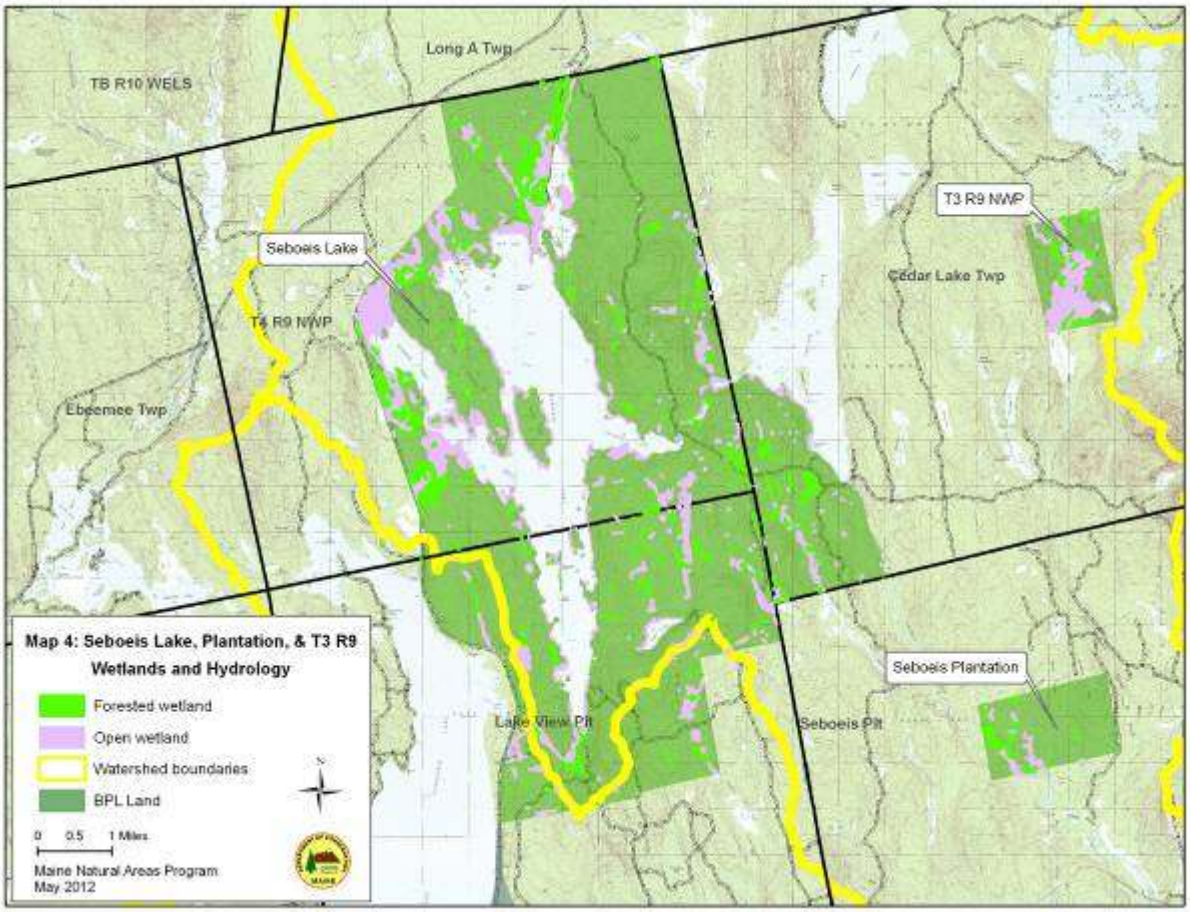
Feature Name	Location	S-Rank/G-rank	EO Rank	Last Obs.	
Bald Eagle	Nest at north end of Seboeis Lake	S4/G5		1999	
Creeper	Outlet of Seboeis Lake	SNR/G5		1996	

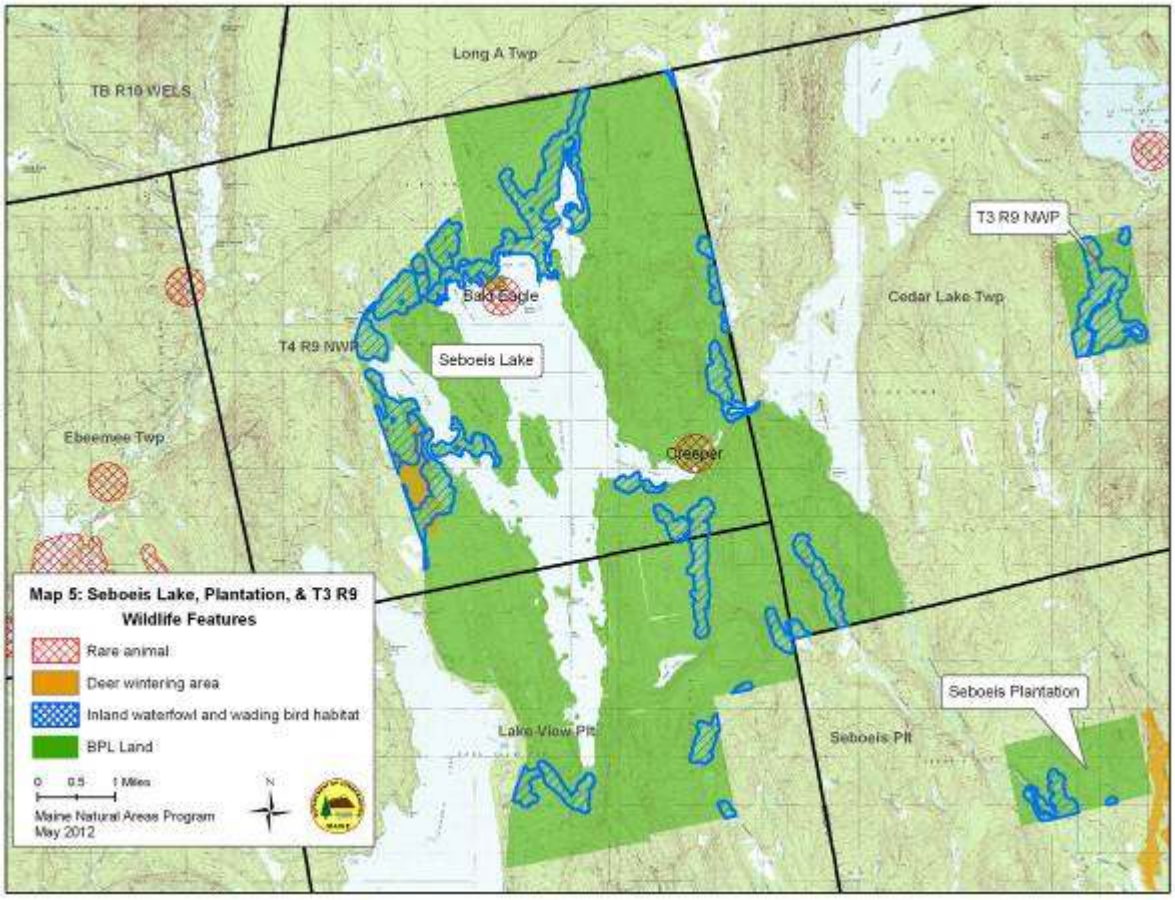
Appendix 2: Maps of the Seboeis Unit

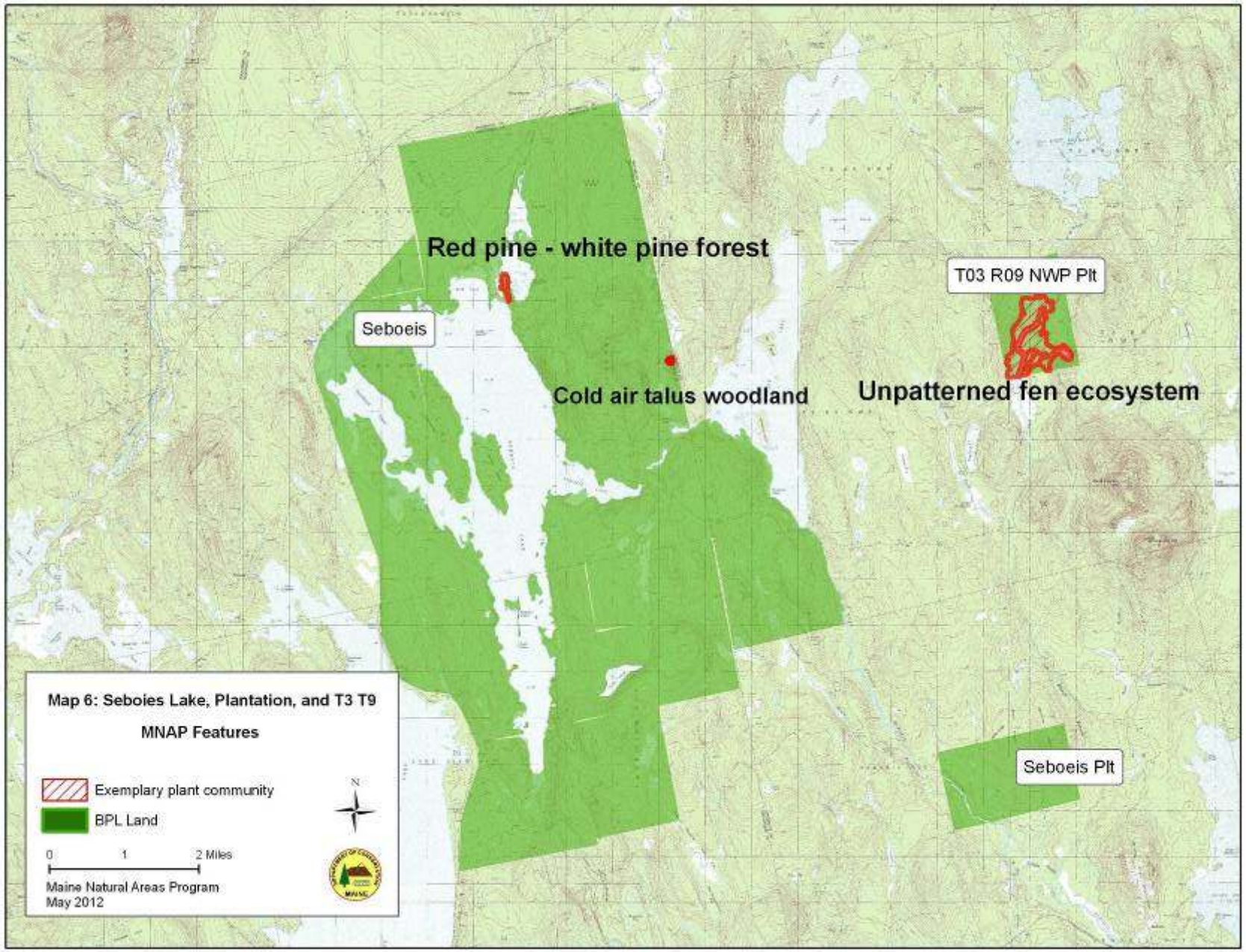



Long A Twp
TB R10 WELS
T3 R9 NWP
Seboeis Lake
T4 R9 NWP
Cedar Lake Twp
Ebeemee Twp
Seboeis Plantation
Lake View Plt
Seboeis Plt
Map 2:Seboeis Lake, Seboeis Plantation, and T3 R9
Bedrock Geology
Granite, quartz, diorite
Calcareous sandstone
Pelite
Waterbodies
BPL Land
Maine Natural Areas Program
April 2012


Long A Twp
TB R10 WELS
TB R11 WELS
T3 R9 NWP
Seboeis Lake
Cedar Lake Twp
T4 R9 NWP
Ebeemee Twp
Seboeis Plantation
Lake View Plt
Seboeis Plt
Map 3: Seboeis Lake, Plantation, and T3 R9
Surficial Geology
Eskers
Ribbed moraine
Sand, gravel, and silt (ice contact)
Swamp, marsh, bog
Till
Water
BPL Land
Maine Natural Areas Program
May 2012


Long A Twp
TB R10 WELS
T3 R9 NWP
Seboeis Lake
Cedar Lake Twp
T4 R9 NWP
Ebeemee Twp
Seboeis Plantation
Lake View Plt
Seboeis Plt
Map 4: Seboeis Lake, Plantation, & T3 R9
Wetlands and Hydrology
Forested wetland
Open wetland
Watershed boundaries
BPL Land
0 0.5 1 Miles
Maine Natural Areas Program
May 2012


Long A Twp
TB R10 WELS
T3 R9 NWP
Bald Eagle
Cedar Lake Twp
T4 R9 NWP
Seboeis Lake
Ebeemee Twp
Deeper
Seboeis Plantation
Lake View Plt
Seboeis Plt
Map 5: Seboeis Lake, Plantation, & T3 R9
Wildlife Features
Rare animal
Deer wintering area
Inland waterfowl and wading bird habitat
BPL Land
0 0.5 1 Miles
Maine Natural Areas Program
May 2012


Red pine - white pine forest
Seboeis
Cold air talus woodland
T03 R09 NWP Plt
Unpatterned fen ecosystem
Seboeis Plt
Map 6: Seboeis Lake, Plantation, and T3 T9
MNAP Features
Exemplary plant community
BPL Land
N
0
1
2 Miles
Maine Natural Areas Program
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