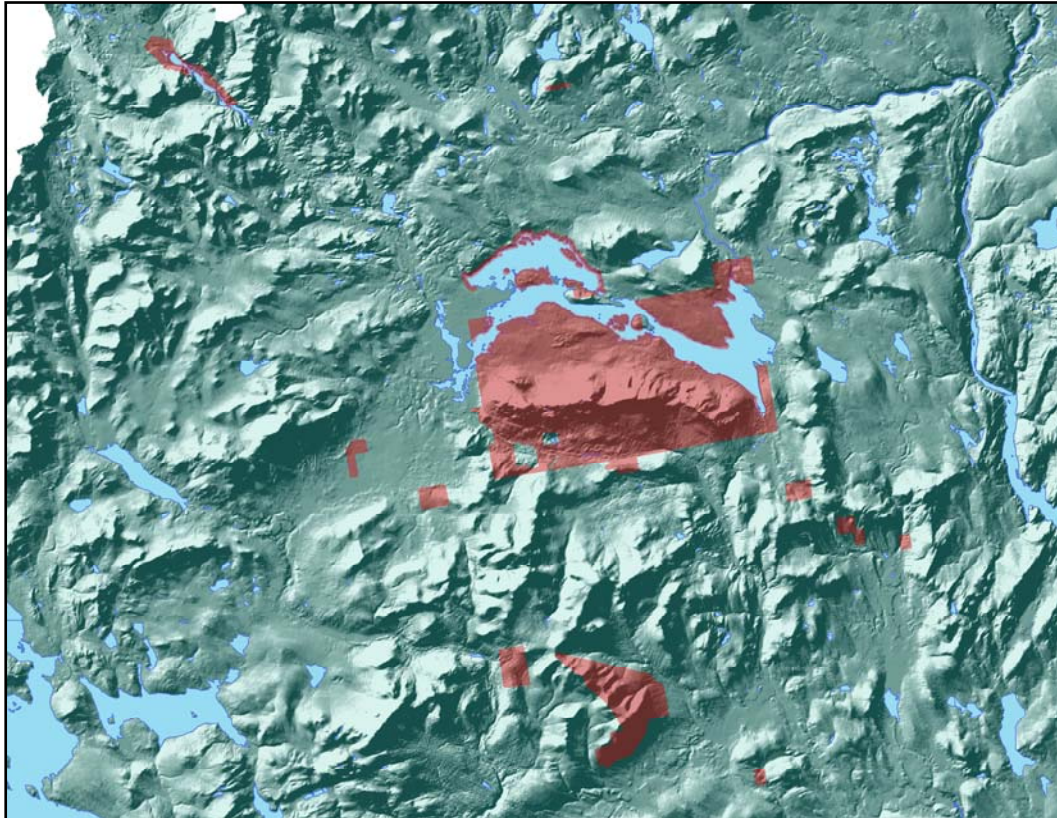


**Natural Resource Inventory  
of the  
Bureau of Parks and Lands  
Flagstaff Region**



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**For the  
Bureau of Parks and Lands**

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# Flagstaff Regional Overview

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## Executive Summary

The attached Natural Resource Inventories document the physical and ecological features of BPL's lands in the Flagstaff Region. Properties in the region total 54,132 acres and include: Chain of Ponds, Mt. Abraham, Redington, Bigelow, Wyman, Coplin Center, Coplin West (DWA), Flagstaff, Flagstaff Island, Flagstaff Lake, Dead River Peninsula, Spring River Lake, King and Bartlett, Freeman, Highland West, Highland Double, and Highland Southeast. These lands represent many of the important ecological features of the area including hardwood and softwood forests along elevational gradients; large, intact wetlands; and alpine summits. Compared with private lands in the region, BPL lands support a significant component of mature and late successional forests.

The Flagstaff Region is within the Western Mountains Biophysical Region (McMahon 1990). The area is characterized by cool summer temperatures, low annual precipitation, and high snowfall, and the mountainous landscape is highly dissected by small, steep-sided streams. Stands of red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) are common on ridgetops, and subalpine forest, which is made up almost exclusively of balsam fir, occurs at elevations greater than 2,500 feet. Sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and beech (*Fagus grandifolia*) are common in the valleys. Woody species richness is low compared with other Biophysical Regions.

The Bigelow/Flagstaff area includes Bigelow, Wyman, and the numerous parcels that surround Flagstaff Lake. While all are state lands, the Bigelow Preserve was created by public referendum and is under an additional set of management guidelines. These areas include most of the shoreline of Flagstaff Lake and the slopes and summits of Bigelow (4,088 feet elevation) and Little Bigelow (3,040 feet elevation) Mountains. An Ecological Reserve totaling 10,562 acres covers the alpine areas of Bigelow Mountain as well as portions of the northern and southern slopes. Numerous exemplary natural communities are known from this area, including wetland types such as a Streamshore Ecosystem, forest types such as Beech – Birch – Maple Forest, and alpine types such as Dwarf Heath – Graminoid Alpine Ridge. In all, there are twelve exemplary natural communities in the area. Rare plants include wetland species such as water awlwort (*Subularia aquatica*) and many alpine species such as alpine sweet-grass (*Hierochloa alpina*). Rock voles, a species of Special Concern, are known from alpine areas; Bicknell's thrushes, also of Special Concern, have been found in Bigelow's sub-alpine forests; and bald eagles nest along the lake. A previous natural resource inventory for the Bigelow preserve was completed in 1981.

The Mt. Abraham unit, 6,620 acres, includes the upper slopes of the mountain and the lower slopes on the eastern side. Most of the unit, 5,377 acres, is an Ecological Reserve, including all of the upper slopes and summit of the 4,049 feet tall mountain. The unit has a number of rare plants and exemplary natural communities associated with its alpine and subalpine areas. Natural Communities include Crowberry – Bilberry Summit Bald, Diapensia Alpine Ridge, and Labrador Tea Talus Dwarf-Shrubland. Rare alpine plants

include *Diapensia lapponica*, alpine blueberry (*Vaccinium boreale*), northern comandra (*Geocaulon lividum*), Bigelow's sedge (*Carex bigelowii*), and a hybrid birch (*Betula x minor*). In addition, two rare plants occur along the steep, shaded streams on the east side of the mountain: Hornemann's willow-herb (*Epilobium hornemannii*) and northern firmoss (*Hypersia selago*). Rock voles and Bicknell's thrushes, both species of Special Concern, are known from the unit.

The Chain of Ponds unit, 984 acres, surrounds the northern portion of Natanis Pond and all of Round Pond. A portion of the state's ownership is leased for use as a campground. No exemplary natural communities or rare plants or animals are known from this unit. The unit has over 100 acres of open wetlands, and uplands include mature Spruce – Northern Hardwoods.

The Flagstaff region contains numerous scattered, small units that are allocated primarily for timber management with secondary uses of wildlife management and dispersed recreation. These units have been grouped into a single section of this report. No exemplary natural communities or rare plants or animals are known from these units, though special features on these units include the large deer wintering area at Coplin West and the Appalachian Trail corridor, which bisects Redington.

## Flagstaff Regional Overview

The Flagstaff landscape is characterized by broad valleys bounded by some of the tallest mountains in the state. The area has a rich history of forestry, and recreation and forestry still drive the local economy. Alpine areas, some of which are located on BPL lands, harbor rare plant and animal species, many of which are at the southern extent of their range. The BPL units covered in this NRI are: Chain of Ponds, Mt. Abraham, Redington, Bigelow, Wyman, Coplin Center, Coplin West (DWA), Flagstaff, Flagstaff Island, Flagstaff Lake, Dead River Peninsula, Spring River Lake, King and Bartlett, Freeman, Highland West, Highland Double, and Highland Southeast.

### The Physical Landscape: Geology, Soils, and Hydrology

The Flagstaff region is underlain by folded and faulted sedimentary and igneous rock that represents the region's chaotic geologic history. The sedimentary rocks originated as layers of sand and mud in an ocean basin along the ancestral margin of North America between 450 and 400 million years ago. The period between 500 and 380 million years ago was tumultuous for the region as an ancient ocean basin closed through a series of collisions between large and small plates that make up the earth's crust. Although this was generally a period in which the crust of the ancestral ocean floor was destroyed as the large crustal plates converged, in some areas small ocean basins formed due to the geometries of the large plates and small plate fragments. As plates continued to collide, this ocean basin was uplifted, and the sediments were metamorphosed. At around the same time, magma welled up beneath the earth's surface and cooled slowly there. Today, the summit of Mt. Abraham is fractured, metamorphosed sandstone, while the top of Bigelow is metamorphosed mudstone. The north slope of Bigelow and Chain of Ponds are underlain by granite.

Much of the landscape is cloaked in till from the last glaciation (11,000 years ago), though pockets of other glacial deposits can be found in the region. Glacial Lake Bigelow was once where Flagstaff Lake is now, and it filled the basin 33 feet higher than the current summer lake levels. Where the glacial lake once was, there are now thick clay deposits. Traces of eskers and glacial



Mt. Abraham's fractured talus summit.

outwash deposits are also found in the region. Soils reflect this glacial heritage and tend to be very stony.

While most of the region drains into the Dead River, the southern and southeastern units (including the Highland, Mt. Abraham, Redington, and Freeman parcels) drain into the Sandy and Carrabassett Rivers and eventually into the Kennebec River. The northern side of the Bigelow range drains into the Dead River, while the southern side drains to the Carrabassett River. BPL owns much of the shoreline of Flagstaff Lake above the 1150 foot contour. The 20,300 acre, shallow lake was impounded in 1949 for electricity generation. The Chain of Ponds unit surrounds part of Chain of Ponds, a 700 acre lake that is actually a series of four lake basins.

### **The Biological Landscape: Forest Types, Plants, and Animals**

While the state average is 14.54 cords/acre, the Flagstaff region BPL lands have 24.32 cords/acre. The Flagstaff region boasts relatively fertile well drained and moderately well drained soils capable of growing quality hardwoods. The region also has small areas of wet soils and an area of excessively drained soil near the north shore of Flagstaff Lake which has a significant pine component. Of the operable (regulated) acres in the region, 85% are within Bigelow Preserve and the Dead River/Spring River Lake unit.

A number of natural disturbances keep the Flagstaff region's forests in flux. Small-scale forest fires, often triggered by lightning strikes, occasionally occur in New England. The fires open up patches of forest that are typically recolonized by fast growing, short lived species such as aspen or paper birch. This patchy disturbance contributes to an uneven and diverse forest canopy.

Spruce budworm outbreaks have occurred two to three times per century, with the most recent occurrence in the 1980s. While the scale of budworm damage covers millions of acres, the intensity varies considerably according to the balsam fir component of each stand (balsam fir is the preferred food of the budworm). Budworm damage is often most severe in transitional areas next to large openings of burned stands and along wetland transitional zones. Large openings from budworm damage are uncommon, though timber salvage may increase the size of natural openings. Past high grading of white pine and red spruce is thought to have increased the severity of budworm outbreaks by promoting fir growth. At higher elevations, budworm damage and the higher proportion of fir combine with wind and weather to create larger, more frequent gaps (though the disturbance level is not high enough to create fir waves that may occur at elevations greater than 3,300 feet).

In alpine areas, strong winds, low temperatures, and a shortened growing season conspire to create krummholz – German for “crooked wood.” As the name implies, trees in this environment (typically balsam fir, black spruce, and heart-leaf paper birch) tend to be low, dense, and shrub-like. Often one tree will have multiple leaders that have died back, and much of its summer growth may be stripped by the ice and winds of winter. Shaped

by wind and ice, the forest is comprised of a nearly impenetrable, dense growth of trees less than ten feet tall.

Many plant and animal species reach the southern limits of their range in Maine's alpine and sub-alpine zones. Those that can live in this harsh environment often adopt unique strategies to survive, including the ability to conserve water in the drying winds and tolerate very cold temperatures. As a result, these areas tend to be hotspots for rare or uncommon species, including animals such as rock voles and Bicknell's thrushes and plants such as Lapland diapensia (*Diapensia lapponica*) and mountain sandwort (*Minuartia groenlandica*).



Stunted vegetation on the summit of Bigelow.

Beavers are a common influence in wetlands in the region, with beaver activity even recorded at Cranberry Pond, along Bigelow's ridgeline. Beavers build dams to give them safe access to the hardwoods they prefer to eat. When active, beaver ponds flood adjoining uplands, enlarging wetlands and creating new areas for wetland species to colonize. 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.

### **The Human Landscape: Land Use History**

The economy of the region has long been driven by forestry. According to Austin Cary's survey in 1895, of the 335 square miles in the drainages of the Sandy and Carrabassett Rivers, only 15% of the total land remained uncut (Cogbill 1998). Many large blocks of timberland remain today.

A law enacted by the Maine Legislature in 1923 gave approval for construction of a dam on the Dead River in Spring Lake Township and water rights up to the 1150 foot contour. In 1940, Central Maine Power acquired the necessary lease, and soon after, the villages of Flagstaff, Bigelow, and Dead River were vacated and flooded. The dam was



constructed and Flagstaff Lake was impounded in 1949. Full pond level now reaches to the 1146 foot contour.

Recreation is a large component of the region's economy. Recreation ranges from ATVing and snowmobiling to cross-country skiing, bird watching, and backcountry hiking. Ensuring a landscape that can accommodate all of these uses without conflict into the future is one of the challenges in this region.

### Summary Acreage Information

<b>BPL Unit</b>	<b>Total Acreage</b>	<b>Forested Wetland Acreage</b>	<b>Open Wetland Acreage</b>	<b>Wading Bird Habitat (ac)</b>	<b>Deer Wintering Areas (ac)</b>	<b>Acres &gt; 2,700 feet elevation</b>
<b>Mt. Abram</b>	6,629	0	0	0	0	3,124
<b>Redington</b>	1,021	0	0	0	0	49
<b>Chain of Ponds</b>	984	20	112	180	0	0
<b>Coplin West</b>	367	140	29	70	302	0
<b>Coplin Central</b>	562	0	0	0	0	0
<b>Highland Double</b>	362	0	0	0	0	0
<b>Highland Southeast</b>	121	0	0	0	0	0
<b>Highland West</b>	408	7	7	0	0	0
<b>Freeman</b>	122	0	4	0	0	0
<b>King and Bartlett</b>	52	0	0	0	0	0
<b>Bigelow</b>	36,704	1,161	1,056	1,232	0	3,113
<b>Dead River Peninsula</b>	3,962	295	166	236	0	0
<b>Flagstaff</b>	290	120	43	79	0	0
<b>Flagstaff Island</b>	221	0	14	0	0	0
<b>Flagstaff Lake</b>	1,316	23	156	102	0	0
<b>Spring Lake</b>	993	34	43	0	90	0
<b>Wyman</b>	1,112	15	28	80	0	0
<b>Subtotal of lands in the Flagstaff/Bigelow area</b>	44,674	1,645	1,510	1,729	90	3,113
<b>Total</b>	55,226	1,850	1,658	1,979	392	6,286

### References

Cogbill, Charles. 1998. An Ecological Assessment of Mead and SAPPI Corps. on Mounts Abraham and Saddleback, Maine, a final report for The Appalachian Trail Conference.

McMahon, Janet. 1990. Biophysical regions of Maine: Patterns in the landscape and vegetation. University of Maine. Orono, Maine.



## **Appendix 1: Exemplary Natural Communities and Rare Plant Species of the Flagstaff Region**



Bigelow/Flagstaff Region						
Feature Name	Location	S-rank	EO-Rank	Last Obs.	Size (ac)	EO number
<b>Acidic Cliff-Gorge</b>	Little Bigelow	S4	B	2004	158	.006
<b>Beech-Birch-Maple Forest</b>	Little Bigelow North	S4	B	2005	1236	.051
<b>Beech-Birch-Maple Forest</b>	Horns Pond Trail	S4	B	2002	30	.023
<b>Dwarf Heath-Graminoid Alpine Ridge</b>	West and Avery Peak	S2	B	2002	150	.009
<b>Fir-Heartleaf Birch-Subalpine Forest</b>	Bigelow Ridge	S3	A	2002	2475	.017
<b>Fir-Heartleaf Birch-Subalpine Forest</b>	Little Bigelow	S3	AB	1985	305	.016
<b>Fir-Heartleaf Birch-Subalpine Forest</b>	Cranberry Peak	S3	E	1985	290	.018
<b>Mixed Tall Sedge Fen</b>	Jones Pond (not in ownership)	S4	AB	1996	37	.012
<b>Monomitic Mesotrophic Lake</b>	Cranberry Pond	SU	E	2002	11	.005
<b>Spruce Talus Woodland</b>	East Nubble	S4	B	2004	16	.003
<b>Spruce-Fir-Broom-moss Forest</b>	East Nubble	S4	B	2004	47	.018
<b>Spruce-Fir-Broom-moss Forest</b>	Flagstaff Island	S4	B	2004	300	.028
<b>Spruce-Fir-Wood-sorrel-Feather-moss Forest</b>	Horns Pond Trail	S4	B	2002	49	.004
<b>Streamshore Ecosystem</b>	NW Wetland	S4	B	2004	526	.018
<b>Tarn</b>	Horns Pond	S2	A	2002	5	.001
<i>Agrostis mertensii</i>	Avery Peak	S2	C	2002		.012
<i>Agrostis mertensii</i>	West Peak	S2	C	2002		.001
<i>Carex bigelowii</i>	Avery Peak	S2	B	2002		.017
<i>Hierochloe alpina</i>	West Peak	S1	C	2002		.007
<i>Hierochloe alpina</i>	Avery Peak	S1	B	2002		.004
<i>Minuartia groenlandica</i>	Avery Peak	S3	C	2002		.001
<i>Minuartia groenlandica</i>	West Peak	S3	B	2002		.029
<i>Huperzia appalachiana</i>	Avery Peak	S2	B	2004		.015
<i>Huperzia appalachiana</i>	West Peak	S2	C	2004		new
<i>Prenanthes nana</i>	West Peak	S1	C	2004		.002
<i>Pyrola minor</i>	East Nubble	S3	E	2004		new
<i>Dryopteris fragrans</i>	Little Bigelow	S2	E	2004		.044
<i>Vaccinium boreale</i>	Avery Peak	S2	C	2002		.002
<i>Potamogeton vaseyi</i>	Flagstaff Lake west	S2	E	1999		.009

Mt. Abraham						
Feature Name	Location	S-rank	EO-Rank	Last Obs.	Size (ac)	EO number
<b>Alpine Ecosystem</b>	NW and SE summits	S2	B	2004	450	.002
<b>Crowberry-Bilberry Summit Bald</b>	SE summit	S3	A	2004	148	.007
<b>Crowberry-Bilberry Summit Bald</b>	NW summit	S3	C	2004	87	.009
<b>Diapensia Alpine Ridge</b>	NW summit	S1	C	2004	4	.001
<b>Labrador Tea Talus Dwarf-Shrubland</b>	NW slopes	S2	B	2004	8	.004
<i>Diapensia lapponica</i>	NW Peak	S2	B	2004		.001
<i>Diapensia lapponica</i>	SE Peak	S2	C	2004		.015
<i>Vaccinium boreale</i>	NW Peak	S2	B	2004		.006
<i>Vaccinium boreale</i>	SE Peak	S2	A	2004		.014
<i>Geocaulon lividum</i>	NW Peak	S2	B	2004		.015
<i>Geocaulon lividum</i>	SE Peak	S2	A	2004		.024
<i>Carex bigelowii</i>	NW Peak	S2	CD	2004		.007
<i>Epilobium hornemanii</i>	Norton Brook	S1	AB	2004		.006
<i>Epilobium hornemanii</i>	Unnamed Stream	S1	A	2004		.003
<i>Huperzia selago</i>	Norton Brook	S1	C	2004		.005
<i>Betula minor</i>	NW Peak	S1	B	1997		.002

## **Appendix 2: Map of the Flagstaff Region**