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Rare and Exemplary Natural Features of the White Mountain National Forest in Maine

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Maine Natural Areas Program

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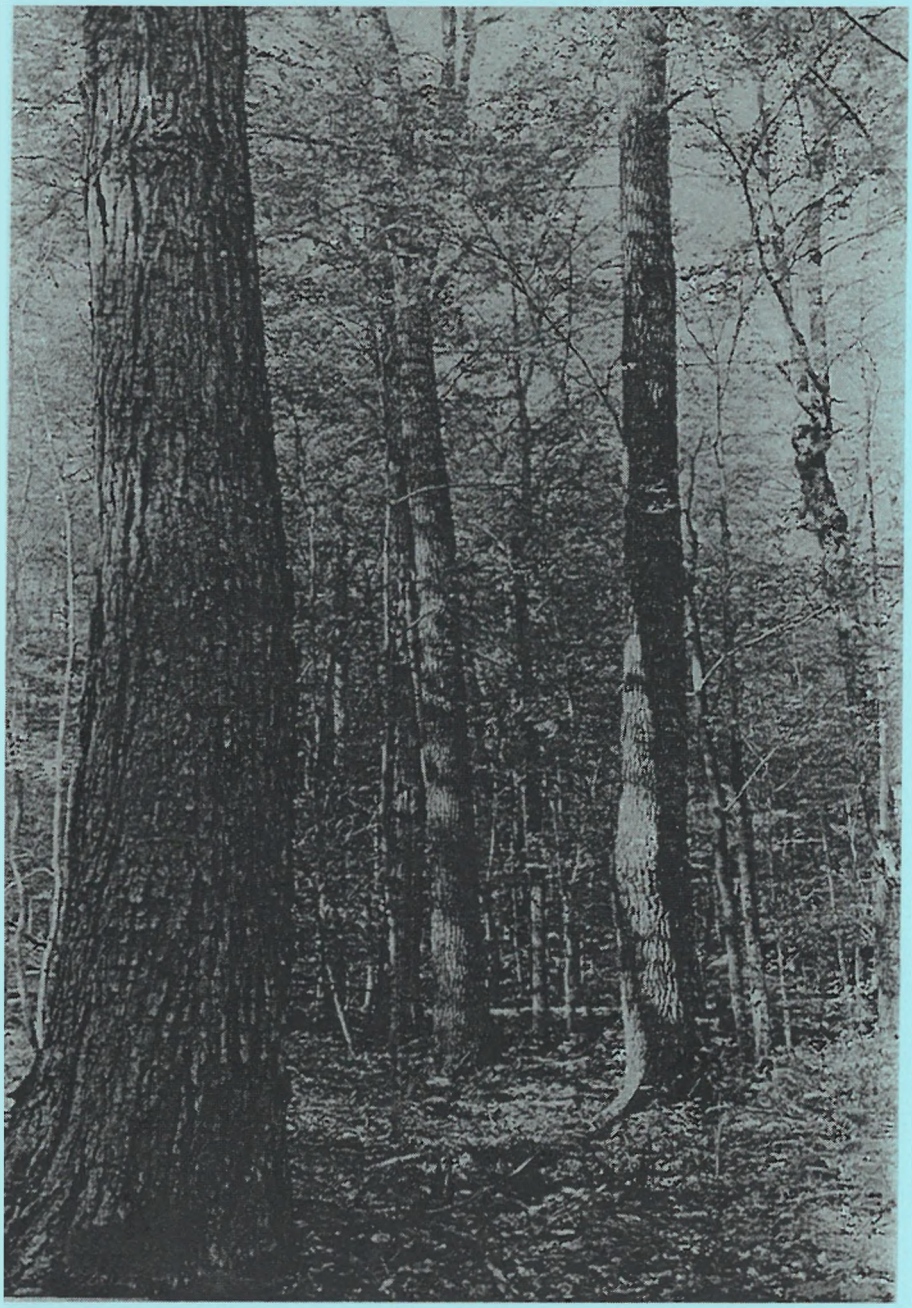

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Dan Sperduto of the New Hampshire Natural Heritage Program shared insights about their inventories in WMNF and loaned a copy of their 1995 report, as well as providing a copy of field notes from a visit to East Royce Mountain.

Finally, Wayne Millen of WMNF answered various questions about sites and management within WMNF, and waited patiently for completion of this report.

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INTRODUCTION

White Mountain National Forest (WMNF) covers approximately 300,000 ha (750,000 acres) of eastern New Hampshire and western Maine. A small portion, approximately 20,000 ha (50,000 acres), lies within Maine, contiguous with the remainder in New Hampshire. Since the early 1990s, ecological inventories of WMNF lands, geared towards identifying particular sites with rare or exemplary natural features, have occurred in both states. This report summarizes the Maine efforts.

In 1991, McMahon and Holmes (1992) conducted a landscape analysis of WMNF lands in Maine to identify areas of potential ecological significance. This work followed rare plant surveys conducted by the Maine Critical Areas Program and by WMNF staff, during which it became apparent that a broad overview of WMNF's Maine lands would be more helpful than a piecemeal approach. The landscape analysis, a pre-fieldwork planning tool, overlaid topographic maps, soils maps, stand histories, geological information, and existing information on rare or exemplary natural features to indicate which areas within WMNF were most likely to harbor exemplary natural communities and/or rare plant species. McMahon and Holmes identified 43 areas that were recommended for field survey.

The general character of WMNF in Maine was described by McMahon and Holmes (1992):

> The terrain is hilly to mountainous with elevations ranging from approximately 500 feet along the southern boundary of the Forest to a topographic high of 3114 feet at East Royce Mountain. Elevations generally increase from east to west. A series of roughly east-west trending ridges, including Speckled, Butters, and Red Rock Mountains, Miles Knob, and Peters and Albany Mountains, form the divide between the Androscoggin River and the Saco River watersheds. The area is drained by a network of first and second order rocky headwater streams. As is generally the case in the Western Mountains region (McMahon 1990), there are few ponds, marshes, swamps, and peatlands. Most of these wetlands are located in the southeastern third of the survey area.
>
> Topography is strongly influenced by bedrock, which is composed primarily of quartz-biotite schist and gneiss (Fisher 1952). Topographic contours parallel the pronounced northeast-southwest strike of these rocks. Glacial plucking on slopes where a foliation or joint system was approximately perpendicular to the direction of ice movement has produced cliffs and talus slopes in a number of places on the southeast side of mountains (Fisher 1952). Soils are generally not deeply developed, very rocky, and derived from granitic and less importantly schistose till (Campbell and Eastman 1980)
>
> Although aquatic and palustrine communities are uncommon, the survey area supports a diversity of forest and woodland communities. The four major forest types in the state are well represented in the region, including

spruce-fir, northern hardwood, transitional forest (spruce-fir-northern hardwood), and oak-pine. Red oak (*Quercus rubra*) reaches a topographic limit in the western mountains, where it generally occurs on dry, southeast-facing slopes below an elevation of 1500 feet. Northern hardwood forests are characteristic of more productive soils on east and south-facing slopes at elevations less than about 1800 feet. Northern hardwood species mix with spruce-fir at middle elevations, and spruce-fir forests occur on summits and ridges above about 2000 feet and on north-facing slopes. In shaded ravines and on north-facing slopes, hemlock forests may occur.

Based on the landscape analysis, the Maine Natural Areas Program (MNAP) conducted field surveys in 1992, 1993 and 1994. Our general objective, as in all of our inventory projects, was to separate the unusual from the ordinary, and to provide information to support appropriate conservation of sites with rare or exemplary natural features. Our specific objectives were

- to confirm whether each site identified by McMahon and Holmes contained any rare or exemplary natural features, to the extent allowed by funding limitations;
- to gather descriptive ecological information on those sites which do contain such features;
- to synthesize the information into an understanding of the occurrence and distribution of rare or exemplary natural community or botanical features across the Maine portion of WMNF; and
- to provide both general and site-specific information to WMNF in a form that would aid their land-use planning.

We did not address zoological or geological features in this inventory.

METHODS

Sites to be surveyed in each year were identified by WMNF and MNAP staff. MNAP has found that choice of field personnel for these surveys is critical, and we thus relied on trained botanists and ecologists who had demonstrated specific capabilities in previous inventory work. MNAP staff involved in the project were John J. Albright, Frances C. Smith, and Susan C. Gawler; contractors were Jill Weber and Sally Rooney as independent consultants, and Josh Royte of Woodlot Alternatives, Inc. The majority of the fieldwork was conducted by Rooney and Weber.

MNAP documents field visits with forms for specific information. For all sites, fieldworkers complete a Site Survey Summary giving locational information, date, and a brief description of the site, as well as a copy of the topographic map showing the area searched and the location of any special features. Then, depending on the nature of the area, other information may be gathered, viz.:

- If the area has any sort of intact natural communities, even if they're common types or not in very good condition, field workers complete a Natural Community Reconnaissance form. This provides an overview of the community types present on the site and the dominant features of each.
- If any of the communities documented on the natural community reconnaissance are rare natural communities, i.e. ranked S1-S3 or outstanding examples of common

- If any of the communities documented on the natural community reconnaissance are rare natural communities, i.e. ranked S1-S3 or outstanding examples of common community types, fieldworkers complete the Natural Community Description and Summary Notes (parts II and III of the Natural Community Survey Forms), using a separate Description form for each rare natural community. These provide the details needed for MNAP to document such areas as rare features.
- When fieldworkers find a species on the MNAP rare plant list (S1 - S3 plants), they complete a Special Plant Survey Form on that species. Animals were not a focus of the present work, but can be documented via a Special Animal Survey Form when appropriate.

Data gathered to document rare or exemplary natural communities include as complete a plant list as possible, with cover classes or dominance for each species (e.g., dbh measurements for trees); basic soils information such as texture, pH, horizon depths, etc.; environmental data such as slope, aspect, topographic position; evidence of past land-use; notes on current condition, including tree ages, if possible; and notes on surrounding landscape character. For rare plant populations, we collect basic information including phenology, approximate number of plants, areal extent of the population (known or surmised), associated species, and habitat condition.

Site descriptions and evaluations by the field workers are reviewed and assessed by MNAP staff ecologists, in this case, the author. Occurrences of rare elements are transcribed, mapped onto our master set of 7.5' USGS quadrangles, and entered into our Biological and Conservation Database. Rare elements include any rare plant species (or animal species, when those are included in surveys), *i.e.*, those ranked S1-S3, SH, or SX in Maine; any rare natural community type, *i.e.*, those ranked S1-S3; or any exemplary occurrence of a more common natural community type, *i.e.*, an occurrence judged to be of "A" - "B" quality according to ranking standards being developed by MNAP. Other natural community occurrences, those judged to be of moderate quality or those for which information is insufficient to assign a quality rank, are kept track of as "leads" pending further information, *i.e.* further field data or further refinements in assessing quality. Natural community occurrences known to be of poor quality in terms of our standards (recently harvested, highly manipulated, very small, etc.) are not entered into our database.

Natural community names follow MNAP's classification of terrestrial and palustrine communities and ecosystems in Maine (Gawler 1991, Gawler et al. 1996). In a few cases, e.g. the Oak-Beech Forest type, the 1996 classification (Appendix Q in Gawler et al. 1996) has been updated from the 1991 report. Brief descriptions of natural community types are given in Appendix B, which also contains a cross reference to The Nature Conservancy's emerging national classification of vegetation Alliances and Communities.

Plant names follow Campbell et al. 1995.

For this project, we also prepared a master set of topographic maps (see schematic, Figure 1) to accompany this report. All occurrences of rare plants, rare or exemplary natural communities,

and lead natural communities are mapped, with numbers keying to Table 1. (Circled numbers, in yellow on the master maps, indicate rare plant occurrences, not site numbers in Table 1.) Areas with known rare or exemplary features are enclosed within a solid line and stippled; areas with potentially exemplary natural communities are enclosed within a solid line but not stippled; and areas found to lack rare or exemplary features are enclosed within a dashed line. (These maps can be easily updated by WMNF if further information becomes available on some of the "lead" areas: if a particular lead is determined to be an exemplary natural community, the area can be stippled, and if it is determined to be not out of the ordinary, the solid line can be changed to a dashed line.)

The areas outlined on the topographic maps represent the known extent of the natural communties, but should be considered minimal areas for conservation purposes. For example, a 20-acre patch of maple-basswood-ash forest would be hardly significant if surrounded by heavily cut hardwood or mixed forest, but more significant if it is considered as part of a more extensive hillside forest that is maintained in its more-or-less natural condition.

Additional fieldwork in WMNF in 1996 to evaluate selected areas as possible ecological reserves will provide additional data on some sites already known; however, those results have not yet been analyzed.

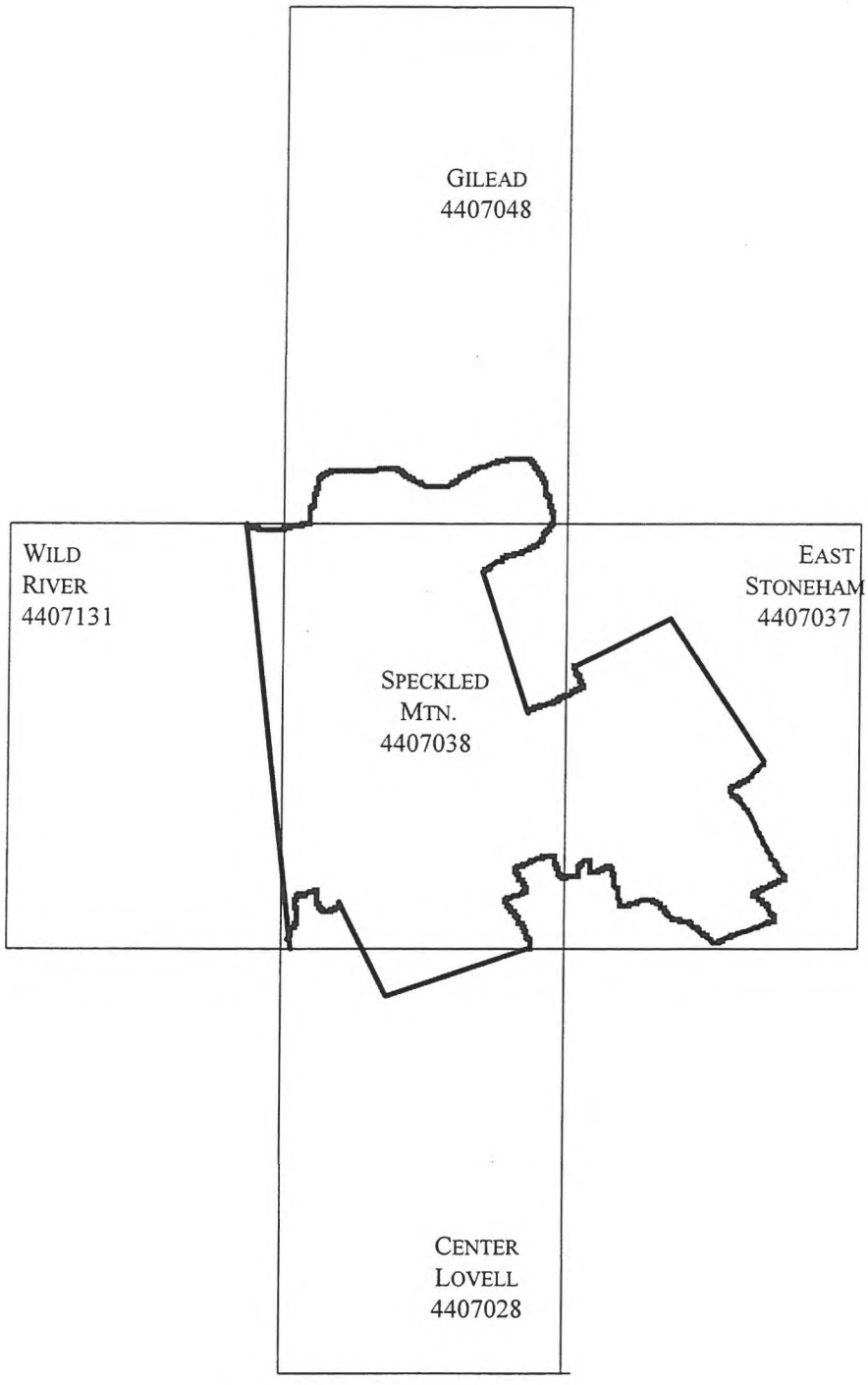

Figure 1. Schematic diagram of the USGS 7.5' topographic quadrangles for the White Mountain National Forest, showing the approximate WMNF boundary.

RESULTS

Of the 41 sites visited in 1992-1994, 15 contained rare plant species and/or exemplary natural communities (Table 1). Eleven sites contained potentially exemplary ("lead") natural communities, those that may be considered exemplary, once sufficient comparative data are available to judge what constitutes exemplariness for that community type. Fifteen sites had no rare features or exemplary communities. Of the 24 additional sites documented before 1992 but not revisited by MNAP, 8 contained rare plant species and/or exemplary natural communities, 12 sites contained potentially exemplary ("lead") natural communities, and four had no rare features or exemplary communities. One of these sites (Albany Mountain northeast slope, with a maple-basswood-ash forest and a population of ginseng), documented in the 1980s, was cut heavily in the late '80s, and the rare plant and notable forest community there did not exist in 1990. This totals 65 documented sites: 23 with rare or exemplary features, 23 with "leads", and 19 without rare or exemplary features (Table 1).

Potentially exemplary natural communities ("leads") are those areas which MNAP and/or WMNF may want to follow up on at some point. These leads may be high-quality community occurrences but data are insufficient to judge. In some of these cases, more data about the particular WMNF site are required; in other cases, especially where assessing whether an occurrence of a common community is exemplary, we need more information from around the state.

The unusual natural features in the Maine portion of WMNF (Tables 2 and 3) form a good representation of the characteristic forest and subalpine ecosystems in this portion of the state. The closed-canopy forest community types found most frequently, and with some very good examples, are Beech - Birch - Maple Forests, Maple - Basswood - Ash Forests, and Oak - Beech Forests. Spruce Slope Forests and Subalpine Spruce-Fir Forests are also characteristic, although less widespread at least in relatively undisturbed condition. Stream valleys are frequently lined with Hemlock Slope Forest, although, like most forests here, many of these were harvested at some point in the past. At slightly higher elevations, or on more xeric soils, Pine-Oak Woodlands, Red Pine Woodlands, and Acidic Summits are frequent.

In contrast to the New Hampshire portion of WMNF, alpine features are uncommon here. Caribou Mountain has the only occurrence of what could be considered alpine vegetation, and even this lacks many of the diagnostic species such as Diapensia (*Diapensia lapponica*). At 2880' elevation, Caribou Mountain is more subalpine than truly alpine in character.

Table 1. Results of field surveys in WMNF, including all sites identified in the 1991 landscape analysis, and sites otherwise known to support rare or exemplary natural features in WMNF. Sites are organized by USGS quadrangle, and within quadrangle, by presence or absence of unusual natural features. Heavy lines separate quadrangles. Sites in **bold** type are those with known rare natural features.

Explanation of column headings:
"Site #" refers to the site number on the accompanying master maps. For the most part, these follow those assigned by McMahon and Holmes (1992), although the sites for which they assigned letters have been converted to numbers (as noted).
"Quad code/name" refers to the USGS 7.5' quadrangle. "Quadcode" is the numerical reference used by MNAP and other heritage programs.
"FS" gives date of field survey. Survey personnel are listed on the field forms.
"EOs?" "Y" = yes, rare or exemplary natural feature confirmed and documented' "P" = potentially exemplary natural community, needing more information (see text for explanation); "N" = no rare or exemplary natural features found at site. "EO" refers to "Element Occurrence", i.e. the occurrence of a rare plant species or rare or exemplary natural community.
"List EO" indicates what EOs or potential EOs are present.
"EO #" gives the Element Occurrence Number, used by MNAP to track data.
"mgt unit" gives the WMNF management unit into which the site falls.
"acres" gives the minimum known acreage of confirmed rare or exemplary natural community occurrences. Actual acreage may be larger.
"page" is where the site description can be found in this report.

site #	site name	QUAD CODE/NAME	Field Survey	EOs ?	list EO/comment	EO number	mgt unit	EO acres	page
42	**Styles Mountain**	**4407028 / CENTER LOVELL**	**92-10-14**	**Y**	**Oak-Pine Woodland**	**004**	**6.2 3.1**	**83**	**14**
51	**Deer Hill**	**4407028 / CENTER LOVELL**	**89-08-22**	**Y**	***Triphora trianthophora*** (site V in M&H '92)[1]	**001**	**6.2**		**14**
35	**Pattee Hill**	**4407037 / EAST STONEHAM**	**91-09-19, 93-02-11**	**Y P**	**Oak-Beech Forest - AB;** Kettlehole Bog lead Northern White Cedar Swamp lead	**001** lead 001 lead 001	**2.1, 3.1**	**70**	**16**
38.5	**Albany Mountain**	**4407037 / EAST STONEHAM**	**90-10-18**	**Y**	**Red Pine Woodland**	**007**	**6.2**	**27**	**18**
38.6	**Albany Notch**	**4407037 / EAST STONEHAM**	**90-10-18**	**Y P**	**Maple-Basswood Ash Forest** Acidic/Circumneutral Cliff and Talus	**027** lead 001	**6.2**	**10**	**18**
38.7	**Albany Mountain, NE slope**	**4407037 / EAST STONEHAM**	**86-07-02 90-10-18**	**Y**	**Panax quinquefolius** Maple-Basswood Ash Forest, "C"-qual; cut since '86 & no *Panax*?	**021 011**	**6.2**	**13**	**18**
39	**Lombard Pond Hill**	**4407037 / EAST STONEHAM**	**92-10-27**	**Y**	**Oak-Beech Forest**	**003**	**3.1**	**34**	**19**
53	**Peter Mountain**	**4407037 / EAST STONEHAM**	**90-10-18**	**Y**	**Maple-Basswood Ash Forest** (site P in M&H '92)	**028**	**6.2**	**29**	**19**

[1] McMahon and Holmes 1992 (Landscape Analysis report)

site #	site name	QUAD CODE/NAME	Field Survey	EOs ?	list EO/comment	EO number	mgt unit	EO acres	page
54	**Square Dock Mountain**	**4407037 / EAST STONEHAM**	**85-06-11** **96-09-25**	**Y**	**Maple-Basswood Ash Forest** ***Panax quinquefolius*** ***Polygonum douglassii*** (site U in M&H '92)	**003** **007** **005**	**2.1**	**6**	**21**
36	Crocker Pond Hill	4407037 / EAST STONEHAM	92-05-06	P	"BC" Beech-Birch-Maple Forest	lead 028	6.2		21
38.1	Albany Mountain, S slope	4407037 / EAST STONEHAM	92-05-11	P	Oak-Beech Forest, unranked, poss. "B"	lead 001	6.2		18
38.2	Albany Mountain	4407037 / EAST STONEHAM	90-10-18	P	Beech-Birch-Maple Forest	lead 027	6.2		18
38.3	Albany Mountain	4407037 / EAST STONEHAM	90-10-18	P	Hemlock Slope Forest	lead 009	6.2		18
38.4	Albany Mountain	4407037 / EAST STONEHAM	90-10-18	P	Mixed Hardwood-Conifer Forest-	lead 003	6.2		18
40	Ridge SW of Round Pond	4407037 / EAST STONEHAM	92-05-11	P	Oak-Beech forest, BC qual	lead 004	6.2		22
55	Farwell Mountain	4407037 / EAST STONEHAM	90-08-04	P	Maple-Basswood Ash Forest (site Q in M&H '92)	lead 004	6.2		22
56	Albany Brook	4407037 / EAST STONEHAM	90-10-18	P	Acidic Fen, unranked (site T in M&H '92)	lead 001	3.1		22
57	Ridge NE of Round Pond	4407037 / EAST STONEHAM	92-05-11	P	Oak-Beech Forest, BC qual.	lead 002	?		23
43	NW of Rattlesnake Mountain.	4407037 / EAST STONEHAM	94-09-19	N	"poor" Beech-Birch-Maple Forest	n/a			--
37	*Bell Mountain*[2]	4407037 / EAST STONEHAM			*LA: Beech-Birch-Maple Forest; White Pine Forest*	*n/a*			--
34	**Blueberry Mountain/ Stone House Trail**	**4407038 / SPECKLED MOUNTAIN**	**90-09-21** **91-08-17**	**Y** P	**"B"Spruce Woodland** **"B" Red Pine Woodland** Beech-Birch-Maple Forest (incl. Site O of M&H '92)	**002** **008** lead 030	**9.1**	**60** **9**	**34**
60	**Miles Notch**	**4407038 / SPECKLED MOUNTAIN**	**88-08-12**	**Y**	**Maple-Bass-Ash Forest** ***Panax quinquefolius*** ***Triphora trianthophora*** (site K of M&H '92)	**009** **022** **003**	**3.1, 6.2**	**105**	**30**
8	**Cold River / Evans Notch**	**4407038 / SPECKLED MOUNTAIN**	**93-06-18 & 93-09-15**	**Y**	**Maple-Basswood-Ash Forest - A** **Beech-Birch-Maple Forest - B** ***Dicentra canadensis*** ***Impatiens pallida*** ***Osmorhiza berteroi***	**010** **022** **007** **010** **026**	**6.2**	**38** **41**	**23**
11.1	**Gammon Mountain.**	**4407038 / SPECKLED MOUNTAIN**	**93-06-07**	**Y**	***Viola canadensis*** ***Dicentra canadensis***	**001** **006**	**9.1?**	**9**	**25**

[2] The two italicized entries are from the 1991 Landscape Analysis (McMahon and Holmes 1992) but have not apparently been field checked.

site #	site name	QUAD CODE/NAME	Field Survey	EOs ?	list EO/comment	EO number	mgt unit	EO acres	page
13	**Mt. Hastings**	**4407038 / SPECKLED MOUNTAIN**	**93-06-07**	**Y**	**Maple-Basswood-Ash Forest - AB** ***Panax quinquefolius***	**019** **027**	**6.2**	**34**	**27**
21	**Ridge W of Haystack Mountain.**	**4407038 / SPECKLED MOUNTAIN**	**93-06-08**	**Y**	**Maple-Basswood-Ash Forest - A** ***Panax quinquefolius*** ***Impatiens pallida*** ***Dryopteris goldiana***	**020** **028** **005** **008**	**9.1, 6.2**	**105**	**27**
24	**Stony Brook**	**4407038 / SPECKLED MOUNTAIN**	**93-05-13, 92-09-01**	**Y**	**Spruce Slope Forest**	**012**	**2.1, 9.1**	**90**	**23**
29	**Isaiah Mountain**	**4407038 / SPECKLED MOUNTAIN**	**92-05-08**	**Y**	**Oak-Pine Woodland**	**003**	**3.1**	**22**	**30**
30	**Bickford Brook**	**4407038 / SPECKLED MOUNTAIN**	**93-06-25 89-09-26**	**Y**	**Beech-Birch-Maple Forest - A** ***Triphora trianthophora*** (site N of M&H '92)	**026** **002**	**9.1**	**132**	**34**
31	**Blueberry Ridge Trail**	**4407038 / SPECKLED MOUNTAIN**	**94-07-08**	**Y** P	**Acidic Summit- A** Spruce Slope Forest lead	**005** lead 012	**9.1**	**86**	**32**
32	**Cold Brook Trail (Speckled Mountain S)**	**4407038 / SPECKLED MOUNTAIN**	**94-09-27**	**Y** N	**Spruce slope Forest-A** **Acidic Summit-A** "C?" Beech-Birch-Maple Forest	**011** **006**	**9.1**	**38**	**32**
59	**Caribou Mountain**	**4407038 / SPECKLED MOUNTAIN**	**96-10-06**	**Y**	**Alpine Ridge** **Krummholz** ***Paronychia argyrocoma*** ***Minuartia groenlandica*** (site E of M&H '92)	**014** **006** **004** **026**	**9.1**	**15** **25**	**27**
10	The Roost	4407038 / SPECKLED MOUNTAIN	93-05-13	P	"C" Oak-Beech Forest	lead 003	2.1		36
12	Tyler Mountain	4407038 / SPECKLED MOUNTAIN	93-06-24	P	"C" Beech-Birch-Maple Forest	lead 012	6.2		36
17	Mud Brook	4407038 / SPECKLED MOUNTAIN	93-06-25	P N	Hemlock Slope Forest, unranked "C" Beech-Birch-Maple Forest	lead 002 n/a	2.1		36
18	SE Slope Caribou Mountain.	4407038 / SPECKLED MOUNTAIN	93-09-16	P	"BC" Beech-Birch-Maple Forest	lead 020	9.1		36
19	West Branch Pleasant River	4407038 / SPECKLED MOUNTAIN	94-09-19	P	ordinary beaver flowage, possibly exemplary	lead 001	9.1, 2.1		37
25	Cold River Overlook	4407038 / SPECKLED MOUNTAIN	93-06-10	P	"BC" Beech-Birch-Maple Forest	lead 017	6.2, 9.1		37
61	Ridge West of Caribou Mountain	4407038 / SPECKLED MOUNTAIN	90-10-19	P	Mixed Hardwood-Conifer Forest, poss. exemplary (site F of M&H '92)	lead 007	9.1		37
62	Flank North of Mud Brook	4407038 / SPECKLED MOUNTAIN	90-10-19	P	Spruce Slope Forest (site G of M&H '92)	lead 014	2.1, 6.2		37

site #	site name	QUAD CODE/NAME	Field Survey	EOs ?	list EO/comment	EO number	mgt unit	EO acres	page
63	Caribou Spring North	4407038 / SPECKLED MOUNTAIN	90-10-19	P	Subalpine Spruce/Fir Forest Beech-Birch-Maple Forest	lead 005 lead 034	? ?		37
64	Caribou Trail North	4407038 / SPECKLED MOUNTAIN	90-10-19	P	Subalpine Spruce/Fir Forest Beech-Birch-Maple Forest	lead 008 lead 035	? ?		37
65	Speckled Mountain	4407038 / SPECKLED MOUNTAIN	90-07-31	P	"BC?" Acidic Summit (site E in M&H '92)	lead 001	9.1		38
66	Butters Mountain	4407038 / SPECKLED MOUNTAIN	1980s	P	Beech-Birch-Maple Forest lead (site J in M&H '92)	lead 037	9.1		38
9	Little Lary Brook	4407038 / SPECKLED MOUNTAIN	91-08-26	N	"C" Hemlock Slope Forest	n/a			--
11	Gammon Mountain North	4407038 / SPECKLED MOUNTAIN	93-06-07	N	"C" Beech-Birch-Maple Forest	n/a			--
14	Evans Brook	4407038 / SPECKLED MOUNTAIN	93-05-13	N	planted red pine, ordinary wetlands	n/a			--
15	Morrison Brook	4407038 / SPECKLED MOUNTAIN	92-08-20	N	various types but not exemplary	n/a			--
16	Mud Brook Trailhead	4407038 / SPECKLED MOUNTAIN	93-06-17	N	"C" Beech-Birch-Maple Forest	n/a			--
20	Slope SW of Haystack Notch	4407038 / SPECKLED MOUNTAIN	93-06-11	N	"C" Beech-Birch-Maple Forest	n/a			--
22	Saddle above Evans Brook	4407038 / SPECKLED MOUNTAIN	93-06-10	N	"C" Beech-Birch-Maple Forest	n/a			--
23	Ridge NE of East Royce Mountain	4407038 / SPECKLED MOUNTAIN	94-09-26	N	"avg" spruce slope forest	n/a			--
26	North of Durgin Mountain.	4407038 / SPECKLED MOUNTAIN	93-06-11	N	"C" Beech-Birch-Maple Forest	n/a			--
27	Great Brook	4407038 / SPECKLED MOUNTAIN	93-09-14	N	"C" Beech-Birch-Maple Forest	n/a			--
28	South of Durgin Mountain.	4407038 / SPECKLED MOUNTAIN	93-09-14	N	"C" Beech-Birch-Maple Forest	n/a			--
33	Rattlesnake Brook	4407038 / SPECKLED MOUNTAIN	92-10-14	N	"C" Hemlock/Beech-Birch-Maple Forest	n/a			--
58	Peabody Mountain	4407038 / SPECKLED MOUNTAIN	86-07-01	N	"C" Beech-Birch-Maple Forest (site B in M&H '92)	n/a			--
41	Pleasant River	4407047 / BETHEL	94-07-08	N	"D" mixed hardwood-conifer Forest	n/a			--
3.2	Wheeler Brook	4407048 / GILEAD	90-06-26	P	Hemlock Slope Forest "BC?"	lead 008	2.1, 6.2		40
52	Peaked Hill	4407048 / GILEAD	90-06-26	P	Beech-Birch-Maple Forest Pine-Oak Forest	lead 007 lead 001	?		40
1	Gilead Picnic Area	4407048 / GILEAD	91-09-17	N	"C" Pine-Hemlock Forest	n/a			--
2	Gammon Brook	4407048 / GILEAD	94-07-27	N	"D" Beech-Birch-Maple Forest	n/a			--
3	Wheeler Brook	4407048 / GILEAD	93-06-24	N	"C" Beech-Birch-Maple Forest	n/a			--
4	*Bog Brook*[3]	4407048 / GILEAD			*LA: Red Maple Swamp*	*n/a??*			--

[3] The two italicized entries are from the 1991 Landscape Analysis (McMahon and Holmes 1992) but have not apparently been field checked.

site #	site name	QUAD CODE/NAME	Field Survey	EOs ?	list EO/comment	EO number	mgt unit	EO acres	page
5	**Carlton Notch**	**4407131 / WILD RIVER**	**1991, 1993**	**Y** P	**Hemlock Slope Forest** Spruce Slope forest lead Beech-Birch-Maple Forest lead	**001** lead 013 lead 029	**2.1, 6.1**	**46**	**38**
7.2	**East Royce Mountain (trail)**	**4407131 / WILD RIVER**	**89-08-06 1992**	**Y**	**"AB" Subalpine Spruce/Fir Forest (Old-Growth Red Spruce)**	**013**	**3.1**	**54**	**40**
6	Highwater Trail - Wild River	4407131 / WILD RIVER	91-09-17	N	"C" mix hardwood-conifer Forest "C" Beech-Birch-Maple Forest "C" Red Maple Swamp	n/a			--
7	East Royce Mountain (North ridge)	4407131 / WILD RIVER	94-09-26	N	"C" spruce/fir/hardwood forest	n/a			--

Table 2. Rare and Exemplary Natural Communities Identified in WMNF.

Community Type	State Rank[4]	Best Examples	EO Rank[5]
Acidic Summit	S4	Blueberry Ridge Trail (31)	A
		Cold Brook Trail (32)	A
Alpine Ridge	S2	Caribou Mountain (59)	C
Beech-Birch-Maple Forest	S5	Cold River - Evans Notch (8)	B
		Bickford Brook (30)	A
Hemlock Slope Forest	S4	Carlton Notch (5)	B
Krummholz	S3	Caribou Mountain (59)	--
Maple-Basswood-Ash Forest	S3	Albany Notch (38.6)	AB
		Peter Mountain (53)	--
		Square Dock Mountain (54)	--
		Miles Notch (60)	--
		Cold River - Evans Notch (8)	A
		Mt. Hastings (13)	AB
		Ridge W of Haystack Mountain (21)	A
Oak -Pine Woodland	S4	Styles Mountain (42)	AB
		Isaiah Mountain (29)	B
Oak-Beech Forest	S3S4	Pattee Hill (35)	AB
		Lombard Pond Hill (39)	B
Red Pine Woodland	S3	Albany Mountain (38.5)	--
		Pattee Hill (35)	--
		Blueberry Mountain/Stone House Trail (34)	B
Spruce Slope Forest	S4	Stony Brook (24)	B
		Cold Brook Trail (32)	A
Spruce Woodland	S3	Blueberry Mountain/Stone House Trail (34)	B
Subalpine Spruce-Fir Forest	S3	East Royce Mountain (7.2)	AB

[4] See Appendix A for explanation of ranks. No community type listed here is globally rare.

[5] "EO Rank" refers to Element Occurrence Rank, used by Heritage Programs to rank particular occurrences of species or communities. The basic ranks run from A - D, representing Excellent to Poor. MNAP enters all occurrences of rare communities (S1-S3) in our database; for common community types (S4 or S5), we enter only those judged to be of "A" or "B" quality, and thus considered exemplary. A dash indicates that the occurrence is not yet ranked, usually due to lack of comparative data.

Table 3. Rare Plant Species Identified in WMNF.

Rare Plant Species	State Rank[5]	Locations
Dicentra canadensis Squirrel-corn	S1	Cold River - Evans Notch (8) Gammon Mountain (11)
Dryopteris goldiana Goldie's fern	S2	Ridge W of Haystack Mountain - Haystack Notch (21)
Impatiens pallida Pale jewelweed	S2	Cold River - Evans Notch (8) Ridge W of Haystack Mountain - Haystack Notch (21)
Minuartia groenlandica Mountain sandwort	S3	Caribou Mountain (59)
Osmorhiza berteroi Mountain sweet-cicely	S2	Cold River - Evans Notch (8)
Panax quinquefolius Ginseng	S2	Albany Mountain, NE Slope (38.7) Square Dock Mountain (54) Miles Notch (60) Mt. Hastings (13) Ridge W of Haystack Mountain - Haystack Notch (21)
Paronychia argyrocoma Silverling	S1S2	Caribou Mountain (59)
Polygonum douglassii Douglas's knotweed	S1	Square Dock Mountain (54)
Triphora trianthophora Nodding pogonia	S1S2	Deer Hill (51) Miles Notch (60) Bickford Brook (30)
Viola canadensis Canada violet	S1	Gammon Mountain (11)

[5] See Appendix A for explanation of State Ranks. Global Ranks are not given because none of these species is globally rare (i.e., all are G4-G5).

SITE DESCRIPTIONS

Sites with rare or exemplary natural features are described below, grouped by USGS quad, and within a quad grouped according to physical proximity. Beneath the site name, each rare or exemplary natural feature is shown by name (e.g. *Panax quinquefolius* or Beech - Birch - Maple Forest) and its occurrence number in the MNAP database. Sites with leads but without known rare or exemplary features are listed at the end of each quadrangle section. The site numbers key to Table 1 and the topographic maps.

Center Lovell Quadrangle: Sites with Known Rare or Exemplary Natural Features

42. Styles Mountain
Oak-Pine Woodland 004
(Fig. 2)

The peaks and SW slopes of the Styles Mountain - Adams Mountain range support a good example of a red oak - red pine woodland community. Oak and pine form a partial low canopy, up to about 50% cover, allowing ample light to reach the shrub, herb, and bryoid (moss, liverwort, and lichen) layers. Exposed bedrock forms over half of the ground cover. Canopy height is about 10 m. Heath shrubs *(Gaylussacia baccata* and *Vaccinium angustifolium* the two most abundant), the grass *Deschampsia flexuosa*, and *Cladina*-type lichens (reindeer lichens) characterize these lower layers. Because trees rarely grow to marketable size in these exposed locations, the area appears basically undisturbed by humans. Most trees here are less than 35 cm, or 14", in diameter. The areal extent of the community here is above average, running from the more open areas of Adams Mountain to the somewhat more closed areas, sometimes approaching 75% canopy cover of red oak, on Styles Mountain.

The dashed line on the master topographic map shows the area originally identified in the landscape analysis as having potential for good natural communities; the stippled areas show the approximate extent of the community itself based on the field visit. Although the community appears on the map as two separate areas, it should be considered as one unit ecologically.

51. Deer Hill
Triphora trianthophora 001
(Fig. 2)

The Deer Hill Nodding Pogonia area is one of the earliest identified sites (as Critical Area #50) for rare natural features on the Maine portion of WMNF. Located downslope from an old amethyst mine popular with rock-hounds, this mixed-age northern hardwood forest on gentle southeasterly slopes supports a comparatively large population of this rare orchid. The orchid population in 1989 was estimated at several hundred individuals. Like some other orchids, nodding pogonia appears above-ground only sporadically. Here, it grows in a beech (*Fagus grandifolia*)-dominated forest, especially in moist microsites where beech litter has accumulated.

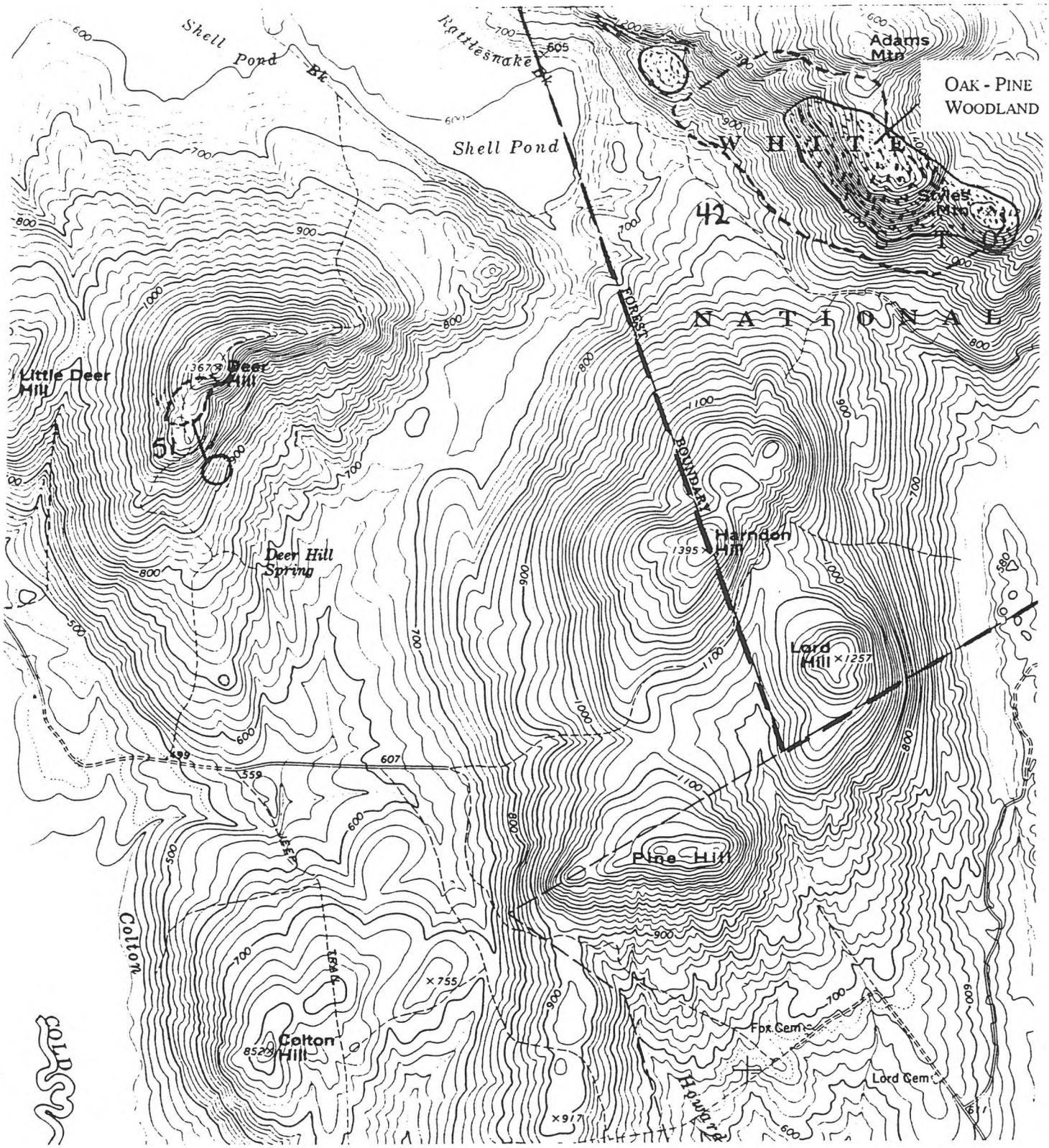

Figure 2. Sites on the Center Lovell quadrangle

The mature beech, sugar maple (*Acer saccharum*), and red oak (*Quercus rubra*) trees form a high canopy and open understory. The forest community itself shows signs of previous harvesting and is thus not considered an exemplary natural community, although it provides fine habitat for this rare species.

East Stoneham Quadrangle: Sites with Known Rare or Exemplary Natural Features

35. Pattee Hill
Oak-Beech Forest 001
(Fig. 3)

The southeast-facing slopes of Pattee Hill support an impressive oak-beech forest characterized by almost total dominance of mature red oak *(Quercus rubra)*. The trees, forming a canopy of approximately 31 m (85'), tall for this latitude, range from 12 - 74 cm (5 - 29") dbh. The origin of the stand, believed from tree cores to be at least 160 years ago, remains unclear. The topography appears unsuitable for pasture; there are very few stumps or remains; and the tall, straight oaks appear forest-grown, not open-grown. The stand may be of fire origin. The oaks are now mature, with smaller beech dominating the regeneration. Scattered paper birch (*Betula papyrifera*), up to 38 cm (15") dbh, are mostly dead or downed. The extent and naturalness of this forest make it one of the best red-oak dominated forests known in Maine.

Detailed plot data were collected from this area in 1996 but these data have not yet been analyzed.

The Pattee Hill oak-beech forest was identified as an exemplary forest site in the early 1990s, and WMNF personnel have been consulting with the Natural Areas Program since that time on management concerns for the area. Along with the oak-beech forest, the nearby wetlands are of interest as good examples of natural community types which are common in Maine but for which few examples exist within WMNF. These include a kettlehole bog community at Sunken Pond, a shrub swamp and sedge meadow area around Waterfowl Marsh, and a swamp equally dominated by northern white cedar and red maple in a small basin (c. 2 ha) north of Sunken Pond. Waterfowl Marsh is not considered an exemplary natural community from a statewide perspective because the water level is managed. Sunken Pond and the cedar/maple swamp to the north appear to be in good natural condition; however, MNAP does not currently have sufficient data on kettlehole bog and northern white cedar swamp communities throughout Maine to judge whether the occurrences here are exemplary.

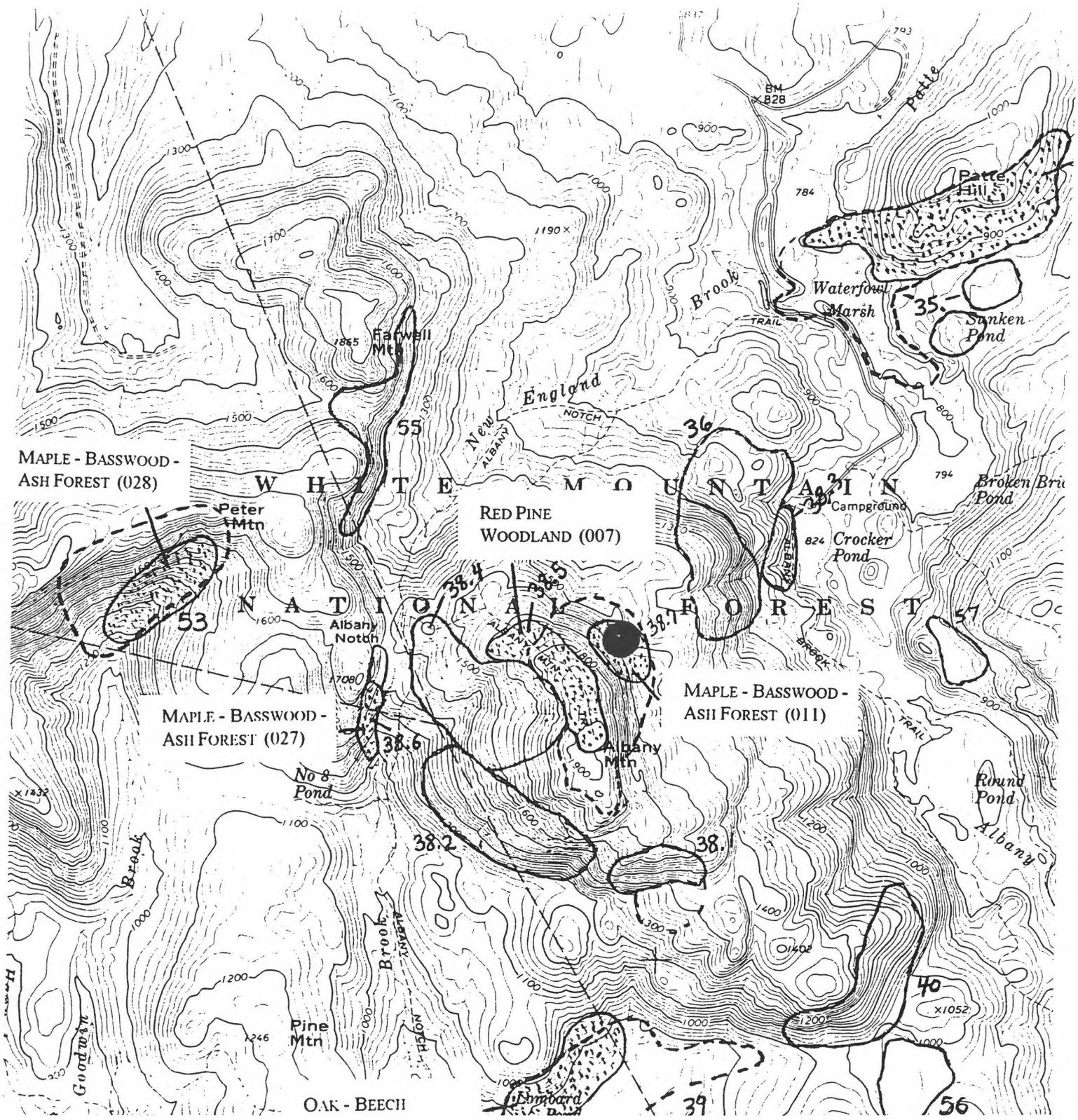

Figure 3. Sites on the East Stoneham quadrangle, northern portion.

38. Albany Mountain area
Red Pine Woodland 007
former Maple-Basswood-Ash Forest 011 (Albany Mountain) - cut
former (?) *Panax quinquefolius* 021 - not seen since forest was cut
Maple-Basswood-Ash Forest 027 (Albany Notch)
(Fig. 3)

possibly exemplary, need more data (leads):
talus and cliffs at Albany Notch
Oak-Beech Forest
Beech-Birch-Maple Forest
Mixed Hardwood-Conifer Forest

The top and side slopes of Albany Mountain, west to Albany Notch, constitute a remarkable diversity of communities within a relatively small area. Though portions of the lower slopes of Albany Mountain have been recently cut, there remains a good deal of intact forest and woodland ecosystems which show little disturbance over the past 75-150 years. The top of Albany Mountain is an open woodland dominated by red pine (*Pinus resinosa*), with a sparse subcanopy of white pine (*Pinus strobus*), red oak, paper birch, and balsam fir (*Abies balsamea*). Lowbush blueberry, huckleberry and the grass *Deschampsia flexuosa* are the commonest ground plants, growing in pockets among the rocks. The pines are estimated at 60-75 years old, and it is likely that this area has burned in the past, as have most other examples of these xeric woodlands dominated by fire-adapted species.

The other two small areas known to be (or have been) particularly noteworthy are the two "cove" forests, or maple-basswood-ash forests, one on the northeastern slope near the headwaters of Albany Brook, and one in Albany Notch. The forest on the northeastern slope, at about 1600' elevation, was noted in 1986 as a site for ginseng, *Panax quinquefolius*, a very rare plant in Maine, and described as follows: "...along the upper reaches of an ephemeral mountain stream... Coarse colluvium has collected along this slope and there is a beautiful moss-covered rock face along the streambed, and the terrain is quite steep above. Below the rock face, ferns, boulders, shrubs, and large white ash and sugar maples are present." Five plants of ginseng were found on the north side of the stream, with the notation that the habitat looked good for more. Only a small portion, about 5 acres, of forest was identified as comprising the best portion of this botanically rich forest. The 1990 survey of the area found that the northeast slope had been heavily cut, and no *Panax* was found. It would appear that the natural community no longer exists here, and although the 1990 surveyor could not be sure he was in the exact spot where ginseng was found four years earlier, it is unlikely that the current state of the habitat would support ginseng.

The maple-basswood-ash forest in Albany Notch was identified in 1990 as the most impressive forest area documented in that survey of the Albany Mountain slopes. Yellow birch (*Betula alleghaniensis*) and sugar maple (*Acer saccharum*) more than 100 cm (3') in diameter, and basswood (*Tilia americana*) over 65 cm (2') in diameter, form a tall full canopy over steep rocky or talus slopes. *Dryopteris marginalis* and *Actaea pachypoda* are the most common herbaceous

plants. The tree ages were estimated, without coring, at 75-120 years. Above the forest, the talus gives way to ledges and scree where mountain maple *(Acer spicatum)* predominates. This higher area is probably a fine example of acidic cliffs and talus (possibly with circumneutral pockets), but we lack sufficient information to adequately document it.

Other portions of the Albany Mountain slopes have been generally described and may prove to include exemplary forests once better comparative data are available from other parts of the state. These include the mixed hardwood-conifer forest on the western slopes, where *Picea rubens* is mixed with *Fagus grandifolia*, *Betula papyrifera*, and *Acer rubrum*; and the beech-birch-maple forest on the southwest slopes. Much of this area has been thinned or recently cut, but it is possible that some pockets of exemplary forest remain. The oak-beech forest on the southeast slope of the mountain has also been noted, although it appears not to be as high quality an oak-beech forest as at nearby Pattee Hill. Although these forests do not immedaitely appear to be outstanding natural communities, MNAP does not currently have sufficient data on these forest communities throughout Maine to objectively judge whether the three occurrences here are exemplary.

39. Lombard Pond Hill
Oak - Beech Forest 003
(Fig. 4)

The lower slopes of the hill north of Lombard Pond support a forest community of mature red oak and beech, with no signs of recent disturbance and with fallen logs and uneven topography indicating a natural condition. Red oak, up to 68 cm (27") dbh, dominates the canopy; beech, which are mostly less than 40 cm (16" dbh) and presumed younger, dominate the subcanopy. Conifers are sparse in the oak-beech dominated portion of the forest, though increasing in dominance upslope. Like Pattee Hill, there is virtually no oak regeneration, and the origin of the forest is unknown. The size of the site (about 40 acres) and its position in a wooded (as opposed to developed) landscape adds to its value as a representative oak-beech forest community, a type which now appears uncommon and, due to high demand for quality red oak, threatened in Maine.

53. Peter Mountain
Maple-Basswood-Ash Forest 028
(Fig. 3)

McMahon and Holmes (1992) list this site as a "previously documented" cove forest (=maple-basswood-ash forest), and the 1990 field inventory map from Albany Mountain outlines this area, noted as a "very old cove"; unfortunately, we have been unable to find the field forms documenting this particular site at MNAP. The site was not targeted for fieldwork because it had been, supposedly, previously documented. A field visit to better document this occurrence of this unusual forest type is recommended.

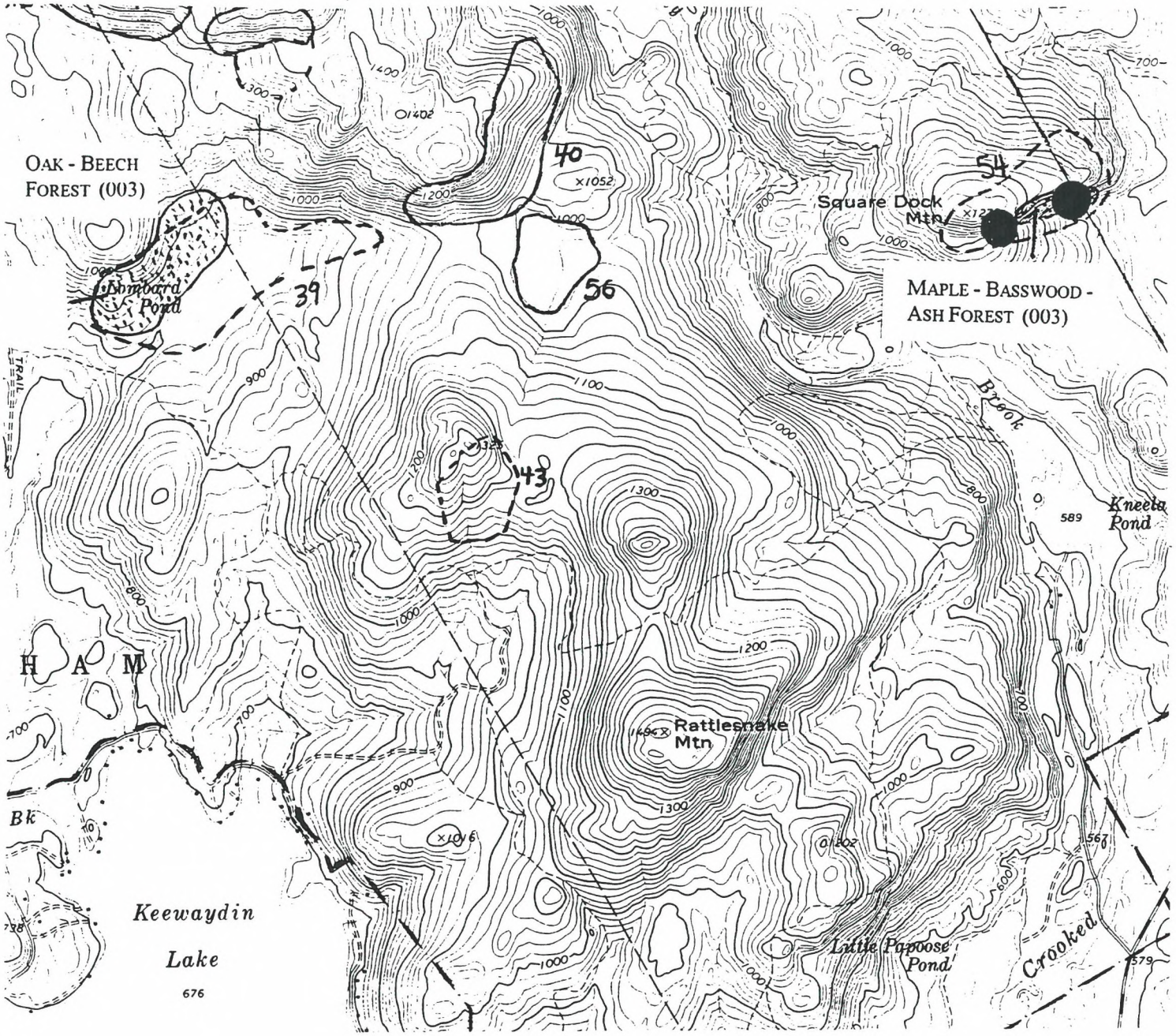

Figure 4. Sites on the East Stoneham quadrangle, southern portion

54. Square Dock Mountain
Maple-Basswood-Ash Forest 003
Panax quinquefolius 007
Polygonum douglassii 005
(Fig. 4)

The southeast face of Square Dock Mountain includes two unusual areas: the cliffs and open talus which support a population of Douglas's knotweed, *Polygonum douglassii*, and the maple-basswood-ash forest on the slopes below the cliffs, which is a rare natural community in itself and also supports a population of ginseng, *Panax quinquefolius*.

The talus field at the west end of the cliff is sparsely vegetated with white ash (*Fraxinus americana*) and poison ivy (*Toxicodendron rydbergii*), and 26 plants of *Polygonum douglassii* were found in September 1996 in an area less than 10 m long. The relatively small numbers and restriction to one open pocket suggests that competition from the woody plants may be limiting the *Polygonum* population here. As an annual species, and one that was documented from this site in 1957, the species can probably continue to persist here in small numbers as long as some open habitat remains. It is also possible that the plant occurs on the open summit, but that area was not visited in 1996.

Lower on the southeast slope, a maple-basswood-ash forest covers the steep, rocky terrain. The forest is strongly dominated by sugar maple, with white ash and occasional hop hornbeam (*Ostrya virginiana*); the absence of beech, and the presence of herbaceous species typical of rich soils, distinguishes this from the more common northern hardwood forests (beech-birch-maple type). Characteristic herbs include herb-Robert (*Geranium robertianum)*, blue cohosh (*Caulophyllum thalictroides*), and the sedge *Carex platyphylla*. Of particular interest is the small population of ginseng (*Panax quinquefolius*), a species which in Maine is restricted to these maple-basswood-ash forests. The ginseng was last documented in 1985, at which time eight plants were found. While this is a small population, most of the other Maine populations of ginseng are small as well.

<u>East Stoneham Quadrangle: Other Possibly Exemplary Sites (leads):</u>

36. Crocker Pond Hill
(including 38.3, Albany Brook hemlock)
Beech - Birch - Maple Forest lead
Hemlock Slope Forest lead
(Fig. 3)

The beech-birch-maple forest on the hillslope forming the west side of Crocker Pond appears to be of average quality, mature but not remarkably old. Beech dominates much of the area, with pockets of richer soil where white ash and yellow birch co-dominate. There is no evidence of recent harvests, and dead and downed wood (such as much of the earlier successional white birch) suggests that natural forest regeneration and replacement is occurring. This forest appears

to be a good representative of beech-birch-maple forests in this part of state, although we lack the comparative data statewide to assess whether it is indeed outstanding. There are no plans for cutting in this area in the near future, and given that its quality should only improve.

Adjacent to the hardwood areas, along the shores of Crocker Pond and Albany Brook, are small areas of hemlock slope forests. These were noted in the 1990 survey of the area, but we do not have detailed information on them.

40. Ridge SW of Round Pond
Oak-Beech Forest lead
(Fig. 4)

This is a forest on a south-facing slope co-dominated by red oak and beech, with sugar maple and yellow birch present on the lower slopes. The oaks range up to 64 cm (25") dbh and average 48 cm (19") dbh. As with other oak-beech forests in WMNF, beech dominates the regeneration layer. More comparative data from other sites in the state are needed to evaluate whether or not this site is exemplary.

55. Farwell Mountain
Maple-Basswood-Ash Forest lead
(Fig. 3)

This is a fragment of rich northern hardwood forest surrounded by recently harvested areas. The field survey from 1990 does not give clear enough information to determine whether this is a maple-basswood-ash community (which is suggested by the topography and the presence of *Tilia*), or merely a beech-birch-maple forest with some *Tilia* (which is suggested by the listing of beech as a "dominant" tree.) As a beech-birch-maple forest, this site would not be of interest as a good example because of the recent cuts surrounding it and its small size. However, the maple-basswood-ash type is uncommon in the state, and MNAP keeps track of all known occurrences of this type. Pending any further field inventory, this remains as a "lead" for a maple-basswood-ash forest.

56. Albany Brook
Acidic Fen lead
(Fig. 4)

McMahon and Holmes list this in their 1992 landscape analysis as a previously documented acidic fen. Acidic fen communities are common in Maine, although not within the Maine portion of WMNF, and the site has not been evaluated since.

57. Ridge NE of Round Pond
Oak-Beech Forest lead
(Fig. 3)

This oak-beech forest does not appear to be of high quality as a natural community. Beech dominates, most of it less than 25 cm (10" dbh), with a lesser component of red oak, most less than 46 cm (18") dbh (largest 60 cm or 23.5"). We keep this as a lead because this is a poorly documented community type, and the data may be useful in assessing or describing the type statewide.

Speckled Mountain Quadrangle: Sites with Known Rare or Exemplary Natural Features

The many sites to discuss on this quad are grouped according to their proximity.

8. Cold River / Evans Notch
24. Stony Brook
Beech-Birch-Maple Forest 022
Maple-Basswood-Ash Forest 010
Dicentra canadensis 007
Impatiens pallida 010
Osmorhiza berteroi 026
Spruce Slope Forest 012
(Fig. 5)

This area supports high quality hardwood forests on the southeast-facing slopes at Evans Notch, paired with an exemplary spruce slope forest on the northwest-facing slope across the Evans Brook valley. The hardwood forests include high-quality examples of both the common northern hardwoods type (beech-birch-maple) and the less common enriched type (maple-basswood-ash, or cove forest). The maple-basswood-ash forest also supports at least three rare plant species.

The maple-basswood-ash forest, or cove forest, has been known as a rare plant area for years, and occurs where metamorphic schist forms a steep talus area downslope to the narrow floodplain of Evans Brook. At the lower elevations, *Fraxinus americana* dominates the canopy, with plants of moist, nutrient-rich soils such as ostrich fern (*Matteucia struthiopteris*) and jack-in-the-pulpit (*Arisaema triphyllum*) characterizing the herbaceous layer. Moving upslope, *Acer saccharum* becomes more dominant, with *Tilia americana*, very characteristic of these habitats, occurring in pockets. The population of *Dicentra canadensis*, or squirrel corn, rare in Maine, occurs midslope in pockets of soil among the talus, where it grows with Dutchman's breeches (*Dicentra cucullaria*), silvery spleenwort (*Deparia acrostichoides*), and blue cohosh. In 1993, a few dozen plants of squirrel corn were found in an area of only a few square meters; however, the mid-June survey may have underestimated the population of this spring ephemeral. Two other plants that are rare in Maine also have been recorded here: *Impatiens pallida* or yellow jewelweed and *Osmorhiza berteroi* or mountain sweet-cicely. Trees in the floodplain portion of the forest, which experience more natural disturbance, are estimated to be about 80 years old; the maples on the slopes above, many in the 24" dbh range, are up to 200 years old.

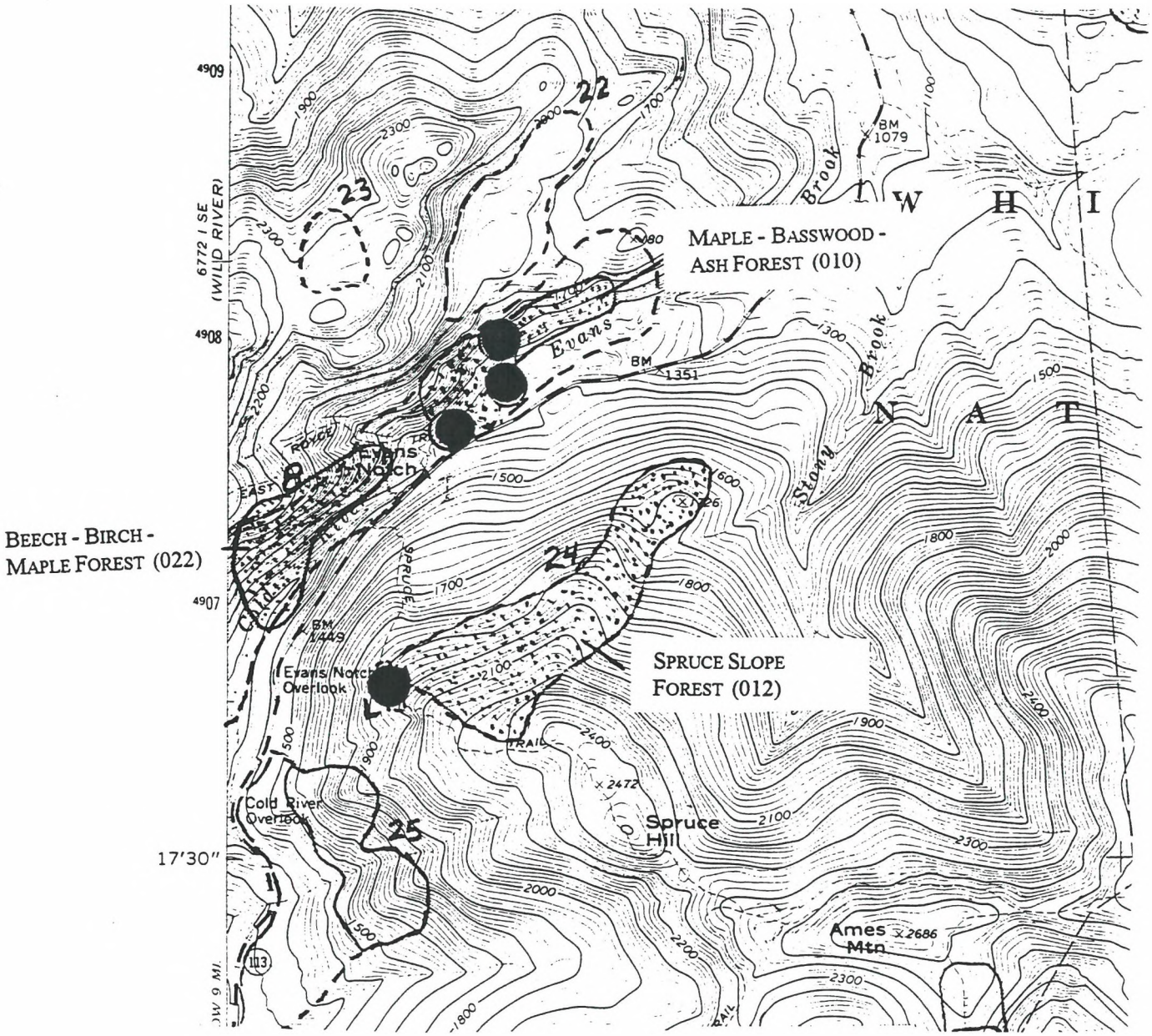

Figure 5. Sites on the Speckled Mountain quadrangle (west and center).

The exemplary beech-birch-maple forest occurs south of the cove forest, across the Evans Notch trail. The forest is dominated by *Acer saccharum* and *Fagus grandifolia*, with a heavy component of *Betula alleghaniensis*. The forest appears multi-aged, with smaller beech and larger sugar maple. The shrub layer is dominated by beech regeneration. Species richness in the herbaceous layer was high relative to most known occurrences of this forest type.

The spruce slope forest on the flanks of Spruce Hill is dominated by red spruce (*Picea rubens)* and smaller hemlock (*Tsuga canadensis)*, forming a complete canopy except where treefalls have opened gaps. The trees cored were not particularly old (109+ and 140+ years for spruce, 117 years for hemlock); however downed trees, pit-and-mound topography, standing trees, and no visible stumps attest to the prevalence of natural processes at this site. The spruces are mostly 12 - 18" dbh, ranging up to 22". Because of the shade cast by the conifers, there is virtually no shrub layer and the herb layer is confined to gaps. The high market value of spruce has made spruce slope forests like this increasingly rare in Maine, and most known occurrences are small pockets. The 90 acres here, while not a huge expanse of natural forest, is comparatively large for this type and is one of the reasons why this site is judged to be an excellent example of this forest community.

11.1. Gammon Mountain
Viola canadensis 001
Dicentra canadensis 006
(Fig. 6)

The southwest-facing slopes to the north of Gammon Mountain (dashed area on map) were identified in the 1991 landscape analysis as having potential as an exemplary northern hardwood forest. The field survey found that the area highlighted on the map was not an outstanding example of a northern hardwood forest community, since the lower slopes and much of the upper slopes had been cut in the not-too-distant past. The dominance of *Picea rubens* in the understory suggests that this site, if left alone, will likely become a mixed spruce-hardwood forest.

Though the natural community attributes were unremarkable, the field investigators S. Rooney and J. Weber pinpointed one area of enriched soils at the southeast corner of the area and discovered a species of violet entirely new to Maine. *Viola canadensis* is common in enriched hardwood forests in Vermont, but is currently known from Maine only at this one site. Twelve to fifteen individuals were seen in an area of less than 100 square meters, on an east-facing slope at approximately 2100' elevation. Growing with the violet was a population of squirrel-corn, *Dicentra canadensis*, a species that is also typically associated with areas of enriched soils in northern hardwood forests. The size of the squirrel-corn population here is unknown because the plants were already going dormant when spotted at the mid-June field visit, so they may occur over a larger area than already identified.

The most important consideration in managing this rare plant habitat is to avoid cutting in the area where the plants grow and the areas upslope, as indicated on the map accompanying this report.

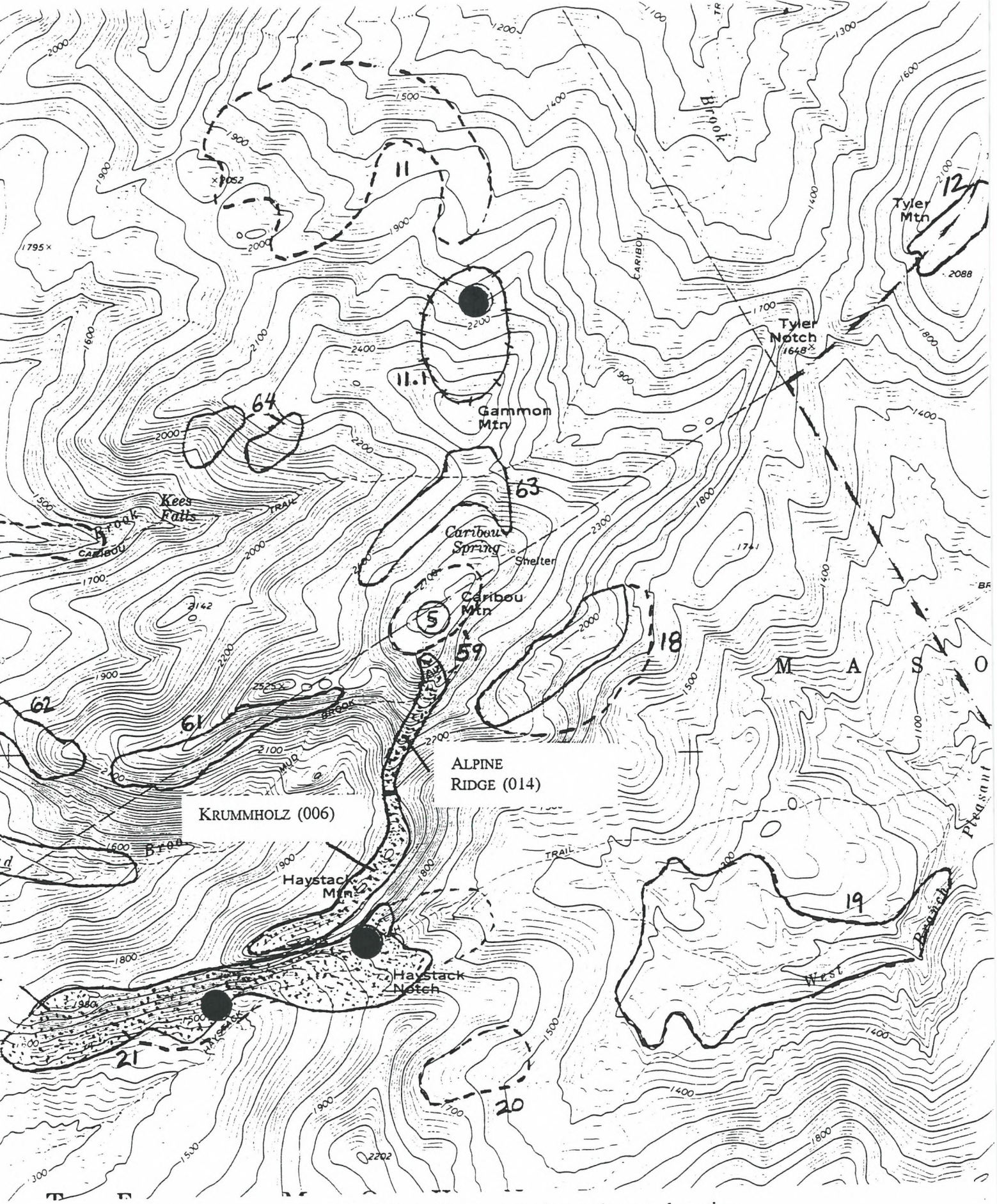

Figure 6. Sites on the Speckled Mountain quadrangle, north-central portion.

13. Mount Hastings
Maple-Basswood-Ash Forest 019
Panax quinquefolius 027
(Fig. 7)

The steep, rocky, southeast-facing slopes of Mount Hastings supports an enriched northern hardwods forest (Maple-Basswood-Ash type) dominated by large white ash, sugar maple, and yellow birch. The trees here included the largest white ash seen in the 1993 inventory of hardwood sites in WMNF, ranging up to 74 cm dbh. Basswood, characteristic of these enriched forests, is present here as saplings and seedlings. Natural treefall is the predominant disturbance here, and no visible signs of human disturbance were found. As with most of these enriched forests in Maine, this occurrence is restricted to the rocky colluvial slope here and covers only about 30 acres. The mature forest around it forms a buffer at present.

The herbaceous layer contains several species that are characteristic of enriched soils, such as blue cohosh (*Caulophyllum thalictroides),* maidenhair fern (*Adiantum pedatum),* silvery spleenwort (*Deparia acrostichoides),* and dutchman's-breeches *(Dicentra cucullaria).* The *Dicentra* here may include the rare *D. canadensis*, although since the field survey was post-flowering none were identified. A population of *Osmorhiza* sp., unidentifiable to species because the field visit was early in the season, is probably (at least in large part) the rare *O. berteroi*, based on the examination of several roots which showed the plants not to be the more common *O. longistylis*.

A typically small population of ginseng, *Panax quinquefolius*, occurs here on a small bench of rocky soil below the cliff face. Four widely-spaced individuals were found. The quality and extent of the uncut forest here indicates that habitat availability is not the limiting factor for *Panax* here.

The slope to the southwest of the identified site, running down to the summit of Mt. Hastings, was not surveyed in 1993 but may contain more of the same habitat.

21. Ridge W of Haystack Mountain / Haystack Notch
59. Caribou Mountain
Maple-Basswood-Ash Forest 020
Panax quinquefolius 028
Impatiens pallida 005
Dryopteris goldiana 008
Alpine Ridge 014
Krummholz 006
Paronychia argyrocoma 004
Minuartia groenlandica 026
(Fig. 6)

Both Haystack Notch and the ridge from Haystack Mountain north to Caribou Mountain have long been known as unusual natural areas. The Haystack Notch area has been known for its rare

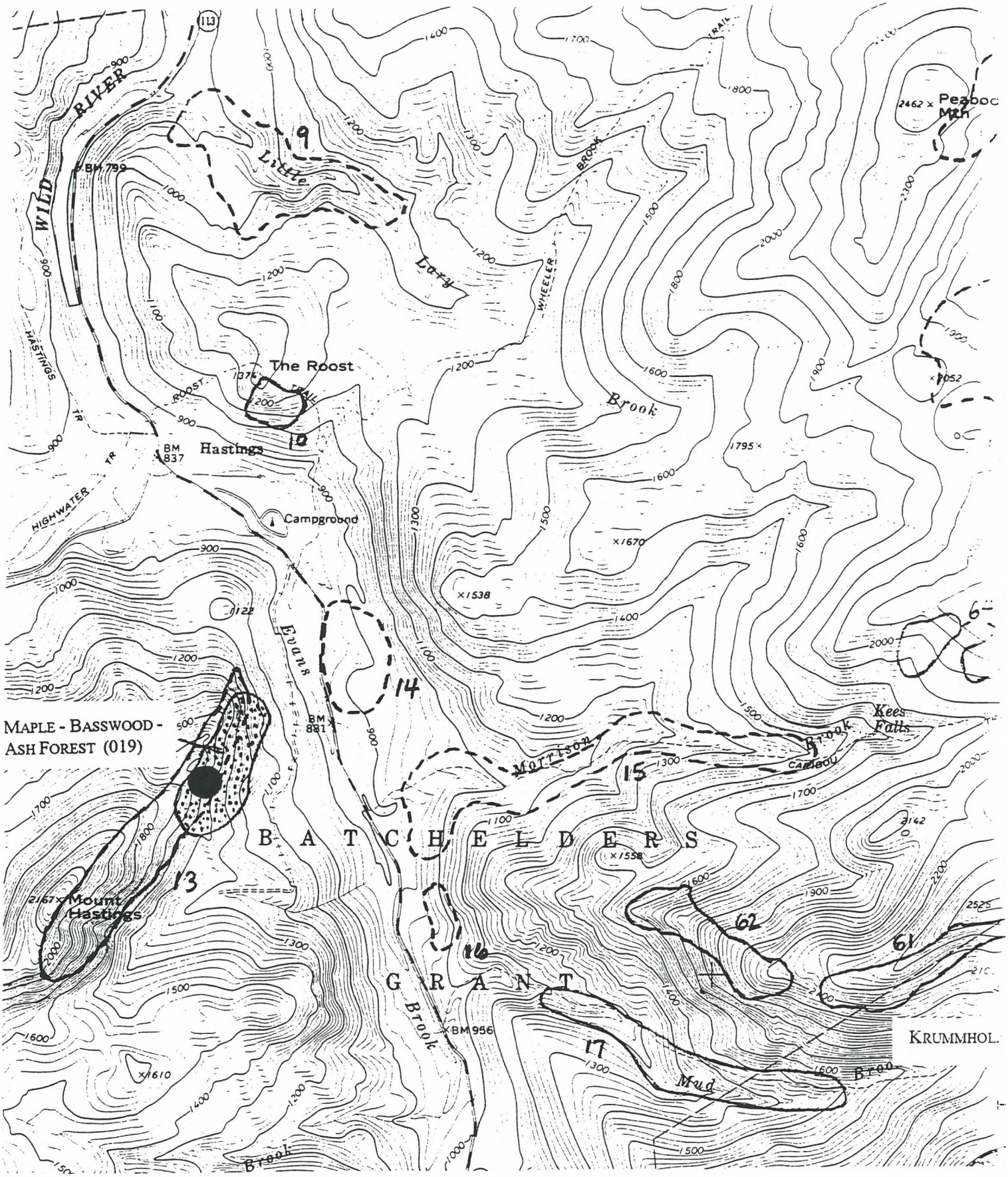

Figure 7. Sites on the Speckled Mountain quadrangle, northwest corner.

plant occurrences at least since the mid-1970s, but this more recent inventory revealed that the forest itself is of note, being a relatively large expanse of maple-basswood-ash forest running from the Notch westward over a kilometer along the south-facing slope. Past logging appears to have been restricted to the lower slopes here which are much less steep. The northern hardwood forest here, classed as an example of the maple-basswood-ash type, actually reflects a gradient between that type and the more typical northern hardwoods (beech-birch-maple), and provides a fine example of how microclimate and topography affect forest composition. On the midslope "bench", sugar maple dominates, with large white ash, some yellow birch and beech, and much *Caulophyllum thalictroides* in the herbaceous layer (the maple-basswood-ash type), while on the upper slopes the ash and yellow birch drop out and beech becomes much more prevalent (beech-birch-maple type). The trees are moderately large (40-50 cm dbh for the largest trees) and the area appears uncut.

In their June 1993 survey of this area, Weber and Rooney noted the potential for ginseng at this site, and in a return visit in August 1993 actually located three individuals, all producing fruit. The small population, fairly typical for ginseng in Maine, is growing in rich mesic soils on a midslope bench underneath mature white ash.

The two other rare plant species in this area were found in earlier inventories focusing on the eastern half of this area, around Haystack Notch. *Impatiens pallida* or yellow jewelweed, and *Dryopteris goldiana* or Goldie's fern, were first located here in 1975 and 1974, respectively, and have been seen here several times since, although they have not been reconfirmed since 1989. The habitat for these rare plants is at Haystack Notch istself, running from the trail northward to the base of the steep ledges. Growing in rocky soils at the base of ledges, large populations of pale jewelweed and Goldie's Fern were found with many fern species including *Athyrium thelypteroides, Adiantum pedatum,* and *Botrychium virginanum.*

The other interesting portion of this area is the ridge running from Haystack Mountain north to Caribou Mountain (#59 on maps and in Table 1). A sharp contrast to the hardwoods on the south-facing slopes, this area is a scrubby ridge of krummholz (perhaps grading into subalpine spruce-fir forest) leading to a small open alpine ridge area at Caribou Mountain. The summit of Caribou itself is heavily impacted by hikers, and the best examples of the ridgetop vegetation was found south of the primary peak on the southern peak and in the saddle between the two peaks. Silverling *(Paronychia argyrocoma)* and mountain sandwort *(Minuartia groenlandica)* were confirmed in the saddle in 1996, and have been found previously on the two summits as well. *Minuartia groenlandica* is typical of higher mountain summits throughout Maine (27 locations statewide), but *Paronychia* is restricted in New England to the White Mountains in New Hampshire and Maine. This population, known since 1904, is the largest mountain population in Maine.

29. Isaiah Mountain
60. Miles Notch
Oak-Pine Woodland 003
Maple-Basswood-Ash Forest 009
Panax quinquefolius 022
Triphora trianthophora 003
(Fig. 8)

Isaiah Mountain and Miles Notch face each other across the valley of Beaver Brook and exhibit very different natural vegetation, showing the effects of environmental factors such as topography and exposure. The dry summit of Isaiah Mountain supports a pine-oak woodland dominated by *Pinus resinosa* and *Quercus rubra*, with low shrubs (e.g. *Vaccinium angustifolium*), herbs (*Carex lucorum* and *Maianthemum canadense*), and reindeer lichens growing in patches on the rock substrate. On the western slope, with a little more soil to support trees, beech replaces the red pine for a beech-oak woodland portion. The trees cored on the slope were between 75 and 120 years old. On the eastern and southern slopes of Isaiah Mountain, the forest is much younger, and old stone walls indicate previous use as pasture. While the forest at this site is not particularly old, the summit and the upper portion of the western slope provide a good example of summit woodland vegetation that, at least at this point, reflects little human influence.

Across the narrow valley, the south-facing slopes of Miles Notch display a completely different vegetation. Bisected by the Miles Notch Trail, the forest covers the southern and eastern slopes of Miles Knob and rises from 1000' to 1900' elevation. Boulders and occasional outcrops of mica schist protrude through a thick litter layer, with small cliffs on the steepest slopes. *Acer saccharum, Fagus grandifolia,* and *Quercus rubra* dominate the canopy, with *Fraxinus americana* and *Tilia americana* present in lesser amounts. Tree diameters range from 20-50 cm (8-20"). Striped maple (*Acer pensylvanicum)* and hobblebush (*Viburnum lantanoides)* are abundant in the shrub layer. The herbaceous layer is generally sparse except in small pockets of enriched soils. One such pocket supports a comparatively large population of ginseng, growing with wild sarsaparilla (*Aralia nudicaulis)* and the sedge *Carex platyphylla.* The abundance of beech and oak here suggest that this site is intermediate between the typical northern hardwood forest type (beech-birch-maple) and the more restricted maple-basswood-ash type.

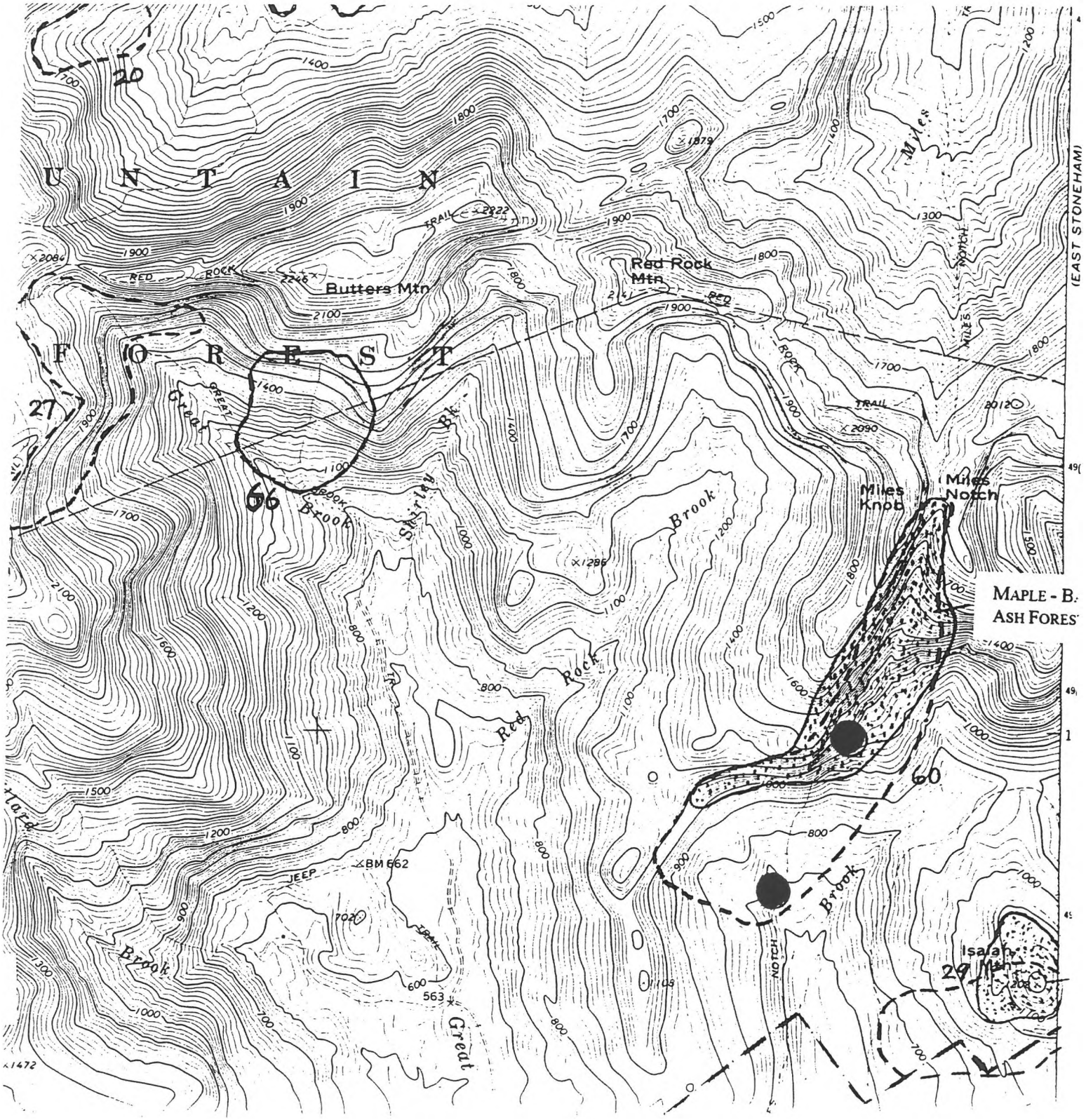

Figure 8. Sites on the Speckled Mountain quadrangle, east-central portion.

The ginseng population here is large compared to other Maine populations, although still small compared to populations in the heart of the species's range. At least 50 plants were seen in 1988, growing beneath sugar maple, basswood, and beech between 110' and 1400' elevation, with the notation that the area needs to be more thoroughly searched if accurate numbers are desired.

The absence of stumps west of the trail, WMNF Stand records, and the presence of ginseng (a long-lived herb that requires continuous shade) indicate that the area has been in an undisturbed condition for at least 100 years; however the absence of large trees suggests that the area may have been cut selectively in the past. Trail use appears minimal and is not at present likely to degrade the site.

Triphora trianthophora, nodding pogonia or three-birds orchid, occurs downslope of the enriched hardwoods forest on a more gentle slope strongly dominated by beech. The occasional stumps, and presence of big-toothed aspen *(Populus grandidentata)*, indicate that this portion of the forest has been more recently harvested than the maple-basswood-ash forest upslope. *Triphora* grows patchily in beech litter west of the trail here. The size of the population here in 1988 and 1989 was estimated in the thousands. In 1991, no plants were seen, but spotty appearance from year-to-year is typical of this orchid, and it may well have reappeared since.

31. Blueberry Ridge Trail
32. Cold Brook Trail (Speckled Mountain. South)

Acidic Rocky Summit 005
Acidic Rocky Summit 006
Spruce Slope Forest 011
(Fig. 9)

These areas, south of Speckled Mountain, provide high-quality examples of ridgetop vegetation. Speckled Mountain itself, of course, is similarly vegetated, but the heavy recreational use of that peak has lessened its quality and these two areas are better examples. Southwest of Speckled Mountain, the acidic summit community along the Blueberry Ridge Trail occurs as pockets of open summit (with fine views) interspersed among subalpine spruce-fir forest. The open areas are mostly exposed granite, with vegetation covering at most 20% of the area. Blueberries *(Vaccinium angustifolium* and *V. uliginosum)* and reindeer lichens are the dominant vegetation. The subalpine spruce-fir forest in which these openings are set is dominated by red spruce (*Picea rubens)*, heart-leaved paper birch (*Betula cordifolia*), and pin cherry (*Prunus pensylvanica*), with mountain holly (*Nemopanthus mucronata)* in the shrub layer. The trees are stunted in these exposed conditions. One spruce, 37 cm dbh, was aged at over 100 years. Overall, this is an excellent example of this vegetation mosaic. The presence of *Prunus pensylvanica* hints of past fires, which are almost expected in these exposed xeric sites.

Southeast of Speckled Mountain is an extensive acidic summit on an almost-flat expanse of granite. The patchy vegetation on the bald summit is formed of islands of spruce and birch ringed by rhodora *(Rhododendron canadense),* blueberries *(Vaccinium uliginosum* and *V. angustifolium)* and mountain cranberry (*V. vitis-idaea)*, as well as islands of reindeer lichens

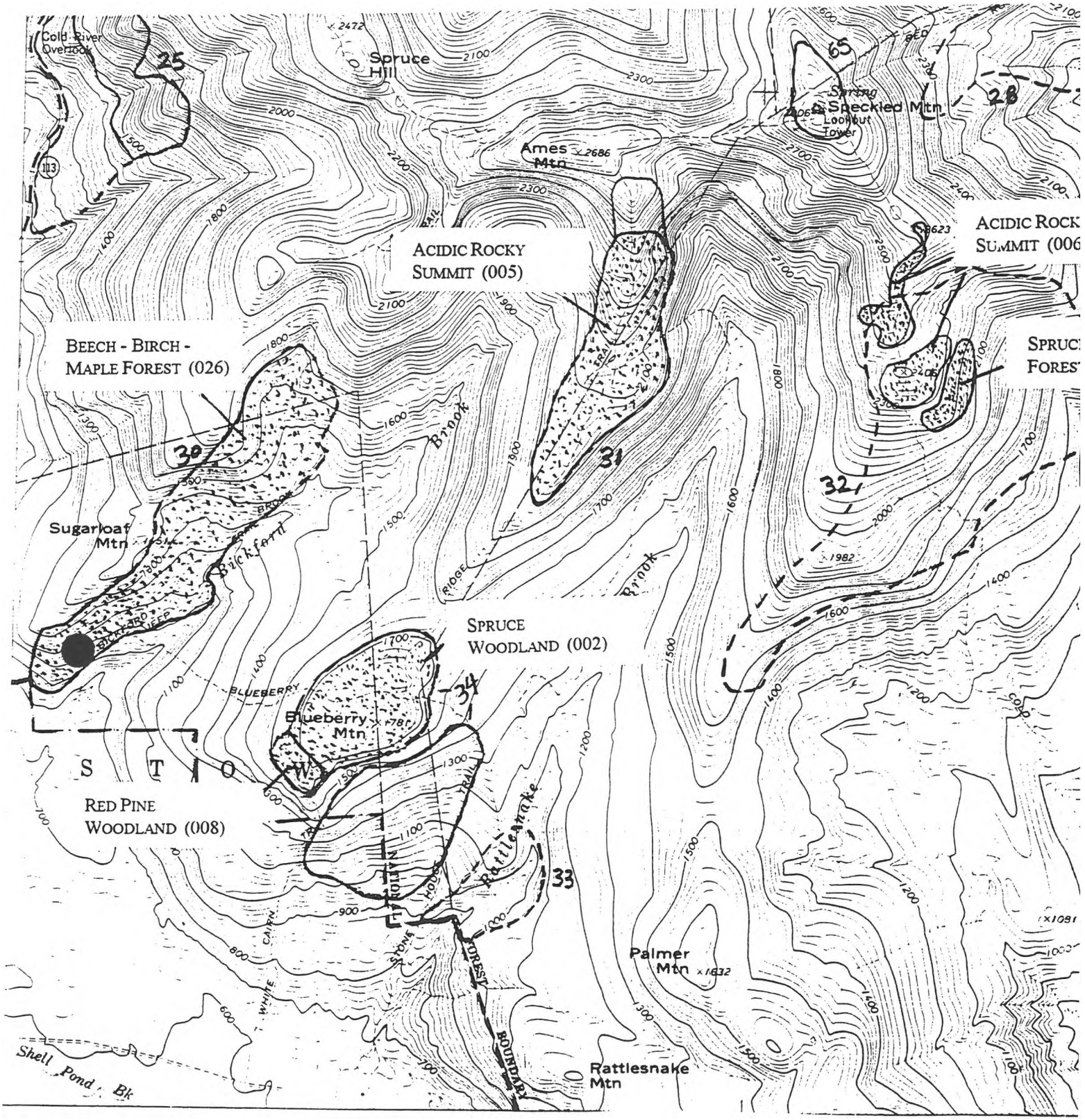

Figure 9. Sites on the Speckled Mountain quadrangle, southwest portion.

(*Cladina* spp.). At the northern end of the bald, a small pool is surrounded by leatherleaf (*Chamaedaphne calyculata), Sphagnum* mosses, and the rush *Juncus brevicaudatus.*

The spruce-slope forest east of the open summit, at 2000'-2300', is a good example of a spruce-fir forest at relatively high elevation. Some of the spruces were quite large for this elevation (e.g., 36-56 cm dbh) and had branches almost down to the ground, indicating open-grown conditions. *Picea rubens* was the dominant canopy and understory tree. Both species of paper birch, *Betula cordifolia* and *B. papyrifera,* were scattered throughout the canopy. The subcanopy was dominated by mountain-ash (*Sorbus americana)* and striped maple *(Acer pensylvanicum).* The herbaceous layer was patchy, with bracken fern (*Pteridium aquilinum),* bunchberry (*Cornus canadensis)* and lowbush blueberry *(Vaccinium angustifolium)* the most abundant species, as well as small individuals of spruce and fir. The area appears natural, with almost no human activity.

Though not large, this is a comparatively good example of this forest type.

30. Bickford Brook/Sugarloaf Mountain
34. Blueberry Mountain / Stone House Trail
Beech-Birch-Maple Forest 026
Spruce Woodland 002
Red Pine Woodland 008
Beech-Birch-Maple forest lead
(Fig. 9)

Sugarloaf Mountain and Blueberry Mountain, separated by Bickford Brook, form another interesting pair of sites where the vegetational differences can be clearly related to environmental factors such as topography and exposure. The Beech-Birch-Maple Forest on the southeast slopes of Sugarloaf Mountain are more mesic and sheltered than the xeric conifer woodlands on the exposed summit and southwest slope of Blueberry Mountain.

The Bickford Brook hardwood site is a beech-dominated forest with scattered large (up to 89 cm dbh) red oak forming a supercanopy. The beech and maple dominating the canopy range up to 62 cm dbh. *Betula alleghaniensis* is also common in the canopy, with trees reaching 48 cm dbh; *Fraxinus americana* is occasional. There appear to be a mixture of age classes in the area, and no signs of recent cutting. The oak supercanopy distinguishes this site from other northern hardwood forests in WMNF. This site may represent succession in process, with an oak-beech forest giving way to a beech-birch-maple forest; or, the unusual combination could reflect the soils which are sandier than at most northern hardwood stands.

Across Bickford Brook, the summit of Blueberry Mountain supports a spruce woodland community, with sparse and stunted red spruce, red pine (*Pinus resinosa*), and grey birch (*Betula populifolia*). The trees, which form about a 30% canopy, reach only about 6 m (20'). The availability of light allows a denser shrub layer covering about 50% of the ground in patches across the bare rock. Shadbush (*Amelanchier canadensis)*, blueberries (*Vaccinium angustifolium* and *V. myrtilloides),* sheep-laurel (*Kalmia angustifolia),* and rhodora *(Rhododendron canadense)*

are the commonest of the eleven shrub species recorded here. On the southwest slope of the mountain, a small area of red pine woodland covers the ledgetops. *Pinus resinosa* and *Quercus rubra* form an almost complete canopy at about 50', with patches of blueberries *(Vaccinium angustifolium* and *V. myrtilloides)* forming the shrub layer. The area appears to be in excellent natural condition.

A lead for northern hardwood forest (Beech-Birch-Maple type) comes from Holmes's 1990 visit, described as "very large timber at 1200'," east of the Stone House trail. The field notes show a dominance of beech, sugar maple, yellow birch, and white ash, with smaller amounts of red oak and red maple in the canopy. More detailed inventory data are needed to assess the quality of this hardwood forest.

Speckled Mountain Quadrangle: Other Possibly Exemplary Sites (leads)

10. The Roost
Oak-Beech Forest lead
(Fig. 7)
The oak-beech forest at The Roost appears of good but probably not outstanding quality. Red oak and beech dominate, with the mature oak up to 45 cm (17") dbh and the beech mostly less than 30 cm (12") dbh. Two larger red oaks were aged at 80 and 100 years. The approximately 35 acre site is smaller than other oak-beech forests identified in this survey, and the trees appear younger. We maintain it as a lead for now because, although it does not appear outstanding, we have few data on this forest type outside of WMNF.

12. Tyler Mountain
Beech-Birch-Maple Forest lead
(Fig. 6)

A hardwood forest dominated by *Acer saccharum* in the canopy and *Fagus grandifolia* in the subcanopy. Tree diameters range from 19-62 cm for maple and 18-35 cm for beech. A few large yellow birch (46-62 cm) are also present. This is a small occurrence of undisturbed northern hardwood forest surrounded by forests that have been more recently cut. While the small size of this hardwood forest remnant would suggest that it is not exemplary, MNAP is maintaining this as a lead because of its undisturbed nature, pending a more complete data on beech-birch-maple forests statewide. While other northern hardwood forests in WMNF are of better quality, the apparently undisturbed nature of this site may make it of interest to WMNF.

17. Mud Brook
Hemlock Slope Forest lead
(Fig. 7)

The hemlock slope forest along Mud Brook was noted, without description, in Weber and Rooney's 1993 inventory, which focused on hardwood forests. McMahon's 1991 visit noted that the hemlock forest near the trailhead was not of good natural quality; whether the quality improves further up the trail is unknown. The hardwood forest along the trail in this area is pleasant, with some large trees (sugar maple up to 71 cm dbh, yellow birch up to 79 cm dbh), but shows signs of past cutting and is not considered exemplary as a natural community.

18. SE Slope of Caribou Mountain
Beech-Birch-Maple Forest lead
(Fig. 6)

Like site #25, the midslope hardwood forest here was characterized as "nice but not outstanding" in Rooney and Weber's 1993 inventory. The lower slopes have been cut. In the undisturbed portion, beech dominates the canopy and subcanopy; sugar maple seedlings are common in the herb layer. The hardwoods grade into spruce-fir forest upslope (only mentioned in the site description, without details). While this was not considered an exemplary hardwood forest, the

combination of good hardwood forest midslope and relatively undisturbed spruce-fir forest upslope to the summit of Caribou may be of interest to WMNF as reflecting typical environmental gradients for this area.

19. West Branch Pleasant River
Beaver Flowage lead
(Fig. 6)

The wetland along the Pleasant River is an active beaver flowage. It appears to be a good example of this type of wetland. Beaver flowages are, of course, common statewide. MNAP does not have comparative data on these communities throughout the state, to judge whether or not a particulr site is "exemplary", and thus this site remains as a lead.

25. Cold River Overlook
Beech-Birch-Maple Forest lead
(Fig. 9)

A "nice but not outstanding" northern hardwood forest dominated by sugar maple and beech. The beech range up to 54 cm dbh and are free of *Nectria* canker. Upslope, there is an increasing component of red spruce regeneration as well as a white pine supercanopy. There were no obvious signs of past harvest, but the proximity to the road and condition of the forest would make one suspect that this is not an untouched stand. It is given as a "lead" here to provide full information to WMNF on the merely good as well as outstanding sites.

61. Ridge W of Caribou Mountain
Mixed Hardwood-Conifer Forest lead
62. Flank N of Mud Brook
Spruce Slope Forest lead
63. Caribou Spring North
Subalpine Spruce-Fir Forest lead
Beech-Birch-Maple forest lead
64. Caribou Trail North
Subalpine Spruce-Fir Forest lead
Beech-Birch-Maple Forest lead
(Figs. 6 and 7)

(see field form for site 59, Caribou Mountain)

The leads for these communities come from J. Royte's 1990 reconnaissance for the first Ecological Reserves inventory. His field notes provide a map of sites of potential interest, with community names, but with no detailed inventory data for these communities.

65. Speckled Mountain
Acidic Summit lead
(Fig. 9)

The summit of Speckled Mountain is a typical acidic summit community with open ledges and pockets of dwarfed spruce, fir, and birch. The site is a popular hiking destination, and most of it has been degraded by foot traffic and other human use. A small pocket to the north of the summit proper is reported to be in good condition.

Acidic summits are a common community type in Maine. The heavy human use here suggests that this is not an exemplary occurrence, but until MNAP gathers more information on acidic summits in Maine, we cannot make a comparative judgement and thus maintain this site as a "lead" for now.

66. Butters Mountain
Beech-Birch-Maple Forest lead
(Fig. 8)

Butters Mountain is listed in McMahon and Holmes (1992) as a documented northern hardwoods site; however, we have been unable to find any documentation for this site, and thus retain it as a lead.

Wild River Quadrangle: Sites with Known Rare or Exemplary Natural Features

5. Carlton Notch
Hemlock Slope Forest 001
Beech-Birch-Maple forest lead
(Fig. 10)

This largely undisturbed forest occurs north of Carlton Notch, near the New Hampshire border and adjacent to the Gilead town line. Approximately 50 acres of Hemlock Slope Forest, on the north slope below the summit, is in natural condition, with some treefall gaps and dead and downed wood. The canopy is strongly dominated by hemlock, although with a notable component of smaller yellow birch. Ages of the larger hemlocks ranged from 107-150+ years. Tree diameters range up to 60 cm (24"), averaging 32 cm (13"). The understory is generally open, with small amounts of striped maple and balsam fir. The herb layer, typical of hemlock forests, is sparse and contains few species. While the trees are not the oldest of the know old-growth hemlock forests in Maine, the forest is certainly mature and appears to be operating as a primarily natural system.

The hemlock forest is bordered by a spruce slope forest uphill and along the crest, and a northern hardwood forest on the east flank (shown as unstippled polygons on the accompanying map). The spruce slope forest is probably undisturbed by humans due to difficulty of access. The northern hardwood forest (which we have as a "lead") is not outstanding compared to other hardwood forests known in WMNF, but it would be in time if left alone. Together, the three

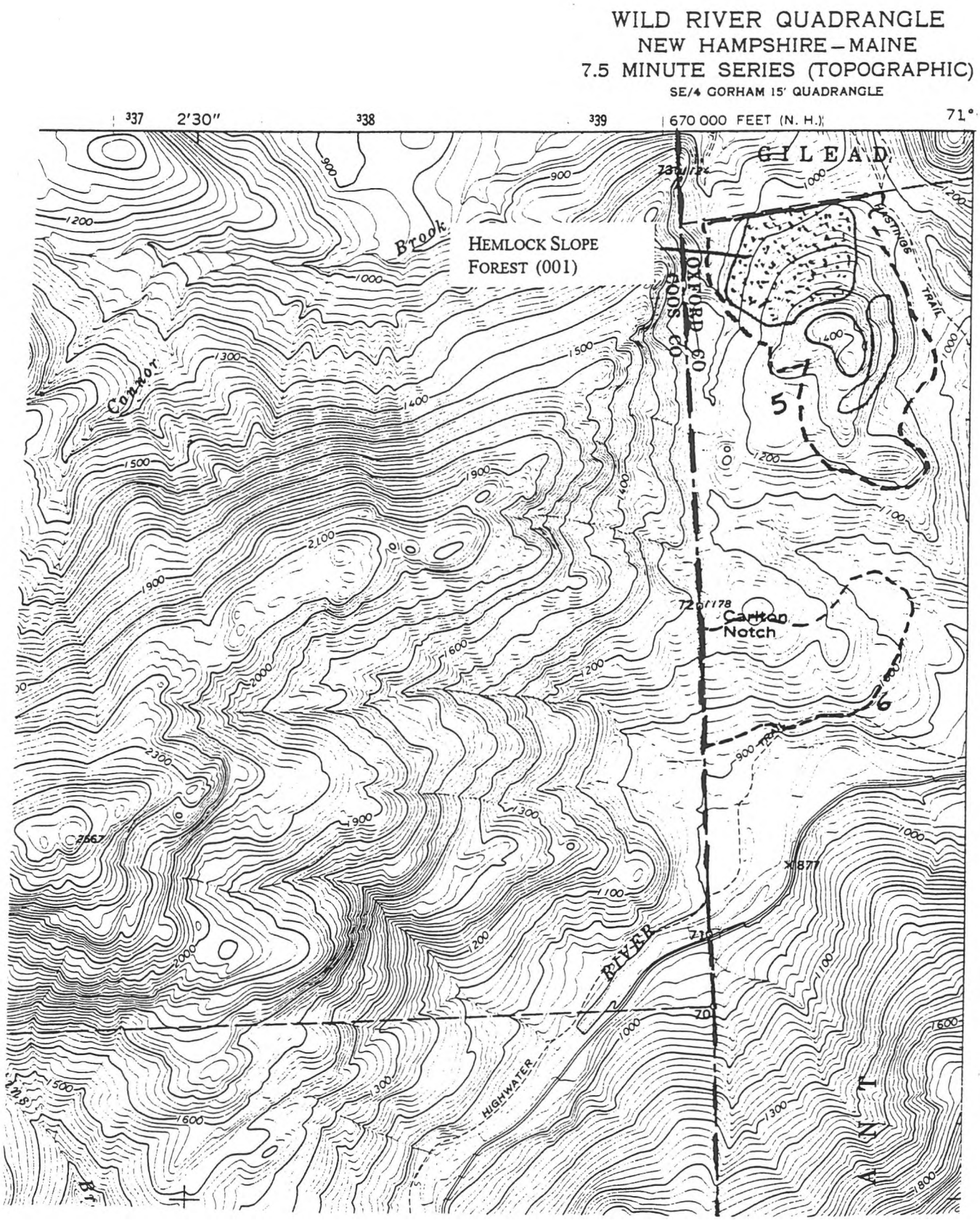

Figure 10. Sites on the Wild River quadrangle, northern portion.

forest communities convey a good example of variation in forest composition with slope and aspect on one hill.

7.2 East Royce Mountain (trail)
Subalpine Spruce-Fir Forest 013
(Fig. 11)

This area of old-growth red spruce within subalpine spruce-fir forest, on the south and west slopes of East Royce Mountain, extends across the Maine border into New Hampshire. A small portion (4 acres) was documented in the early 1980s, and a more recent survey indicates a more extensive area (54 acres). With the steep slopes and the relatively high elevation (about 2500'-3000'), the subalpine forest is subject to windthrow, and patches are opening up in the canopy as these natural processes continue. Several remnant patches of very old red spruce, 60-75' tall, are scattered through this regenerating red spruce and balsam fir. Cored trees ranged from 150-295 years old.

The area outlined on the accompanying map shows the known extent of the old-growth spruce area. As a subalpine forest community, the extent is probably greater. However, neither a landscape inventory to determine the extent of subalpine spruce-fir forest here, nor a quantitative inventory of the known old-growth area, have been done.

Gilead Quadrangle: Possibly Exemplary Sites (leads)

3.2 Wheeler Brook
Hemlock Slope Forest lead
(Fig. 12)

Hemlock in near pure stands, or mixed with balsam fir and red spruce, grow along the shores of Wheeler Brook. While the hardwood forest surrounding the hemlock gorge shows evidence of fairly recent harvests, the steep banks of the brook do not show recent disturbance. A more detailed inventory is necessary to fully describe this community and to enable comparison to other known Hemlock Slope Forests in Maine.

52. Peaked Hill
Beech-Birch-Maple Forest lead
Oak-Pine Forest lead
(Fig. 12)

Peaked Hill shows a characteristic transition from mesic northern hardwoods (Beech-Birch-Maple type) on the northern and eastern slopes to a xeric oak-pine forest on the summit. The summit forest has a partial canopy over thin soils or exposed granitic outcrops. Field survey has been limited to a reconnaissance in 1990, which identified these features but does not provide enough information to assess their quality or condition, nor to compare to other occurrences of these forest types.

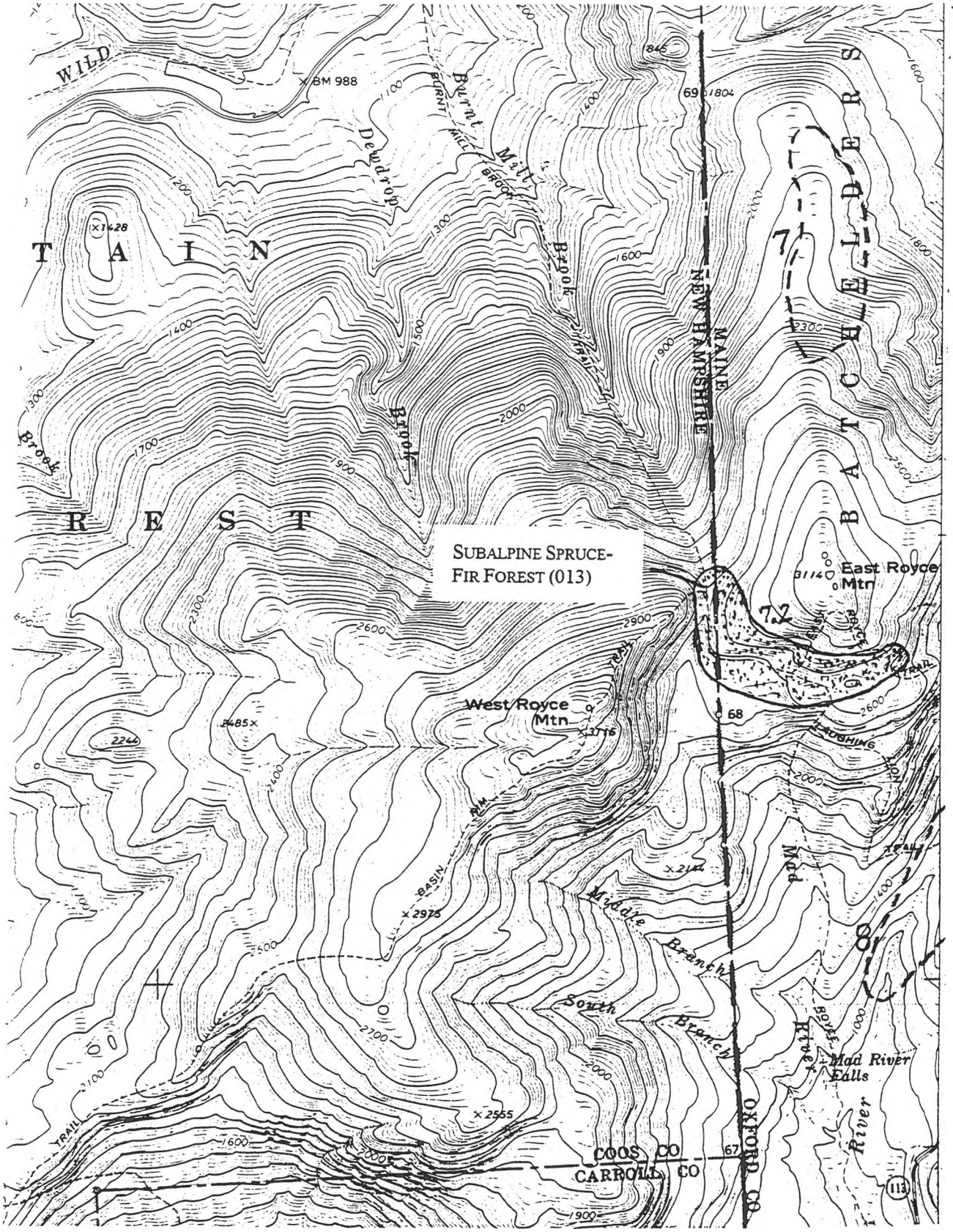

Figure 11. Sites from the Wild River quadrangle, middle portion.

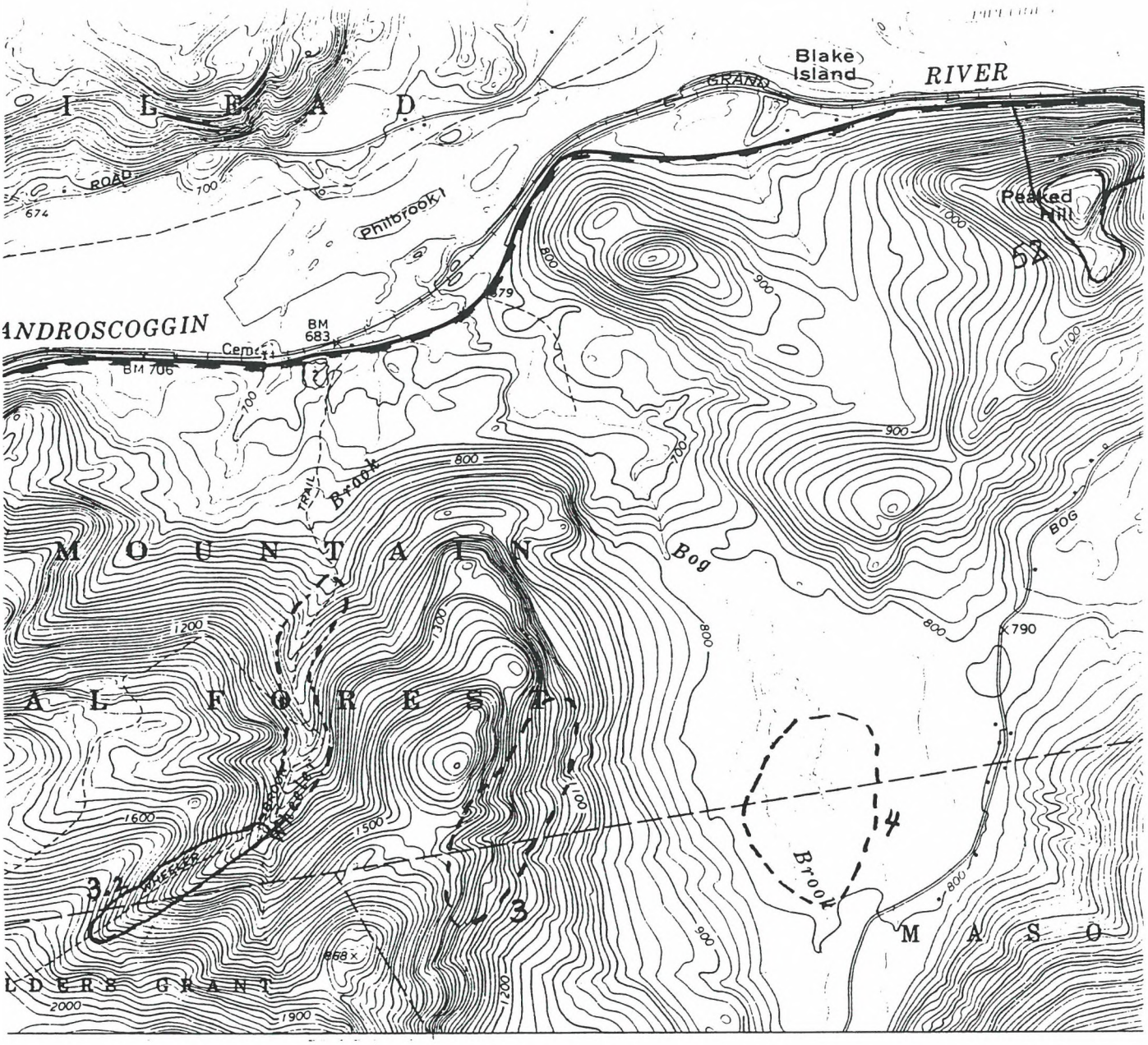

Figure 12. Sites on the Gilead quadrangle.

DISCUSSION AND RECOMMENDATIONS

Ensuring the maintenance of the biological integrity of any area such as WMNF requires inventories such as these followed by management decisions. Only the portions of the WMNF landscape found to be biologically outstanding or possibly outstanding in our inventories are described here. The next step would be designing on-the-ground protection areas or incorporating these areas into appropriate management zones. Ideally, this would be done from a landscape perspective, i.e., rather than looking at individual small sites, looking for areas which encompass various outstanding "pockets" in a matrix of more ordinary forest. This project does not encompass this step. However, the ecological reserves project currently being coordinated by the Maine Chapter of The Nature Conservancy will be looking at the potential for ecological reserves in WMNF and many other public lands and private conservation lands in the state. Thus, management decisions will probably want to consider both the site-specific recommendations contained in this report and whatever ecological reserves potential emerges from the TNC analysis.

Several sites within WMNF have been previously registered as Critical Areas under the former Critical Areas Program of the State Planning Office (now incorporated into the Maine Natural Areas Program). These sites, including parts of Miles Notch, Deer Hill, etc., are included in this report. However, it is important to note that the Critical Area designation does not mean that these sites are more important ecologically than other sites included in this report. The Critical Areas inventories focused on rare plant species, while this inventory focused on rare or exemplary natural communities (and discovered several rare plant areas in the process). The presence of rare or exemplary features at a site, rather than whether or not it is registered as a Critical Area, is the important consideration in deciding its future management.

A. Current Management Area Designations and Location of Rare or Exemplary Features

The majority of sites found to be ecologically outstanding or potentially outstanding ("leads") have already been designated by WMNF for management compatible with maintaining their natural character (Table 1, those areas in management areas 6.2 or 9.1).

Four sites with known rare or exemplary features and two sites with potentially exemplary features appear to straddle management units, where one part of the area is under 6.2 or 9.1 management and another part of the area under management 2.1 or 3.1, types which include or focus on timber harvest. These are:

site 42	Styles Mountain	Center Lovell quadrangle
site 60	Miles Notch	Speckled Mountain quadrangle
site 24	Stony Brook	Speckled Mountain quadrangle
site 62 (lead)	Flank north of Mud Brook	Speckled Mountain quadrangle
site 3.2 (lead)	Wheeler Brook	Gilead quadrangle
site 5	Carlton Notch	Wild River quadrangle

MNAP recommends that:

1. WMNF consider changing the management unit boundaries for the four known exemplary sites so that the whole site falls within the 6.2 or 9.1 management area.

2. WMNF delay any timber harvest of the two lead sites until the quality of these as exemplary natural communities can be assessed.

Five sites with known rare or exemplary features fall within areas designated as management 3.1, focusing on timber production. All five sites feature exemplary forest communities, and maintenance of these as exemplary natural forest communities is incompatible with timber harvest. These are:

site 35	Pattee Hill	E Stoneham quadrangle
site 39	Lombard Pond Hill	E Stoneham quadrangle
site 54	Square Dock Mountain	E Stoneham quadrangle
site 29	Isaiah Mountain	Speckled Mountain quadrangle
site 7.2	East Royce Mountain	Wild River quadrangle

MNAP recommends that:

3. WMNF consider placing these sites within management areas that do not include timber production (6.2, 8.1, 9.1), to focus on maintaining the natural qualities of these areas rather than their timber-producing quality.

Any changed management unit boundaries should incorporate the site itself as mapped plus an adequate buffer to minimize impacts from adjacent operations.

Two sites with potentially exemplary natural communities fall within areas designated as management 2.1, which balances visual quality and producing high-quality sawtimber and cordwood. These are:

site 10	The Roost	Speckled Mountain quadrangle
site 17	Mud Brook	Speckled Mountain quadrangle

Again, **MNAP recommends that:**

4. WMNF delay any timber harvest until the quality of these as exemplary natural communities can be assessed.

B. Management or monitoring needs of specific sites

Sites with rare or exemplary natural communities that are designated as no-harvest areas should require little or no management. Those that receive recreational use should be monitored to assure that such use does not degrade the site (either from sheer quantity of use or from off-trail effects). Moderate non-motorized recreational use should not conflict with maintaining the natural qualities of these sites, and can provide educational opportunities that yield their own benefits.

Monitoring sites with rare plant populations at least every three years would provide updated information on the status of these populations. Monitoring need not be extensive nor quantitative, but could consist of relocating the population, determining its size and areal extent, noting the percentage of plants in flower or fruit, etc. (MNAP's Special Plant Survey Form outlines the information needed.) In many cases, our information to date is spotty, and periodic monitoring would provide baseline information on population size and condition that could be useful in looking at trends or in identifying areas for further study. Several botanists or naturalists have volunteered in the past to monitor plant populations in WMNF, and it is possible that volunteers could be recruited to monitor certain populations on a regular basis. MNAP would be happy to provide WMNF staff or volunteers with Special Plant forms, and would appreciate receiving a copy of the completed information.

MNAP recommends that:

5. WMNF provide for monitoring of rare plant populations at least every three years, either by WMNF staff or by volunteers with the needed botanical skills who are familiar with MNAP's basic plant monitoring approach.

C. Further Inventories

The sites identified as "leads" in this report would be obvious priorities for future field work in WMNF. Most of these, however, are in areas already managed for natural values rather than for timber, and for these, the need for assessment is not pressing in terms of management decisions. Further fieldwork at any particular "lead" site would probably best be done in conjunction with other work on the particular forest type elsewhere in the state, since one of the limitations to assessing quality of some sites is the lack of comparative data. WMNF may wish to focus on those "lead" areas which are in management areas that include timber harvest:

site 10, The Roost, Oak-Beech Forest: needs more complete field survey and more comparative data;
site 17, Mud Brook, Hemlock Slope Forest: needs more complete field survey.
site 62, Flank N of Mud Brook, Spruce Slope Forest: needs more complete field survey.
site 3.2, Wheeler Brook, Hemlock Slope Forest: needs more complete field survey.

Although WMNF may not need additional detailed data on many of the "lead" sites for management purposes, they should be flagged as sites of possible interest to researchers or other people involved in increasing our understanding of Maine's forest habitats.

When is an inventory such as this "done"? An inventory for rare natural features in WMNF would only be "done" when all of the acreage had been surveyed on the ground by qualified personnel at appropriate times of the year. Thus an inventory of any sizeable holding is almost never truly completed. However, the work summarized here reflects good progress towards the goal of an "acceptably complete" inventory. Previous work in WMNF, and the landscape analysis and subsequent field visits, have likely identified all of the extensive forest areas representing relatively undisturbed natural forests. What remains to be found *de novo* are most likely smaller pockets of exemplary forest or rare plant habitat: a dozen or so acres of maple-

basswood-ash forest here and there, or a new occurrence for ginseng or Douglas's knotweed, for example. The forested habitats most likely to support rare plants in WMNF are the maple-basswood-ash forests, so more careful attention to those would be warranted prior to any harvest.

CONCLUSION

The Maine portion of WMNF contains some high-quality examples of the forest and non-forest communities typical of this part of the state. Many are of interest primarily as examples of natural communities, while others (particularly among the maple-basswood-ash forests) feature both exemplary natural communities and rare plant occurrences. A few sites are known to support rare plant species although the forest habitat does not constitute an exemplary natural community.

Straddling the Western Mountains and Southwest Interior biophysical regions of the state (McMahon 1990), WMNF exhibits a gradation from areas with somewhat southern affinity, such as Square Dock Mountain, to areas more northern or subalpine in character, such as East Royce Mountain. Even within a particular portion of WMNF, microclimate variation-- caused by differences in slope, aspect, and elevation, for example-- is well displayed by the transitions from conifer-dominated forests in the cooler sites to hardwood-dominated forests on the warmer sites. Differences in soils cause additional variation: from the sparse woodlands on bedrock hilltops to the well-developed forest canopies in the deeper soils at the base of slopes, for example. This large-scale and small-scale variation lends ecological diversity to WMNF, which is further influenced by past and present human use of the area. The inventories summarized in this report identified sites within WMNF that best represent that natural ecological diversity.

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APPENDIX A. Explanations of Ranks for Community Types and Plant Species

MAINE NATURAL AREAS PROGRAM

STATE RANKS (S-RANK)

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.

S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

S3 Rare in Maine (on the order of 20-100 occurrences).

S4 Apparently secure in Maine.

S5 Demonstrably secure in Maine.

SA Accidental in Maine, including species that only sporadically breed in Maine.

SE An exotic species established in Maine; may be native elsewhere in North America.

SH Occurred historically in Maine, and could be rediscovered; not known to have been extirpated.

SU Possibly in peril in Maine, but status uncertain; need more information.

SX Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).

S? Probably rare or historic in Maine, based on status elsewhere in New England, but not yet reviewed or documented by the Maine Natural Areas Program.

Note: "**S-RANKS**" are determined by the Maine Natural Areas Program.

"**G-RANKS**" indicate global ranks as determined by The Nature Conservancy, and follow the criteria listed above for state ranks. For example, "G1" means 1-5 occurrences and critically imperiled throughout its entire range.

APPENDIX B. Descriptions of Natural Community Types, with Cross-Reference to TNC Alliances.

Descriptions are taken from Gawler 1991 and Gawler et al. 1996. The cross-references to National Classification Alliances being developed by The Nature Conservancy are taken from the August 1996 version of the emerging classification (in-house draft, The Nature Conservancy, Eastern Regional Office, Boston). Only community types documented in this report are included, and are organized by forest types, woodland types, and open upland types. Names in parentheses are synonyms used in previous MNAP classifications.

FORESTS (more or less closed canopy)

Beech-Birch-Maple Forest (=Northern Hardwood Forest):
Beech, yellow birch, and sugar maple are dominant; extensive on ridges and hillslopes in central and northern Maine. Hemlock and spruce are common associates; in central Maine, red oak is a common associate. Striped maple is a common understory component. Shrubs are sparse. The herb layer varies, sometimes consisting almost entirely of sugar maple seedlings. Typical herb layer species include *Maianthemum canadense, Medeola virginiana, Dryopteris intermedia, Trientalis borealis, Uvularia sessilifolia, Mitchella repens, Streptopus roseus,* and *Huperzia lucidula.*
TNC Alliance: I.B.2.N.a.1. *Acer saccharum - Betula alleghaniensis - Fagus grandifolia* Forest

Maple-Basswood-Ash Forest (=Cove Forest, Enriched Sugar Maple Forest):
Northern hardwood forest on enriched soils with stronger dominance of sugar maple, and more basswood and ash than typical northern hardwoods. Mesic soils, often in talus pockets or at the base of small to mid-size hillslope cliffs where calcium-enriched colluvium has collected. Rich herbaceous flora with several species that are unusual or rare in Maine (e.g. *Panax quinquefolius, Dryopteris goldiana*). Herbaceous indicators include blue cohosh (*Caulophyllum thalictroides*), the sedge *Carex platyphylla*. Usually not extensive acreage, but embedded in northern hardwood forest.
TNC Alliance: I.B.2.N.a.2. *Acer saccharum - Fraxinus americana - Tilia americana* Forest

Hemlock Slope Forest:
Cool microsites within hardwood or mixed forests, often in stream gullies. Strongly dominated by hemlock; may be lesser amounts of other tree species, most commonly white pine or yellow birch. Few shrubs or herbs; typical herbaceous species include *Mitchella repens* and *Gaultheria procumbens*.
TNC Alliance: I.A.8.N.c.7. *Tsuga canadensis - Betula alleghaniensis* Forest

Oak-Beech Forest:
Hardwood forest dominated by red oak and beech. White pine is sporadic, as is sugar maple. Possible post-fire origin, needs more study. Soils are mesic and acidic. Shrubs are few.
TNC Alliance: unclear. I.B.2.N.a.5. *Quercus rubra - Acer saccharum* Forest?

Spruce Slope Forest:
Red spruce - dominated forests on mid- to upper-slopes, typically with well-drained soils. Balsam fir and white birch (*B. papyrifera* or *B. cordifolia*) are common associates. Exposure can limit growth. Rarely extensive, rather within a matrix of other types. Fire susceptible.
TNC Alliance: I.A.8.c.2. *Picea rubens - Abies balsamea* Forest

Subalpine Spruce-Fir Forest:
Conifer-dominated forests of high elevations, usually over 900 m. Found on level ridges and steep stony slopes. Two types are fairly distinct: those dominated almost entirely by balsam fir, and those with a large component of mountain ash and heart-leaved paper birch. Wind damage is common, and may result in a patchy shrub layer of young mountain ash and hobblebush. "Fir-wave" forests are a particular manifestation of this type.
TNC Alliance: I.A.8.N.c.2. *Picea rubens - Abies balsamea* Forest

<u>WOODLANDS (tree-dominated, canopy less than 65%)</u>

Oak-Pine Woodland:
Partially-forested knolls on thin, dry soils; much bedrock exposed. Widely spaced red oak and white or red pine, often stunted, dominate. Shrubs are mostly ericads, and graminoids such as *Carex lucorum* and *Deschampsia flexuosa* dominate the herb layer. Oak-pine woodlands occur where soil is insufficient to support a closed-canopy forest, though they often occur on hill summits above oak-pine forests on the lower slopes.
TNC Alliance: II.B.2.N.a.3. *Quercus rubra - Quercus prinus* Woodland

Red Pine Woodland:
Semi open (or rarely closed) forest dominated by red pine. On rocky soils and outcrops or dry glacial deposits like eskers. White pine is a common associate. Shrubs are ericads, and herbs are few.
TNC Alliance: II.a.4.N.a.3. *Pinus (banksiana, resinosa)* Woodland

Spruce Woodland:
Semi-open forest on thin acidic soils over rock, or on bare rock. Red and/or black spruce dominate. Heath shrubs are scattered in understory. Distribution and variants are not well known.
TNC Alliance: II.A.4.N.b.1. *Picea (rubens, mariana*) Woodland

<u>OPEN UPLANDS (non-forested)</u>

Acidic Summit (= Acidic Rocky Summit):
Bald ledges and summits of igneous or high-grade metamorphic rocks. Vegetation typically patchy, with few trees. Blueberry (*Vaccinium* spp.), bearberry (*Arctostaphylos uva-ursi*), lichens, and hairgrass (*Deschampsia flexuosa*) are characteristic. Xeric; many with fire evidence.
TNC Alliance: IV.B.2.N.a.1. Vaccinium (*angustifolium, myrtilloides, pallidum*) Dwarf-Shrubland
V.A.6.N.f.1. *Pinus strobus - Quercus (alba, rubra*) Wooded Herbaceous

Alpine Ridge:
Exposed, windswept mountain summits and tablelands with sparse vegetation; microsites support lichens, rushes, low-growing alpine shrubs or forbs, including many species rare in Maine. *Vaccinium uliginosum, Potentilla tridentata*, and *Juncus trifidus* are common species. In protected sites, *Carex bigelowii* may occur; in the most exposed sites, *Diapensia lapponica* is characteristic. Variations based on physiognomy create several sub-types.
TNC Alliances: IV.B.2.N.b.1. *Vaccinium uliginosum* Dwarf Shrubland
IV.B.2.N.c.1. *Diapensia lapponica* Dwarf Shrubland
V.A.5.N.g.1. *Carex bigelowii - Juncus trifidus* Herbaceous
V.A.5.N.h.1. *Scirpus cespitosus* Herbaceous

Krummholz:
Dense mass of conifer-dominated shrub-like trees above treeline. Thin cold soils and constant exposure to wind cause stunted and flagged growth. Balsam fir dominant, black spruce common, heart-leaved paper birch occasional. Trees usually < 1.5 m (5') tall.
TNC Alliance: III.A.3.N.a.1. *Picea mariana - Abies balsamea* Shrubland

APPENDIX C. Botanical Fact Sheets for Rare Plant Species

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

PDFUM04010

The Maine Natural Areas Program, within the Department of Conservation, is the most comprehensive source of information on Maine's rare or endangered plants, exemplary natural communities, and other features. For more information, including further details on this species, please contact the Maine Natural Areas Program, State House Station 93, Augusta, Maine, 04333; telephone (207) 287-8044.

Dicentra canadensis (Goldie) Walp.

Squirrel-corn

Family: Fumariaceae

Habitat: Rich woods

Range: Southwest Quebec to Minnesota, south to New England, North Carolina, and west to Missouri.

Phenology: Flowers in early spring along with hepatica, bloodroot, and dogtooth violet.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: The finely cut foliage and succulent stems of squirrel-corn are indistinguishable from Dutchman's breeches, *D. cucullaria*, but the flowers and tubers are different. The fragrant flowers of *D. canadensis* have very rounded, as opposed to pointed, lobes, and the shallow tubers look like yellow grains of corn; whereas *D. cucullaria* has clusters of smaller, pink corms.

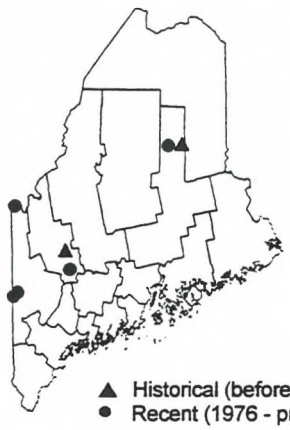
Ecological characteristics: Squirrel-corn grows in rich, moist woods, sometimes with soils derived from calcic rocks. It has been suggested in the literature that the seeds are ant-dispersed.

RARITY OF *Dicentra canadensis*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Dicentra canadensis*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 6 town(s) in the following county(ies): Franklin, Oxford, Penobscot.

Dates of documented observations are: 1881, 1882, 1980, 1991 (2), 1993 (2)

Reason(s) for rarity:
Unknown, scarcity of suitable habitat?

Additional comments:

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

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Dryopteris goldiana (Hook. ex Goldie) Gray

Goldie's Wood-fern

Family: Dryopteridaceae

Habitat: Rich mostly calcareous woods

Range: Southeastern Canada to the Carolinas; Tennessee, Iowa, and Minnesota.

Phenology: Fruiting bodies apparent in July - August, fronds evergreen.

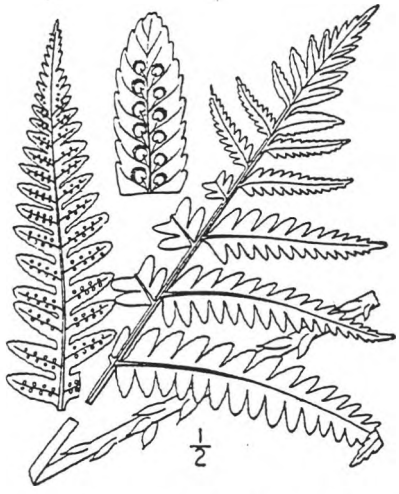


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Goldie's wood-fern has a short, creeping rhizome and large, evergreen fronds in a crown-like cluster 3-4 feet high. The bipinnate fronds are about 3/4 broad as long at the base, tapering quickly to a point. The stalk is covered with distinct shiny brown scales about 1 inches long.

Ecological characteristics: Unknown.

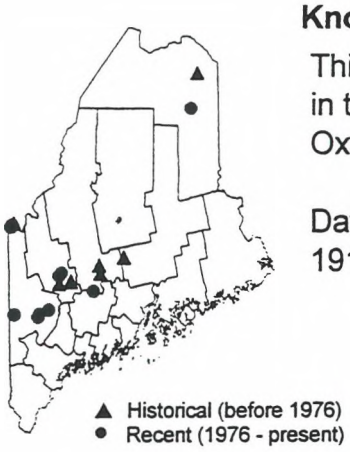
RARITY OF *Dryopteris goldiana*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
Global Rank:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

LEGAL STATUS OF *Dryopteris goldiana*

State Status: None — No State Legal Status.

Federal Status: None — No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 14 town(s) in the following county(ies): Aroostook, Franklin, Kennebec, Oxford, Penobscot, Somerset.

Dates of documented observations are: 1899 (2), 1904, 1907, 1910, 1941, 1975, 1989, 1990 (4), 1991 (2), 1992 (3), 1995

Reason(s) for rarity:
Habitat naturally scarce.

Additional comments:

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

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The Maine Natural Areas Program, within the Department of Conservation, is the most comprehensive source of information on Maine's rare or endangered plants, exemplary natural communities, and other features. For more information, including further details on this species, please contact the Maine Natural Areas Program, State House Station 93, Augusta, Maine, 04333; telephone (207) 287-8044.

Impatiens pallida Nutt.

Pale Jewel-weed

Family: Balsaminaceae

Habitat: Wet or springy places, often in shade and chiefly in calcareous areas

Range: Nova Scotia to Saskatchewan, Georgia and Kansas.

Phenology: Flowers July - September.

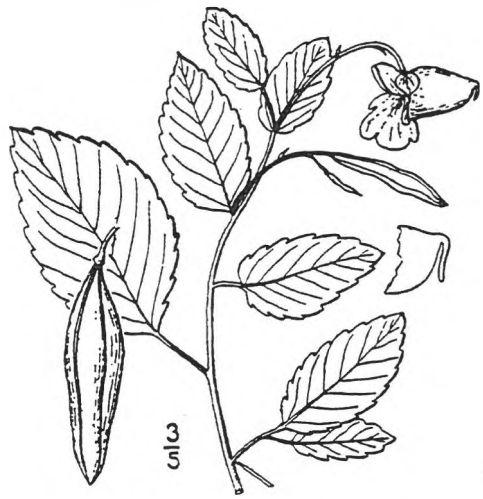


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Pale jewel-weed is a wildflower closely related to our common and ubiquitous touch-me-not or jewelweed (*I. capensis*). It is basically similar in appearance but differs in usually having the flowers canary yellow, rather than orange and in having the sac-like part of the flower slightly different in shape.

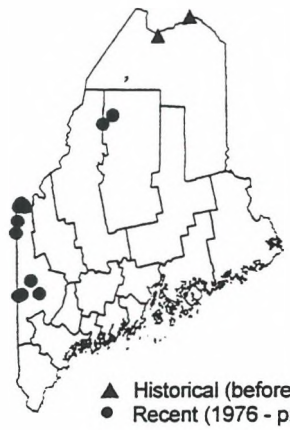
Ecological characteristics: While common touch-me-not is found in wet areas and in acid soil, pale touch-me-not is more exacting in its habitat, requiring wet woods of calcareous, or limy, areas.

RARITY OF *Impatiens pallida*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Impatiens pallida*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 13 town(s) in the following county(ies): Aroostook, Oxford, Piscataquis.

Dates of documented observations are: 1893, 1901, 1981, 1987, 1988 (3), 1989 (2), 1990, 1991 (4), 1993

Reason(s) for rarity:

Additional comments:

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

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Minuartia groenlandica (Retz.) Ostenf.

Mountain Sandwort

Family: Caryophyllaceae

Habitat: Granitic ledges and gravel

Range: Greenland and Labrador to northern New England, New York, along coast of Nova Scotia to eastern Maine.

Phenology: A perennial, flowers June - September, fruits July - October.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Mountain sandwort is a low-growing perennial with dense tufts of linear opposite leaves at the base. Its slender flowering stems with cymes of 1-30 white, five-petaled flowers rise 2-5 inches above the matted foliage. *Minuartia groenlandica* differs from *M. glabra*, which has been considered the southern variety of the same species, in having larger flowers and more densely tufted leafy basal shoots.

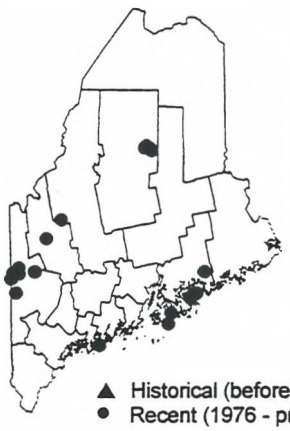
Ecological characteristics: Mountain sandwort most often grows on relatively dry wind-swept exposures of acidic rock or gravel. In such habitats it may be abundant, forming extensive mats where the irregularities of the rock substrate afford it a niche. While its occurrence in Greenland and Labrador and at elevations above 4000 feet in Maine indicate its tolerance for climatic extremes, it is probably restricted from less severe habitats by competition from other plants.

RARITY OF *Minuartia groenlandica*

State Rank:	S3	Rare in Maine.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Minuartia groenlandica*

State Status:	None	No State Legal Status.
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 18 town(s) in the following county(ies): Franklin, Hancock, Knox, Lincoln, Oxford, Piscataquis, Somerset.

Dates of documented observations are: 1976 (2), 1980 (3), 1981 (5), 1982, 1984 (4), 1985, 1986, 1988, 1990 (2), 1991 (2), 1992 (4), 1996

Reason(s) for rarity:
At southern limit of range, habitat somewhat restricted.

Additional comments:
Formerly known as *Arenaria groenlandica*.

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

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Osmorhiza berteroi Hook. & Arn.

Mountain Sweet-cicely

Family: Apiaceae

Habitat: Woodlands and clearings

Range: Newfoundland to Alaska, south to Nova Scotia, northern New England, and west to South Dakota and California; also Chile and Argentina.

Phenology: Flowers midsummer.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: A perennial herb with twice ternately compound leaves, the lower ones with petioles and the upper ones sessile to the stem. The small umbels of white flowers differ from the more common *O. claytonii* by their absence of subtending bracts (involucels).

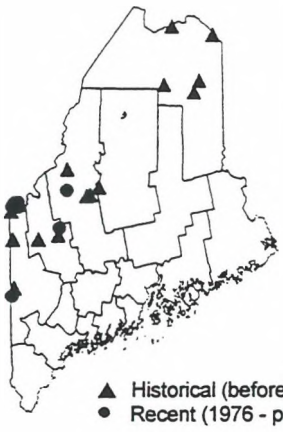
Ecological characteristics: Inhabits damp rich woods.

RARITY OF *Osmorhiza berteroi*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Osmorhiza berteroi*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 21 town(s) in the following county(ies): Aroostook, Franklin, Oxford, Piscataquis, Somerset.

Dates of documented observations are: 1897 (2), 1904, 1914, 1917, 1922, 1925, 1927 (2), 1941, 1945, 1946, 1962, 1974, 1988 (2), 1989, 1991 (7), 1993

Reason(s) for rarity:

At southern and eastern limits of range, more common in western part of range; may be more common than what is indicated by current information.

Additional comments:

Also known as *Osmorhiza chilensis*.

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

PDARA09010

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Panax quinquefolius L.

American Ginseng

Family: Araliaceae

Habitat: Rich, shady hardwood forests.

Range: Eastern North America, south to northern Florida and occasionally west to Manitoba. Primarily a species of the Appalachian hardwood forests.

Phenology: herbaceous perennial; flowers in June, fruits ripen in September.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Ginseng is a fleshy-rooted herb that grows about 25 cm high and bears several palmately compound leaves at the top of the stem. The five leaflets are elongate-oval in shape, with the lowermost two smaller than the upper three. The small, yellowish-green flowers are borne in an umbel on a short stalk above the leaves, and develop into bright red berries. Ginseng is most likely to be confused with its close relative, wild sarsaparilla (*Aralia nudicaulis*), which is present in almost any upland woods in Maine. Wild sarsaparilla also has five leaflets, but these are pinnately arranged, i.e., the lowest two are separated from the upper three.

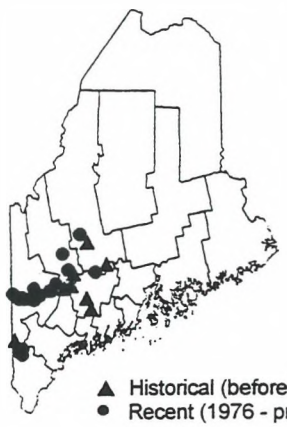
Ecological characteristics: Ginseng occurs in northern hardwood forests where the soils are locally enriched with nutrients. Sugar maple, yellow birch, and white ash are the most common tree associates; basswood often occurs and can be a good indicator species. Ginseng often occurs at the base of rock outcrops or hillslopes, where nutrient-rich colluvium has collected. Herbaceous plants often growing with ginseng include Goldie's Fern (*Dryopteris goldiana*), Silvery spleenwort (*Deparia acrostichoides*), and blue cohosh (*Caulophyllum thalictroides*). The plant does not spread vegetatively, and most known ginseng populations in Maine consist of fewer than a dozen plants.

RARITY OF *Panax quinquefolius*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
Global Rank:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

LEGAL STATUS OF *Panax quinquefolius*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 24 town(s) in the following county(ies): Androscoggin, Franklin, Kennebec, Oxford, Piscataquis, Somerset, York.

Dates of documented observations are: 1878, 1895, 1896, 1907, 1910, 1912, 1922, 1923, 1930, 1980, 1982, 1985 (4), 1986, 1988, 1989, 1990 (2), 1991 (2), 1992 (2), 1993 (3), 1995

Reason(s) for rarity:

Naturally rare because near the northern limit of its range, and and scarcity of suitable forest microhabitat. Several sites have declined or disappeared due either to harvesting the plants for their roots, or to heavy cutting of the forest habitat.

Additional comments:

Recent interest in ginseng as a cash crop may lead to woodland plantings of this species. All planted populations should be carefully documented so as not to be confused with native populations in the future. Natural Maine populations are not large or vigorous enough to sustain harvesting.

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

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Paronychia argyrocoma (Michx.) Nutt.

Silverling

Family: Caryophyllaceae

Habitat: Bare granitic slopes, mountain tops, or sandy river banks

Range: Maine, New Hampshire, near Newburyport, Massachusetts. Mountains of Georgia, Tennessee, to Virginia and West Virginia.

Phenology: Perennial; in Maine, flowers late June to July, seeds mature late summer.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Silverling is a low-growing, tufted plant; its linear leaves forming mats 4-15 cm across. The small, white flowers, clustered at the tops of stems, are almost hidden by the conspicuous silvery-hairy bracts that give the plant its common name. New England plants are distinguished from the typical species (that occurs in the mountains in the southeast) by their smooth, not silky-hairy, leaves and smaller flowers.

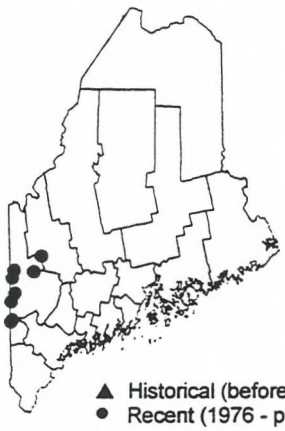
Ecological characteristics: *Paronychia argyrocoma* grows on ledges on bare gravel with little or no organic matter or soil, where few other vascular species venture except *Minuartia groenlandica*. Its habitat on exposed mountain tops is frequently traversed by hiking trails. Plants in such sites show evidence of damage by trampling and are also particularly subject to collecting. A single Massachusetts population has fluctuated from 196 colonies in 1945, to 56 in 1978, back to 104 colonies in 1980. The cause of this fluctuation is unknown. Many populations are extremely small, down to single individuals at a few sites, which increases its vulnerability.

RARITY OF *Paronychia argyrocoma*

State Rank:	S1S2	Critically imperiled in Maine because of rarity.
Global Rank:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

LEGAL STATUS OF *Paronychia argyrocoma*

State Status:	None	No State Legal Status.
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 8 town(s) in the following county(ies): Franklin, Oxford.

Dates of documented observations are: 1982, 1983, 1985, 1990 (2), 1992, 1994, 1996

Reason(s) for rarity:

The New England populations of silverling, when considered a rarity separate from the typical species, were considered as possible threatened species by the U.S. Fish & Wildlife Service. Further taxonomic review of the species seems to indicate that the northern populations are simply at one extreme of a clinal, geographic continuum of variation in the population and therefore should not be given a distinct taxonomic status. Since the southern populations are vigorous and thriving the species as a whole cannot be considered threatened. However, because of their disjunct location and extreme rarity within the region, Maine populations still merit consideration as rarities significant at the New England level.

Additional comments:

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

PDPGN0L0X0

The Maine Natural Areas Program, within the Department of Conservation, is the most comprehensive source of information on Maine's rare or endangered plants, exemplary natural communities, and other features. For more information, including further details on this species, please contact the Maine Natural Areas Program, State House Station 93, Augusta, Maine, 04333; telephone (207) 287-8044.

Polygonum douglasii Greene

Douglas' Knotweed

Family: Polygonaceae

Habitat: Rocky slopes and dry soil

Range: Northwest Territory and British Columbia to New Mexico, Nebraska and Oklahoma, east through Ontario and New York to Vermont.

Phenology: Flowers June - September.

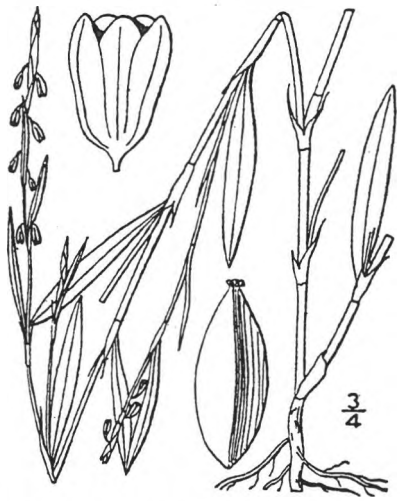


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Douglas' knotweed is a rather nondescript annual that stands 1-2 feet high, with stiffly upright stems and narrow, upward-pointing leaves approximately 1 inch long borne alternately on the stem. The small flowers are spaced well apart in a narrow, spike-like inflorescence at the end of the stem. Each flower is subtended by a leaf-like bract, and turns downward as it matures.

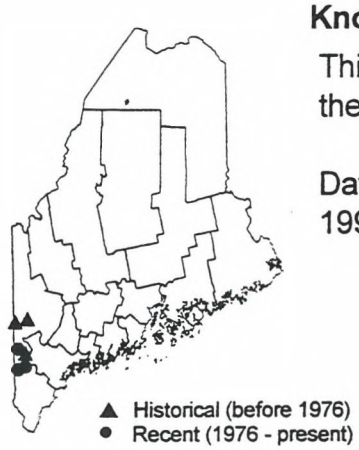
Ecological characteristics: Douglas' knotweed grows in exposed places (in Maine, on hillside ledges), often with very little other vegetation.

RARITY OF *Polygonum douglasii*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Polygonum douglasii*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 6 town(s) in the following county(ies): Oxford, York.

Dates of documented observations are: 1933, 1975, 1995 (3), 1996

Reason(s) for rarity:
Unknown.

Additional comments:

DEPARTMENT OF CONSERVATION

Maine Natural Areas Program

Rare Plant Fact Sheet

PMORC2F050

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Triphora trianthophora (Sw.) Rydb.

Nodding Pogonia

Family: Orchidaceae

Habitat: Northern Hardwood (beech-birch-maple) forests, usually dominated by beech (*Fagus grandifolia*), often in deep litter.

Range: Southern Maine south to northern Florida and west to Texas and the Lake States; uncommon throughout much of its range.

Phenology: Appears above ground in late July, flowers in August and early September.

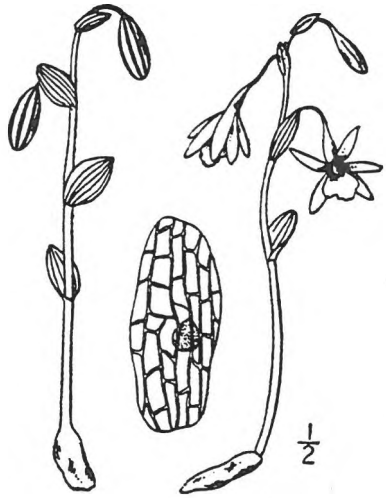


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Herbaceous perennial, stem 8 - 30 cm tall and bearing three (occasionally up to six) pale pink irregular flowers. The stems appear almost leafless, with several small, oval leaves clasping the slender stem.

Ecological characteristics: Nodding pogonia grows in moist hardwood forests. In Maine, it is associated with beech-birch-maple forests, usually where beech is a dominant species. It is frequently found in hillside depressions where mats of hardwood leaves have collected. Because it appears aboveground only sporadically, and flowers briefly before returning underground, the plant is frequently overlooked. Populations may fluctuate from hundreds of stems in one year to no stems in successive years.

RARITY OF *Triphora trianthophora*

State Rank:	S1S2	Critically imperiled in Maine because of rarity.
Global Rank:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

LEGAL STATUS OF *Triphora trianthophora*

State Status:	Threatened	Represented in Maine by two to four recent (within the last twenty years) documented occurrences, or federally listed as Threatened (some exceptions apply).
Federal Status:	None	No Federal Legal Status.

Known Distribution in Maine:

This species has been documented from a total of 5 town(s) in the following county(ies): Cumberland, Oxford, York.

Dates of documented observations are: 1975, 1989 (3), 1995 (3)

Reason(s) for rarity:

At northern limit of range. The irregular appearance of this plant above ground adds to its appearance of rarity.

Additional comments:

The other common name for Nodding Pogonia is Three Birds Orchid, referring to the (usually) three flowers it bears.

IF YOU KNOW OF LOCATIONS FOR THIS PLANT,
PLEASE CONTACT THE NATURAL AREAS PROGRAM.

DEPARTMENT OF CONSERVATION

Rare Plant Fact Sheet

Maine Natural Areas Program

PDVIO040A0

The Maine Natural Areas Program, within the Department of Conservation, is the most comprehensive source of information on Maine's rare or endangered plants, exemplary natural communities, and other features. For more information, including further details on this species, please contact the Maine Natural Areas Program, State House Station 93, Augusta, Maine, 04333; telephone (207) 287-8044.

Viola canadensis L.

Canada Violet

Family: Violaceae

Habitat: Deciduous woods, usually Northern Hardwoods type.

Range: Southwestern Quebec and Northeastern and North Central U.S., south to Pennsylvania and occasionally further south in the mountains.

Phenology: An herbaceous perennial; emerges in springtime, flowers late May or early June, remains above-ground and may produce cleistogamous flowers (flowers that self-fertilize in the bud and never open) and capsules through the summer.

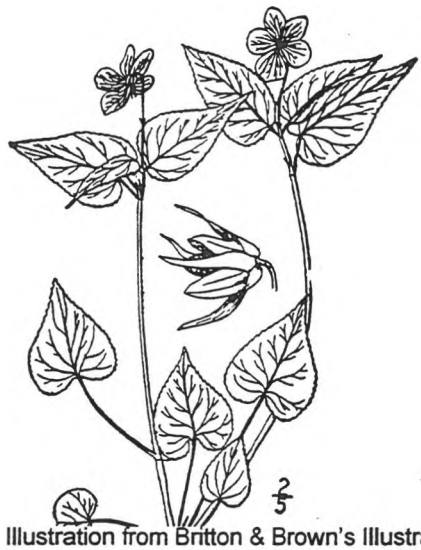


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Plants 20-30 cm tall, with white, five-petalled and irregular flowers and leaves (at least the lower) heart-shaped. This differs from most other violets in bearing leaves on upright stems with the flowers, rather than having the leaves all basal. The petals are sometimes tinged with violet on the backs, and often are yellowish at their base. Other white-flowered violets in Maine do not have erect, leafy stems.

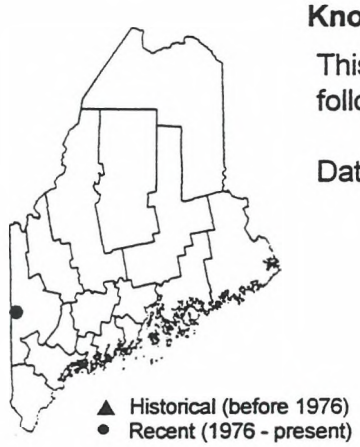
Ecological characteristics: Canada Violet is a species of Northern Hardwood Forests (beech-birch-maple or maple-basswood ash type), usually with sugar maple (*Acer saccharum*) as a dominant species. It tends to occur in moist soils that are not strongly acid.

RARITY OF *Viola canadensis*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

LEGAL STATUS OF *Viola canadensis*

State Status:	None	No State Legal Status.
Federal Status:	None	No Federal Legal Status.



Known Distribution in Maine:

This species has been documented from a total of 1 town(s) in the following county(ies): Oxford.

Dates of documented observations are: 1993

Reason(s) for rarity:
Disjunct from main portion of its range, which extends east only to the Vermont/New Hampshire border. Other reasons for rarity unclear, apparently suitable habitat exists in western and northern Maine.

Additional comments:
First discovered in Maine in 1993. Also called Canada Violet.