Natural Old-Growth Forest Stands in Maine and its Relevance to the Critical Areas Program

Maine State Planning Office

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Natural Old-Growth Forest Stands
in Maine
and its Relevance to the
Critical Areas Program

A report prepared by the Maine Critical Areas Program
of the State Planning Office
184 State Street
Station #38
Augusta, Maine 04333

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AUTHORSHIP

John Grena conducted the old-growth inventory from 1980 to July 1981. He undertook the initial interviews of foresters and visited stands in 1980 and 1981. He authored the descriptions of areas that he field checked. Further, he authored the report A Preliminary Report on Natural Old-Growth Forest Stands in Maine. Charlie Cogbill continued the inventory and field checked from October 1981 to September 1982. He authored the descriptions of areas that he field checked, as well as revised the introduction. From January 1983 to May 1983, Lissa Widoff organized, tabulated, mapped and edited the final report with assistance from Hank Tyler. Alec Giffen and Hank Tyler supervised the project and report preparation.

ABSTRACT

From 1980 to 1982 the Maine Critical Areas Program conducted statewide inventories to identify and document old-growth forests. Corporate, private and government foresters were interviewed for information. A definition of old-growth forests and selection criteria were developed (1. greater than 100 years old, 2. undisturbed, and 3. stand identity.) From the numerous leads, 104 stands were field checked, and 68 areas were found to meet the criteria and are recommended for evaluation as critical areas: hemlock (11), red spruce (18), white pine (14), red pine (7), cedar (1), red oak (3), and hardwoods (14). The size of the areas ranged from 1 acre to 240 acres, with most of the areas ranging from 5 to 50 acres.

Some of the stands attained ages of 250 to 325 years. Many of the stands were found in northern and mountainous areas of Maine. Additional work remains to complete the documentation of old-growth forests throughout Maine.
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorship</td>
<td>i</td>
</tr>
<tr>
<td>Abstract</td>
<td>i</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>ii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>v</td>
</tr>
<tr>
<td>List of Tables</td>
<td>v</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>v</td>
</tr>
<tr>
<td>Letter from the Maine Forest Service</td>
<td>vi</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>vii</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Why an old-growth inventory?</td>
<td>1</td>
</tr>
<tr>
<td>What is old-growth?</td>
<td>2</td>
</tr>
<tr>
<td>Where is old-growth</td>
<td>4</td>
</tr>
<tr>
<td>Inventory of old-growth by the Critical Areas Program</td>
<td>7</td>
</tr>
<tr>
<td>Hierarchy and Nomenclature used in Forest Classification</td>
<td>9</td>
</tr>
<tr>
<td>Classification Used in this Inventory</td>
<td>11</td>
</tr>
<tr>
<td>Main Criteria</td>
<td>13</td>
</tr>
<tr>
<td>Methodology</td>
<td>14</td>
</tr>
<tr>
<td>Locating Old-Growth Stands</td>
<td>20</td>
</tr>
<tr>
<td>Inventory Procedures</td>
<td>20</td>
</tr>
<tr>
<td>Instructions for Dyeing Increment Cores with Phloroglucinol</td>
<td>22</td>
</tr>
<tr>
<td>Descriptions of the Natural Old-Growth Forests of Maine</td>
<td>32</td>
</tr>
<tr>
<td>Hemlock Forests in Maine</td>
<td>33</td>
</tr>
<tr>
<td>Introduction</td>
<td>33</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>33</td>
</tr>
<tr>
<td>Descriptions of Hemlock Forests inventoried</td>
<td>37</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>White spruce Forest in Maine</td>
<td>57</td>
</tr>
<tr>
<td>Introduction</td>
<td>57</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>57</td>
</tr>
<tr>
<td>Descriptions of White Spruce Forests Inventoried</td>
<td>59</td>
</tr>
<tr>
<td>Red Spruce Forests in Maine</td>
<td>63</td>
</tr>
<tr>
<td>Introduction</td>
<td>63</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>63</td>
</tr>
<tr>
<td>Descriptions of Red Spruce Forests Inventoried</td>
<td>67</td>
</tr>
<tr>
<td>White Pine Forests in Maine</td>
<td>99</td>
</tr>
<tr>
<td>Introduction</td>
<td>99</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>99</td>
</tr>
<tr>
<td>Descriptions of White Pine Forests Inventoried</td>
<td>105</td>
</tr>
<tr>
<td>Red Pine Forests in Maine</td>
<td>133</td>
</tr>
<tr>
<td>Introduction</td>
<td>133</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>133</td>
</tr>
<tr>
<td>Descriptions of Red Pine Forests Inventoried</td>
<td>137</td>
</tr>
<tr>
<td>Cedar Forests in Maine</td>
<td>151</td>
</tr>
<tr>
<td>Introduction</td>
<td>151</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>151</td>
</tr>
<tr>
<td>Descriptions of Cedar Forests Inventoried</td>
<td>154</td>
</tr>
<tr>
<td>Oak Forests in Maine</td>
<td>159</td>
</tr>
<tr>
<td>Introduction</td>
<td>159</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>159</td>
</tr>
<tr>
<td>Descriptions of Oak Forests Inventoried</td>
<td>163</td>
</tr>
<tr>
<td>Hardwood Forests in Maine</td>
<td>171</td>
</tr>
<tr>
<td>Introduction</td>
<td>171</td>
</tr>
<tr>
<td>Inventory Results</td>
<td>171</td>
</tr>
<tr>
<td>Descriptions of Hardwood Forests Inventoried</td>
<td>175</td>
</tr>
<tr>
<td>Summary of Results</td>
<td>207</td>
</tr>
<tr>
<td>Discussion</td>
<td>217</td>
</tr>
<tr>
<td>Ranking System</td>
<td>223</td>
</tr>
<tr>
<td>Ranking System Score Sheet</td>
<td>227</td>
</tr>
<tr>
<td>Plans for Future Work</td>
<td>229</td>
</tr>
<tr>
<td>Action Plan and Recommendations</td>
<td>231</td>
</tr>
<tr>
<td>General Evaluation</td>
<td>237</td>
</tr>
<tr>
<td>Bibliography</td>
<td>243</td>
</tr>
<tr>
<td>Appendix - Maine Big Tree List</td>
<td>247</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1: Old-Growth Hemlock Stands Inventoried 35
Figure 2: Old-Growth White Spruce Stands Inventoried 58
Figure 3: Old-Growth Red Spruce Stands Inventoried 65
Figure 4: Old-Growth White Pine Stands Inventoried 101
Figure 5: Old-Growth White Pine Stands on the Register of Critical Areas 105
Figure 6: Old-Growth Red Pine Stands Inventoried 135
Figure 7: Old-Growth Cedar Stands Inventoried 152
Figure 8: Old-Growth Oak Stands Inventoried 161
Figure 9: Old-Growth Hardwood Stands Inventoried 173
Figure 10: Potential Natural Vegetation, from Kuchler (1964) 219
Figure 11: Major Forest Regions, from Lull (1968) 220
Figure 12: Natural Forest Vegetation Zones, from Society of American Foresters (1955) and Westveld et. al. (1956) 221
Figure 13: Natural Forest Vegetation Zones of New England, from Irland (1982) 222

LIST OF TABLES

Table 1: Old-Growth Hemlock Stands Inventoried 34
Table 2: Old-Growth White Spruce Stands Inventoried 57
Table 3: Old-Growth Red Spruce Stands Inventoried 64
Table 4: Old-Growth White Pine Stands Inventoried 100
Table 5: Old-Growth White Pine Stands on the Register of Critical Areas 102
Table 6: Old-Growth Red Pine Stands Inventoried 134
Table 7: Old-Growth Cedar Stands Inventoried 151
Table 8: Old-Growth Oak Stands Inventoried 160
Table 9: Old-Growth Hardwood Stands Inventoried 172
Table 10: Unchecked leads for Old-Growth Forests in Maine 211
Table 11: Areas Recommended for Evaluation as Old-Growth Forests 214

List of Photographs

Plate 1: Old-Growth Hemlock Stand - Waldoboro 36
Plate 2: Old-Growth Red Spruce - T13R11 66
Plate 3: Old-Growth White Pine Stand - Monmouth 104
Plate 4: Old-Growth Red Pine Stand - Bradstreet 135
Plate 5: Old-Growth Cedar Stand - T13R10 153
Plate 6: Old-Growth Oak Stand - Camden Hills State Park 162
Plate 7: Old-Growth Hardwood Stand 174

List of Abbreviations

avg. = average
max. = maximum
est. = estimated
d.b.h. = diameter at breast height

1694B
Dear Forest Landowners:

The State Planning Office has been given the responsibility by the Legislature of inventorying unusual or rare natural areas in Maine. One phase of their program is the search for old growth forested areas and the Planning Office has requested our assistance. Twenty-five areas have been registered because of the rare or old growth trees growing on them. Among these, for example, are areas containing massive Eastern White Pine to the diminutive Flowering Dogwood.

Here is a chance for us to learn more about the forest heritage that our State was founded upon. This program is non-regulatory and the protection or preservation of these areas is entirely dependent on its owner. But locating, cataloging and advising the owner of what they possess and its historical importance is the first step.

The Maine Forest Service heartily endorses this program and I urge you if you have any areas or stands that you feel would be of interest in this search to contact the State Planning Office in Augusta. Thank you for your support.

Very truly yours,

Kenneth G. Stratton, Director
MAINE FOREST SERVICE

/dmw
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David Rock

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Brady Scott
Elmer Bowden
Richard Davis

Ed Bowden
Otis Gray
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Lee Turner

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James Rea

Delbert Ramey
Fred Rooney
David Schiable

Dana Toothaker
Charles Cochran

Charles A. Bessey
Dan Glidden

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Philip Conkling
Robert Bradford
Richard Arsenault
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T. C. Tryon
John Brake
Robert Fiske
Joseph Lupsha
Robert Rochester
<table>
<thead>
<tr>
<th>Foresters (cont.)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>William Woodward</td>
<td>Melvin Ames</td>
<td>David Alerich</td>
</tr>
<tr>
<td>John Peters</td>
<td>Robert Dinneen</td>
<td>Earl McChesney</td>
</tr>
<tr>
<td>Eugene Putnam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Baxter State Park</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee Tibbs</td>
<td>Gerald Merry</td>
<td>Barry MacArthur</td>
</tr>
<tr>
<td>George Ruopp</td>
<td>Lester Kenway</td>
<td>Paul</td>
</tr>
<tr>
<td>William Krennerlich</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Great Northern Paper Company</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ray Goody</td>
<td>William Carpenter</td>
<td>Paul Miller</td>
</tr>
<tr>
<td>Lyman Feero</td>
<td>Joel Brown</td>
<td>Raymond Emery</td>
</tr>
<tr>
<td>Ed Catz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>International Paper Company</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Eubanks</td>
<td>Duane Nadeau</td>
<td>Al LeBrun</td>
</tr>
<tr>
<td>Russel Hovencamp</td>
<td>William Sylvester</td>
<td>Peter Provencher</td>
</tr>
<tr>
<td>William Turner</td>
<td>Shelley Risma</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diamond International Corporation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Linda Alverson</td>
<td>Bruce Brockway</td>
<td>Carroll Willette</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>St. Regis</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Cope</td>
<td>Robert Turner</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seven Islands</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed Meadows</td>
<td>Robert Vigue</td>
<td>Roger Green</td>
</tr>
<tr>
<td>Peter Volz</td>
<td>Morris Henderson</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pejepscot Paper Division</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Niles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Georgia Pacific Corporation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscar Selin</td>
<td>Richard Niles</td>
<td>Donald Duval</td>
</tr>
</tbody>
</table>

-viii-
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INTRODUCTION

This report on Natural Old-Growth Forest Stands in Maine covers four aspects of the Old-Growth Forest Inventory conducted by Maine's Critical Areas Program. The report:

1) defines old-growth stands;
2) develops a methodology for locating possible old-growth forests;
3) describes an inventory of sites as existing old-growth in Maine;
4) evaluates sites for further consideration as significant old-growth.

Why an old-growth inventory?

The Program's work with forest topics prior to 1980 brought to attention existence of several significant forest stands, a general lack of knowledge concerning the number and location of unusual stands, and an indication of their scientific and educational value. With the previous work, it was realized that stands that have developed over a long period of time, relatively undisturbed by man, possess certain values that are not easily replaced, and that natural stands merit consideration for protection.

The values of old-growth forest are more than aesthetic, although their beauty and historic significance are reasons enough for an effort to identify some examples. The few well-known sites of old-growth (mostly small remnants) have proven invaluable as a source of scientific reasearch and as an educational resource. They are literally our contact with our past. The few remaining stands have recorded a long history which is used to define the base-line conditions for a variety of scientific studies of changes on the earth, for example, man's influence through pollution. Old undisturbed trees in old-growth stands are primary material for the determination of past climate changes, wildfire frequency or insect outbreaks. These forests also maintain natural conditions, both disturbed and undisturbed, which allow plants and animals to interact in their original evolutionary setting. The nutrient cycles, energetics and development in old-growth is preserved for a comparison with other ecosystems. Genetic varieties of the whole spectrum of known and as yet unknown organisms maintain themselves in this setting. The search for insect resistant, rapidly growing, climate tolerant genetic stock have a reservoir of lines undergoing selection in their original condition. Additionally, species such as eagles, pine warblers, winter wrens, or wolverines become more abundant when utilizing the diverse, structurally complex and unique environment of old-growth stands.

Natural old-growth stands can be useful as a guide to better utilize managed areas found on similar sites. Lorimer (1980) found the patterns of disturbance in natural areas were "important considerations in shaping the policies of both wilderness and commercial forestland." This natural selection process he talks about results in a composition and age structure that is optimum for the site. Thus, an old growth stand, or a stand that can develop naturally into an old-growth stand can serve as a guide to manage stands of the same forest type.

Because old-growth stands have taken centuries to develop, they often contain a different assemblage of plants and animals (dependent organisms)
than some younger stands or managed areas. This becomes apparent in the
different vertical layers of vegetation that are conducive to the support of a
variety of birds and wildlife. Also the structure of old-growth with snags
and forest floor decay provide a diverse habitat.

A natural old-growth stand can also record past influences on an
ecosystem. For example, old-growth stands on Elephant, Traveler and Sugarloaf
Mountains were used in a dendrochronology study in 1979 by a researcher from
the University of Arizona's Laboratory of Tree-Ring Research. Laura Conkey,
now at Dartmouth College, Hanover, New Hampshire, took increment borings from
old-growth red spruce in these stands, attempting to analyze the past climate in North America through tree growth rings. While other factors in addition
to temperature and rainfall commonly limit tree growth in the Northeast, this
data will be useful in reconstructing climate for North America (Conkey, 1979)
and as red spruce biology. A similar study conducted by Columbia
University's dendroclimatologist Edward Cook, examined annual growth in tree
rings from specimens in six Maine old-growth stands identified in the present
inventory. His ongoing study will attempt to determine how the present
climate of the Northeast has changed in the past three centuries.

Natural old-growth stands maybe useful to compare species composition and
soil types in these stands with managed sites of the same soil type. Several
researchers in Maine (Struchtemeyer, Saviello, Ferwerda, 1981, H. Young,
personal communication) have indicated that these stands would be useful to
compare the climax forest composition and productivity differences between the
managed and natural site.

What is old-growth?

An old-growth forest is an abstraction dependent on one of several
theories about forest development. The concept and associated terminology is
familiar to most people, but the reality underlying the rhetoric is rarely
seen. The precious few known examples of old forests give an only limited and
preconceived image of actual conditions. In searching for new natural areas
we need objective criteria to identify the decreasing number of sites which
continue to support old-growth, as well as to assess their significance.

A Natural Old-Growth Forest should be a stand or group of trees with
consistent composition in a uniform environment. It must contain trees that
have been dominant in the stand for some time; and it must be in a natural a
condition as possible. The naturalness of the stand is clearly distinguished
between stands that are completely undisturbed and those which have had some
management or cutting performed in the past.

The definition of natural old-growth forest stands changed several times
during this inventory. Initially, sought were stands which met three
criteria: 1) Age - trees 150 years or older (later 100 years), 2) Species -
long-lived types, characteristic of climax forests, and 3) Naturalness - as
undisturbed as possible.

Without any precedent, and few unambiguous examples, a hard definition of
what constitutes old-growth continues to be an unresolved necessity. Not only
is the ultimate evaluation of a site dependent on these criteria, but the
sorting of site information for field checking and data collected must be
based on the essential characters of old-growth.
It cannot be overemphasized that tree size is not an indication of old age and aesthetically robust stands (e.g. white pine) are usually not old-growth. In reality, old-growth can fail to appear outwardly unusual as in many instances it is composed of small or short trees, anything but mature merchantable timber, and/or not visually pleasing to an observer. Only detailed documentation of a few subtle and overlooked criteria can confirm the condition. This does not include consideration of size, height, or impressive visual effect. Also, the rarity of most old-growth types makes casual discovery of these stands, using either forester's or layman's preceptions, highly improbable.

Four independent components contribute to the narrow traditional old-growth concept: 1) a long history without catastrophic disturbance giving aged trees; 2) influence of natural, not man-induced, conditions for the entire existence of the forest, including initiation; 3) a developmental process consistent with replacing of the present stand; 4) and singularly large trees or aesthetically robust structure to the forest. Criteria for identification of old-growth stands must account for the first three properties: age of origin, historic integrity, and developmental dynamics. The fourth component of impressive size, despite the common perception, is not an ecological condition necessarily indicative of old-growth forest.

A review of concepts associated with old-growth and regional examples described in associated terms (e.g. virgin, climax, overmature, primeval) leads to the following shared common characters of old-growth:

1) a coherent forest stand;
2) a long time without catastrophic disturbance;
3) influence of natural condition for its entire existence, including initiation; and
4) a structure consistent with replacement of the present stand (but not necessarily by the same species)

In turn, each of these four theoretical concepts has lead to four objective criteria necessary for old-growth:

1) minimum size homogenous area capable of continuously supporting a forest stand;
2) minimum percentage of the maximum longevity reachable by the dominant tree species;
3) undetectable influence of humans; and
4) evidence indicating the presence of a subsequent generation.

The first two criteria can be quantified, but it must be realized that the subjective separations are arbitrary on continuous measures and are relative to location. For sampling convenience and correspondence to concept of aging, a minimum size of 5 acres and a minimum percentage of 50% maximum age, respectively, are suggested and used in the present study. The other stand criteria are subjective and qualitative, but for the most part based on, easily observed, unambiguous properties. For most species in the region, 150 years is adequately old and about 50% of the 300-400 year maximum longevity observed in Maine.

The stand or group of stands must appear to be undisturbed by man, with the exception of very minor alterations which do not affect the composition or
structure. Such alterations would include the historic removal of a few old
trees, or the existence of a trail through the stand. Not acceptable are
stands bearing man's influence through initiation (e.g. old-fields), cutting
of one species (e.g. old pine or spruce selective logging), or affecting
seeding source (e.g. grazing or removal of downed wood). The effects of man
through pollution inputs or casual visits, although influential (and negating
the designation of virgin) are impossible to avoid in any Maine stand today.

These criteria define and separate old-growth from all other forests.
This is a condition of a forest and can occur with an infinite variety of
species compositions. Thus it cannot be recognized by species or its change
documented by compositional changes. Contrarily, with constant composition,
the old-growth character can develop. The condition is not eternal, despite
theoretical consideration, and can be disrupted at anytime.

However, there is no set schedule of development or "typical" condition
and our only reference points are the known longevity of the dominant species
and actual regional examples. These must be the basis for determining
old-growth and not the preconceived view of "well developed" forest or
predictions about a theoretically ideal forest.

Where is old-growth?

In New England there are about a dozen publicized, but understudied,
putative old-growth forests. The rarity of this community is more dramatic if
one realizes that these sites support forests of dramatically different
composition, from hardwood to high-elevation spruce. There are certainly more
unknown or unrecognized areas, but until now active identification has lacked
both a scientific characterization and more-than-casual search. Many extant
types of forest such as swamps or oak forest have no typical reference stand. A
long history of specific interest in cutting trees has removed virtually all
but an estimated few thousand acres of old forest in New England. Due to
their use as recording monitors of past environments, their preserving unusual
biological properties in a long-standing evolutionary setting, and not the
least their historic legacy, these areas are a critical piece of the natural
history of the region. They maintain the essential quality of a forest
community at the epitome of its natural state.

The following New England areas have been viewed as old-growth (sensu
latu) and generally, although lacking confirming data (cf. Foster 1982), are
taken as examples for comparison:

1) Great Gulf Wilderness, New Hampshire ca. 2,000 acres. A large area
immediately north of Mount Washington. It comprises a varied area
from northern hardwoods at the lower elevations (1700 feet) to
alpine meadows at higher elevations (5000 feet). Good stands of red
spruce are found along Adams Brook and northern hardwoods along the
Great Gulf Trail. The red spruce-fir forest has been somewhat
disturbed by natural disturbances and windthrow patches in old forest
exist at medium elevations (3500 feet+). Much of the subalpine area
is short undisturbed fir forest.

2) Camel's Hump, Vermont 1,000 acres. The upper western slopes (2800
feet) in the Camel's Hump State Forest support a relatively
undisturbed
subalpine forest. The dominant trees vary from red spruce mixed with birch at the lower elevation to stunted balsam fir at the highest level (3800 feet).

3) Norton Pool, New Hampshire 150 acres. A stand of red spruce and fir on the flat (2000 feet) near Second Connecticut Lake. The dominant large fir grows to nearly 2 feet in diameter and red spruce obtain heights of nearly 90 feet. The fairly wet site contains a lush covering of moss and boreal vascular plants.

4) Gibbs Brook, New Hampshire 1,875 acres. The east side of Crawford Notch contains undisturbed hemlock, spruce, yellow birch and balsam fir forests (cf. Foster 1982). Extending from 2000 to 4000 feet this is one of the best examples of natural altitudinal variation known. The forest is affected by blowdown, but contains very old (500 year old hemlock) and large (to 3 foot diameter spruce) trees.

5) Nancy Brook, New Hampshire 500 acres. This National Forest Scenic Area, southwest of Crawford Notch, contains the state's largest undisturbed forest. It has a grove of large red spruce slightly over 400 years old. The stand is on the side (2100-2800 feet) of a ravine, but also includes a spruce flat. It appears to have an old even-aged component which started after a fire.

6) Eagle Cliff, New Hampshire 100 acres. Located on the slope behind a steep cliff east of Franconia Notch. At about 2800 feet this small stand of slope spruce, with hemlock, is just above yellow birch and conifer-deciduous forest.

7) Cold River, Massachusetts 2,500 acres. On the side of the Cold River in the Savoy and Mohawk State Forests. Mixed stands of hemlock, spruce and hardwoods. The steep ravine along the Deerfield River contains old and large undisturbed spruce at the lower limit of its range.

8) Bowl Natural Area, New Hampshire 512 acres. This is the best known site for old-growth hardwoods. The whole west side of this mountain valley (1900-4000 feet) has not been disturbed. It contains beech, yellow birch and sugar maple forest below 3000 feet growing over 30 inches in diameter. At higher elevations red spruce and fir begin to dominate and form a contrasting composition with the same history.

9) Lord's Hill, Vermont 25 acres. This recently promoted site is on a hillside in the center of Marshfield, Vermont. It contains a hardwood forest of sugar maple, beech, yellow birch and others over 100 ft. tall and 40" in diameter. Ages supposedly exceed 400 years. There is a good mixture of conifer at this elevation (1600 feet) and northern location for northern hardwoods.

10) Battell Biological Preserve, Vermont 425 acres. On the mountain slopes (600-1110 feet) in Middlebury, containing a mixed forest. Much has been disturbed, but large hemlocks (2 1/2 feet diameter) occur in some ravines. A small area is probably undisturbed.

11) Granville Gulf, Vermont 5 acres. The steep slopes in Granville support a small, but impressive stand of hemlock and spruce. The ledgey slopes
have never been cut and contain a forest of dominant conifers mixed with hardwoods. The narrow ravine (1200 feet) has spruce and hemlock up to 20 inches in diameter.

12) Cathedral Woods, Connecticut 20 acres. This hillside south of Cornwall Village is a multi-aged stand of huge white pine and hemlock. The oldest trees are over 300 years old and younger trees have established in at least two other time periods. The overstory is nearly pure pine while hemlock forms secondary community which is replacing the falling pine.

13) Catlin Wood, Connecticut 17 acres. Located in the White Memorial Foundation in Litchfield is an example of original forests. The stand is mostly hemlock with a scattering of other species. It was affected by a windthrow disturbance about 150 years ago.

Prior to this inventory, the only information available on Maine's natural old-growth forests was a forester's recollection of a past timber cruise, or passing comments in a text or article. For example, the Maine Appalachian Trail Guide (1979) mentions a "dense primeval spruce forest" near Elephant Mountain in one of the trail descriptions; but no descriptive information is given. Similarly, although one can read numerous volumes filled with the history of Maine's lumbering (board food volumes, dams, working conditions), visit museums, or listen to foresters describe exemplary stands they have seen, these sources are diffuse and nowhere compiled to facilitate research. As David Smith, silviculture professor at the Yale School of Forestry stated at the Blaine House Conference on Forestry in 1981: "We have nothing to show as how good the original forests (in Maine) were." Whatever the condition, what is really missing from Maine's forest history are actual examples of the stands like those viewed (and utilized) by the early settlers of Maine.

Old-growth stands are rare in Maine if only a result of natural processes. Furthermore, 350 years of logging have exploited Maine's forests for specific tree species: oak for shipbuilding, hemlock for tannin, hardwoods for furniture, veener, or popsicle sticks, and spruce and fir for paper-making. These examples illustrate the complete use of this resource and why undisturbed stands are rare and difficult to locate. In addition, natural disturbances in the forest left few of these locations untouched for long periods. Today no one knows—or is willing to tell—of large tracts which would be considered old-growth.

Old-growth forests are not only rare but each stand is unique with a long individual history. This forest cannot be forced into extinction in a traditional sense, but a minimum of centuries of development are needed to replace (not replicate) a destroyed stand. Moreover, of necessity, the site must change with time and exact forest properties or appearance are different from one place to place and one time to another. Because of this variability and the inevitable dynamics, the few old-growth examples already known do not respond to typical preservation. However, unnatural disturbances have been absent from a variety of suitably large sites for long periods of time. These areas can now be monitored and appreciated as they naturally age. The critical aspect of old-growth forests is not their age, per se, but that they indicate the continuity of conditions which are easily disturbed and seldom allowed to develop.
The inventory of old-growth by the Critical Areas Program

The need for initiating a statewide inventory of natural old-growth stands in Maine grew as the complete lack of knowledge on their character and abundance became obvious. The existence of a few relic stands were known, and their scientific, educational, and aesthetic importance began to draw attention. The Critical Areas Program's work on forest topics began with the inventory of species which do not commonly occur in all sections of the State. Species such as shagbark hickory (Carya ovata), white oak (Quercus alba), pepperidge (Nyssa sylvatica) and sassafras (Sassafras albidium) were relatively rare and the subject of reports.

The consideration of forest stands as a topic for study continued with the Inventory of Old-Growth White Pine. In 1978, forester Phil Conkling completed an inventory and planning report on old-growth white pine in Maine. In his report, Conkling compiled 119 possible sites and recommended 11 of the 38 stands he field checked for critical area status.

Momentum on the old-growth topic continued as Conkling's work for the Program drew public interest. One person who became interested in the Critical Areas Program's work with old growth stands was George "Pete" Sawyer, a well respected forester from Ashland. Sawyer informed the Program about two, natural old-growth stands he knew about in Aroostook County: a red spruce stand in T13 R11 WELS, and a northern white cedar stand in T11 R10 WELS.

A directed search for old-growth started with a preliminary 18 month inventory conducted by John Grena. Emphasis centered on obtaining information on the location of stands. Over 600 individuals and 36 corporations or organizations dealing with Maine's forest land were contacted. Over 15 specific meetings were made with forest management or timberland owning corporations to seek leads of areas on their land. With rare exception, despite expressed interest in locating significant sites through this means, there was little active help forthcoming. In most cases there is a strong passive resistance by forest companies to be informative about the nature of their holdings. Without quality information, and its comprehensive compilation, any inventory of Maine's forests is necessarily incomplete.

Contact with the general public through newspaper and newsletter articles, and public presentations, produced many possibilities. These leads in general concerned trees or highly disturbed areas with large trees, not forest stands. Although individuals provided most of the leads, in general, their information was of variable usefulness due to the common impression that old-growth is equivalent with big trees. The best information was from knowledgeable foresters. Despite some misconception about what old-growth might encompass, the sites recommended by these individuals led to the most qualified areas. Unfortunately, it is virtually impossible to determine the status of a stand without an on the ground field trip and collection of appropriate observations on composition and history. Thus the primary occupation in this study was field checking the leads generated and sampling those which might fit the concept of old-growth forest. Overall, less than one-fifth of actual leads generated by all methods produced sites eventually given even serious consideration as old-growth under the stated criteria.

In addition, much thinking was done on how to make this survey as comprehensive as possible. Everything from airphoto coverage to random
sampling of geographic districts was considered. However, the obscure nature
of old-growth and its infinite variety makes most methods impossible to apply.
Unfortunately, without specific identification (e.g. old-time forester
knowledge) coupled with appropriate on-site observations, old-growth cannot be
identified.

The frequency of old-growth is somewhere between non-existent (oak forest)
and scattered (montane red spruce forest). The exact amount and locations
will remain hidden until a more productive quantitative methodology can be
developed. On a state scale an intensive wide-based survey of this general
type is prohibitive (and impossible without active support by all timberland
corporations). What this study does produce is a series of representative
stands of assessed requisite quality on which future work can be based.
Toward this end, intensive quantitative documentation of stand composition and
condition is essential.

The only way to determine the significance of a specific area is an
on-site determination of the essential characteristics. When visiting a stand
the necessary information collected and recorded consists of composition,
size, and age of the stand, nature of the site, and history of the area. The
age was determined from the oldest cohort in the stand based on tree-ring
analysis. This history is determined from increment borings taken from
representative trees in the stand, and a detailed perusal of the forest floor.

Although this particular study was concerned primarily with coherent
forest stands, and not single large trees, it is worthwhile to note that the
Maine Forest Service maintains a list of the largest individual trees found in
the state. This "Big Tree List" can be found in the Appendix, and is
published in Forest Trees of Maine available for $1.00 from the Maine Forest
Service, State House Station #22, Augusta, Maine 04333.
HEIRARCHY AND NOMENCLATURE USED IN FOREST CLASSIFICATION

A review of basic forest ecology terminology will facilitate the reader's understanding of the terminology used to describe the old-growth stands described in the inventory. The terms Forest Region, Forest Type, and Forest Stand are of particular importance.

Forest Regions or Formations: A forest refers to a large expanse of tree growth. A forest region or formation separates the forests of a country or state into areas of nearly uniform climatic and vegetation characteristics (Spurr and Barnes, 1973).

The term forest region is most often used by foresters, while formation is used by ecologists. Both represent the largest and most comprehensive division used in the classification of forestland. Some of the forest regions or formations in the east include: Boreal, Spruce-fir, Eastern Deciduous, Northern hardwood, and Central hardwood. Nichols (1935) has classified a section from Minnesota to Pennsylvania, up to Maine including a belt of Canada above Maine as the Hemlock-White Pine-Northern Hardwood Forest. This region would actually encompass the 5 regions listed above.

Forest Types or Associations: The next division within a forest region or formation is a forest type or association. Forest types are distinct community names for the predominant tree species found in the overstory. The term association is used by ecologists and includes the lesser plants, or the site characteristics along with the predominant tree species (Spurr and Barnes, 1973).

Both of these may overlap with the nomenclature used for forest regions. For example, some authors (Lull, 1968) refer to a beech-birch-maple forest region, which can also be termed a forest type (Eyre, 1980). Also, the northern hardwood forest region can be a forest type, for beech-birch-maple are the species that characterize and define northern hardwoods (Harlow and Harrar, 1969). Discussion over the semantics classifying forest lands is not worth the effort. What is important to remember is: first, a forest type is contained within a forest region; and second, in naming a region such as spruce-fir, one will find other forest types as well as a spruce-fir type within that region.

Old-growth stands will be of the subclimax or climax types. Certain species are considered characteristic of climax types. It is important to remember that this depends on the location. A species considered characteristic of a climax can also be found in a seral stand (Whittaker, 1953).

The following table of Society of American Foresters (SAF) cover types are considered to potentially contain an old-growth component, e.g., long-lived species (Eyre, 1980).
<table>
<thead>
<tr>
<th>SAF Type</th>
<th>No.</th>
<th>SAF Type</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balsam fir</td>
<td>5</td>
<td>Red spruce</td>
<td>32</td>
</tr>
<tr>
<td>Red spruce-balsam fir</td>
<td>33</td>
<td>Red spruce-yellow birch</td>
<td>30</td>
</tr>
<tr>
<td>Red spruce-sugar maple-beech</td>
<td>31</td>
<td>Northern White-cedar</td>
<td>37</td>
</tr>
<tr>
<td>Red pine</td>
<td>15</td>
<td>Eastern white pine</td>
<td>21</td>
</tr>
<tr>
<td>White pine-hemlock</td>
<td>22</td>
<td>Sugar maple-beech-yellow birch</td>
<td>25</td>
</tr>
<tr>
<td>Beech-sugar maple</td>
<td>60</td>
<td>Northern red oak</td>
<td>55</td>
</tr>
<tr>
<td>White pine-northern red-oak-maple</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Forest stands: The smallest unit used to classify forest land is the stand. It is usually used to delineate areas ten or more acres in size and is the division most used for management purposes. A stand is defined as a contiguous group of trees, sufficiently uniform in species, composition, arrangement of age classes, and condition, to be a homogeneous and distinguishable unit (Smith, 1962).

When identifying a stand, foresters incorporate an abbreviated system that provides information on composition, constitution (age structure), and canopy density (condition), as given in Smith's definition of stand. Composition is named for the dominant species in the overstory and may contain or list the associated species found in the stand; age structure is determined for the relative age distribution or age classes; and condition of the stand refers to 1) the canopy density (the collection of all the crowns of all trees) or 2) the density of stocking by number of trees or basal area (area of the cross-section of the trunks at breast height), or 3) the height of the stand.

Age classes are usually divided into 10 year intervals, such as the 20-30 year age class, 30-40 year age class, and so on. Regeneration is not considered as an age class. The constitution, then is the name given to describe the age structure of the stand: Uneven aged, two-aged, and even-aged stands.

Uneven-aged stands contain three or more age classes: e.g. 20-30 years, 80-90 years, and 150 and over. A two-aged stand is a type of uneven aged stand containing only two age classes, illustrated by an overstory and understory or different-sized trees which indicate that each stand originated at different times. An uneven-aged stand represents a forest community that originated at or near the same time.

Thus, the naming or typing of the stand will contain 3 elements: composition, constitution, and condition. An example of this would be MHE80, which would represent a stand of mixed hardwood, even-aged, with a 80% crown closure.
CLASSIFICATION USED IN THIS INVENTORY

No such abbreviated classification system was used in this inventory. The lack of information or previous work with old-growth in Maine created uncertainty as to what would be found, and this precluded the need to establish a classification or typing system. Because the Inventory focused on stands of old-growth, the three elements (composition, age structure, and condition) used by Smith to define a stand were also the key element in naming and describing natural old growth forest stands.

Composition: Each stand was named for the predominant overstory tree species. This was determined through ocular computation of the species comprising the majority of the stocking. Stands comprised of 80 percent or more of one species were considered pure, while those species occupying 50 percent or more of the composition were considered to comprise a majority of stand. (Eyre, 1980; Kingsley, 1972).

The old-growth specimens were not necessarily predominant in the stand. Often, the old-growth component grew in association within the stand. Trees growing in association do not comprise a majority of the stand, but are found throughout the stand. An example of this is old-growth white pine growing in association within a spruce-fir stand or a northern hardwood stand. The spruce-fir or the hardwoods comprise the majority of the composition, while the white pine represents the associated species.

Age Structure: Determining age structure had two parts: 1) the constitution, and 2) oldest age class of the stand. The constitution was determined through visual inspection of the trees' height, diameter, and the disturbance in the stand. In some cases, increment borings were necessary to determine whether the stand was even-aged or uneven-aged. For example, some apparent even-aged stands were actually uneven-aged. The reason for this as Smith (1962) states, is that the irregularities in height of uneven-aged stands "gradually smooth out do to the decreased growth in height in very old uneven-aged stands." Contrastingly, trees in even-aged stands are fairly uniform in height, but may be highly irregular in diameter.

Secondly, the oldest age class of the stand was determined by extracting increment cores from trees in the largest diameter class of the stand. It was assumed that the ages obtained would be representative of the other trees in the stand in that diameter class. The oldest age class was used to compare a stand with others.

Condition: The condition of the stand was written into the description. This included stand height, height of the live crown, and if easily determinable, the percentage of each species comprising the majority of the stand.

In naming the old-growth area, the old growth species in the stand and the location were used. The forest type of the stand was determined from the species comprising the majority of the stand and was named using the SAF types (Eyre, 1980).
With this system, the stand was not always named for the old-growth trees within it. For example, a spruce-fir thicket containing old-growth white pine growing in association was termed a spruce-fir stand in the description because these two species were in majority. The title given to the area, however, contained the location and the old growth component, white pine.
MAIN CRITERIA

The following three criterion determine which stands qualify as a natural old-growth stands. Stands that meet all of the criteria are further evaluated by a ranking system that awards points in ten categories.

I. **Age:**

   a) First, the stand must contain a significant number of trees that are 100 years or older. Overstory trees with diameters well represented in the stand were cored under the assumption that the ages obtained would be approximately the same among trees with a similar diameter.

   b) Secondly, the stand or stands must contain long-lived species characteristic of a subclimax or climax forest. Species may include, but are not limited to, those listed below with their maximum life expectancy:

<table>
<thead>
<tr>
<th>Species</th>
<th>Maximum Life Expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>black spruce</td>
<td>250</td>
</tr>
<tr>
<td>red pine</td>
<td>350</td>
</tr>
<tr>
<td>white pine</td>
<td>450</td>
</tr>
<tr>
<td>hemlock</td>
<td>600</td>
</tr>
<tr>
<td>sugar maple</td>
<td>300</td>
</tr>
<tr>
<td>northern red oak</td>
<td>200</td>
</tr>
<tr>
<td>beech</td>
<td>350</td>
</tr>
<tr>
<td>red spruce</td>
<td>400</td>
</tr>
<tr>
<td>white spruce</td>
<td>250</td>
</tr>
<tr>
<td>northern white-cedar</td>
<td>400</td>
</tr>
<tr>
<td>pitch pine</td>
<td>200</td>
</tr>
</tbody>
</table>

II. **Stand Identity:**

   The old-growth component must be a stand, a group of stands, or be growing in association within a stand. A stand is defined as a "contiguous group of trees sufficiently uniform in species composition, arrangements of age classes, and condition to be a homogeneous and distinguishable unit" (Smith, 1962).

III. **Naturalness:**

   The stand or group of stands must appear to be undisturbed by man, with the exception that very minor alterations to the stand may be acceptable. Such alterations would include, the removal of a few trees per acre, the construction of a road through the stand without completely disrupting the continuity, or the existance of a trail through the stand.
METHODOLOGY

The first 18 months of the inventory were divided into three parts. Emphasis during the first part centered on obtaining information on the location of old-growth stands. As many people familiar with Maine's forestland were contacted to obtain leads on these areas. A description of this part of the inventory is found in this section. The second part was the actual data collection, described in the section entitled Inventory Procedures. The third part was the compilation and analysis of the data into this report.

During the first two months of the inventory, January and February of 1980, a work packet explaining the Critical Areas Program and the Old-Growth Inventory was put together (Grena, 1980). This packet contained the inventory criteria for old-growth stands, a preliminary data form that the reader could return, and register entries of three forest areas. The packet was created to initiate the inventory and request information on the location of old-growth forests.

After the packet was completed, nine avenues of obtaining leads on old-growth areas were followed:

1. The first approach was a series of meetings with the state foresters and large land-holding companies. Prior to each meeting, a work packet and Critical Areas brochures were mailed to the chief forester in the woodland division. At the meeting, slides of several critical areas, especially the forest-related areas were shown. The purpose of these meetings was to familiarize the forestry community with the Critical Areas Program and to ask for information on the location of old-growth stands. A sample of the Old Growth Forest Inventory Preliminary Data Form is found on page 18.

Below is a list of meetings held with companies and foresters:

1980
Maine Forest Service - Southern Region (February 6, at Sebago Lake)
Maine Forest Service - Eastern-Western Region (February 12, in Old Town)
Diamond International Corp. (February 12, in Old Town)
Prentiss and Carlisle (March 6, in Bangor)
Seven Islands (March 12, in Bangor)
Great Northern Paper Company (March 18, in Millinocket)
St. Regis (March 21, in Bucksport)
Georgia Pacific (April 15, in Woodland)
James Sewall Co. (April 24, in Old Town)
International Paper Company (May 6, in Augusta)
Boise Cascade (June 27, in Rumford)

1981
S. D. Warren (May 1, 1981 in Westbrook)

2. During the same period, work packets were mailed to other companies, agencies, managers and landowners. The following lists those that received a work packet:
Registered consultant foresters (50)
Maine Forest Service - Northern Region foresters (8)
Dead River Co.
Brown Paper Co.
Scott Paper Co.
Pejepscot Paper Co.
Chadbourne Lumber Co.
Sherman Lumber Co.
Timberlands Co.
J.M. Huber Co.
Webber Timberlands
Raymigda Co.
C.F. Eaton
Maine Timber Holdings, LTD.
Irving Pulp and Paper Co.
John Pierce
Coburn Land Trust
D'auteuil Lumber Co.
Arthur R. Elathal

District Ranger, White Mountain National Forest
Lowell White, Superintendent, Acadia National Park
Robert Cummings, Gannet Publications
Lloyd Irland, Director, Bureau of Public Lands
Leigh Hoar, Bureau of Public Lands
Herbert Hartman, Bureau of Parks and Recreation, Director
Lee Tibbs, Baxter State Park Director
John Peters, U.S. Forest Service, Broomall, Penn.
Terry McGovern, Department of Environmental Protection
Austin Wilkins
Fred Holt
William Parker, Eastland Reality
Gary Boyle, CMP
David Alerich, U.S. Forest Service, East Corinth
Paul Adamus, Center for Natural Areas

Soil and Water Conservation Districts (16)
District and Regional Rangers, Maine Forest Service (22)

University of Maine, Forestry Department:

Dr. Fred B. Knight    Dr. Robert Shepard
Dr. Ralph Griffin     Ken Hendren
Dr. Max McCormick     Dr. Richard Campana
Dr. David Canavera    Roger Taylor
Charles Williams      Gordon Mott, U.S.F.S.
David Field
Dr. Richard Jagels

Organizations:

Small Woodlot Owner's Association of Maine (SWOAM)
Natural Resources Council
3. During April of 1980, a questionnaire explaining the Inventory was mailed to those listed below. The questionnaire, Inventory of Old-Growth Forests in Maine for the Critical Areas Program, (page ), served as a self-addressed postage paid mailer.

<table>
<thead>
<tr>
<th>Inland Fish and Wildlife Wardens</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retired Wardens</td>
<td>93</td>
</tr>
<tr>
<td>Registered Maine Professional Guides</td>
<td>13</td>
</tr>
<tr>
<td>Sportsman Associations, Fish and Game Clubs</td>
<td>168</td>
</tr>
</tbody>
</table>

4. In addition to the questionnaire, a data sheet was distributed to the members of the U.S. Forest Service Resource Evaluation Team for their use while conducting the resurvey in northern Maine. A slide show and talk explaining the criteria for old-growth and the data form was given to the team on May 7, 1980 at the University of Maine at Orono. A sample of the Old-Growth Forest Data Form appears on page 19.

5. Articles on the Old-Growth Forest Inventory were submitted to the following newspapers and newsletter:

- The Nature Conservancy - Maine Chapter News (printed April, 1980)
- State Planning Office's Coastal Mailing List (55)
- Maine Times (printed April, 1980)
- Natural Resources Council of Maine
- Maine Forest Review (pending)

6. Two slide shows and talks were held to publicize the inventory:

- A presentation at the annual meeting of the State Biologist's Association in Freeport on May 31, 1980.

- A hike and discussion with the Norway Nature Club at the Ordway Grove on July 28, 1980.

7. The author was interviewed in May 1980 on public radio to discuss the goals and objectives of the Old-Growth Forest Inventory.

- In addition, Public Service Announcements (PSA) were made on the public radio network throughout the spring and summer of 1980.

8. The National Natural Areas Inventory was searched for any listing of forest stands.

9. Two, week-long road trips were conducted in two different sections of the State. During this week, as many foresters, outdoorsmen or hikers were contacted to obtain information on old-growth areas. The trips took place in Greenville on and in May 1-5, 1980, Ashland-Presque Isle-Caribou from July 21 to 26, 1980.
Inventory of Old-Growth Forests in Maine
for the Critical Areas Program

The Critical Areas Program of the State Planning Office is conducting an inventory of old growth forests. Since its inception in 1974, the Program has provided a service to landowners and the people of Maine by identifying unique natural areas worthy of conservation. Areas are chosen for the educational, aesthetic, and scientific value they display, and include such features as rare plants, animal habitats, hydrologic and geologic landmarks. Areas of outstanding value, with the approval of an eleven-member advisory board are placed on the Register of Critical Areas.

To conduct this inventory, the Critical Areas Program is soliciting foresters, game wardens, landowners and the general public to help it locate old growth forest areas. The criteria used to select old growth forests is:

1) Naturalness - The areas should be in as natural, undisturbed condition as possible.

2) Composition - The following species, because of their long-lived nature and regenerative capacity have been chosen:

- White Pine
- Red Pine
- Pitch Pine
- White Spruce

- Red Spruce
- Black Spruce
- Hemlock
- Tamarack

- Northern White Cedar
- White Ash
- Sugar Maple
- Northern Red Oak

3) Age - The stands should be old growth, generally 150 years or older.

Currently, 25 areas of forest trees are registered. These include rare species such as Black gum, Sassafras, and Chestnut Oak; and single old growth stands of Cedar and Red Spruce in Aroostook County. During this inventory, the Program will add to this list by examining areas throughout the State. Stands with good visual appeal, educational value, or other unique natural features will be prime candidates for registration.

If you know the location of an old growth stand and would like to help the Program, fold and return this letter (postage paid). I will contact you to verify the location, then field check the area in the summer.

John Grena, Forester
Critical Areas Program
289-3155

Name: ____________________________________________

Location, and type of stand: ____________________________________________

Telephone: ____________________________

Best time to call: ____________________________ -17-
Old-Growth Forest Inventory Preliminary Data Form

Return to:
Critical Areas Program, State Planning Office
189 State Street, Augusta, Maine 04333
Telephone Hank Tyler or John Grena at 289-3154

1. Location: Town_________________________ County_________________________

2. Mark area on Map:

3. Size

4. Ownership

5. Forest composition, age and size of trees

6. Disturbance

7. Other Comments

8. Contact Person_________________________ Address_________________________

__________________________________________
Phone:____________________________________

-18-
Criteria:

Stands in a natural, undisturbed condition. Absence of recent cutting or development.

Exceptional height or diameter in long-lived species. Remnants growing on harsh sites: bogs or steep ridges.

Date ___________________________  Point No. ___________________________
Crew ___________________________  Photo No. ___________________________
Quad. ___________________________
Town ___________________________

Location of Site

Composition ________________________________________________________

Stand ___________________________  Scattered trees ___________________________
Landform (ridge, valley, flat) _______________________________________
Person knowledgeable about site: _______________________________________

00398
Locating Old-Growth Stands

Information on the location of old-growth sites was recorded at each stage of the inventory. As the leads came in, their locations were first plotted on topographic quadrangles, then on a state road map and a Department of Transportation highway atlas. Marking the distribution on state maps allowed sites to be grouped when planning field visits. This approach saved gas and time, but eliminated the possibility of scheduling appointments for each stand with persons who knew the stand's exact location.

Information on the location of old-growth stands in which no guide was available was carefully researched before the field visit was attempted. The authenticity of the information was verified with two or more different sources (foresters, hunters and outdoorsmen) before visiting the site. Location and the best access route to the stand was studied on aerial photographs and topo maps.

In northern Maine, where very few people had visited old-growth areas, current information on the status of the stand was not always obtainable. A "seat-of-the-pants" approach to locating stands was necessary, relying on past experience and some luck to locate the stand.

Inventory Procedures

Once in the stand, emphasis was placed on collecting data on the age of the trees, composition, degree of man-caused disturbance, and size of the stand. An Old-Growth Forest Data Form (pages 23 to 28) along with a diameter and species tally sheet (page 29) were used, to record this information. An explanation of each category on the data form, and the procedures used to collect this data follows:

Composition
An ocular determination of the predominant species in the stand: forest type. Listing of the old-growth species.

Disturbance
Both natural and man-caused. Noting the roads, buildings, and amount of stumps found on the site. Estimation of the years since the last cutting, based on the extent of decay of the stumps.

Forest Floor
Type of litter: slash, hardwood leaves, or needles. Amount of exposed bedrock, and surface rocks and boulders.

Soils
Surface soil description from a 6-12 inch hole; including thickness, color, and texture of the organic and mineral layers to that depth.

Landform - Topography
Location of the stand in terms of area physiography. Relief of the site.

Groundcover - All plants and shrubs. Percentage of each tree species in the regeneration stratum.
Insects - Disease
Describing the condition and health through the biotic and mechanical injury present in the stand. Estimation of the impact these influences have on the longevity of the stand.

Crown Condition - Pruning
Describing the appearance of the crowns as an aid to determine the health of the trees. Describing the aesthetics: quality of the trees in terms of branch-free lower boles.

Height
Measured on representative trees in the overstory, understory and within the old-growth component. At least 4 trees were measured with a clinometer to obtain the total height, length of the trunk that was branch-free, and the height to the live crown.

History
Information on past cutting done in the stand.

Age: Increment corings were taken from trees in the 1) old-growth component, 2) overstory, and 3) understory. Within the old-growth component trees were chosen from the largest diameter class that was well represented in the stand. For example, if trees in the 22" diameter class were well represented in the stand, and the stand contained only a few trees of a larger diameter, the trees in the 22" diameter class would be bored to obtain stand age. Trees of average diameter in the overstory and understory were also selected for increment corings. (See Plate 1).

Corings were taken at breast height (4 1/2') with a 14 inch increment borer. The cores were placed in numbered plastic straws and then counted at the Office. As a general rule of thumb, 10 to 15 years could have been added to represent the years needed to reach breast height. This was not done because of the differences in growth found from site to site, and the desire to maintain precision with the data. Thus, the numerical age given in the stand descriptions is actually the age at breast height, and not the total age of the tree.

Increment cores that were incomplete were recorded as partial ages. In these samples, the present growth rate was not used to determine the number of years in the missing portion, unless a definite pattern of growth was apparent.

With species such as sugar maple and beech, a phloroglucinol solution and a hydrochloric acid (HCl) solution were used to dye the cores, making the annual growth rings more pronounced. The cores were then counted under a fluorescent light and a dissecting scope. Instructions for this method are given below.

Tally Sheet: Measurement of diameters were collected using one or more of four inventory methods: random samples, stratified prism plots, stratified samples, and ocular estimates. Prism plots, least used, were taken primarily in flat areas or where time permitted a sufficient number of samples to be taken. Random samples were taken in every stand, especially on steep slopes. The third method, stratified samples, worked best in stands in which the acreage was known, and data could be collected in areas that would give a true
representation of the stand as a whole. Lastly, ocular estimates were used in all stands after sample measurements for diameters were taken with a diameter tape. Diameters were recorded to the nearest whole inch using the dot tally system.

Instructions for Dyeing Increment Cores with Phloroglucinol

For distinguishing annual rings in diffuse porous species. Two solutions are needed: a 1% solution of phloroglucinol in 95% ethyl alcohol; and a 50% solution of hydrochloric acid. This phloroglucinol solution is made by dissolving one gram of phloroglucinol crystals in 100 ml. of 95% ethyl alcohol.

Soak the increment cores in the phloroglucinol solution for one minute; then place them in the HCl for one minute. Remove the cores from the acid solution and wash in water when they begin to turn red. Examine the cores under a fluorescent lamp when the cores dye. (Instructions with phloroglucinol obtained from Forestry Suppliers, Inc.)

During the initial stages of the inventory concern was raised over the damage increment corings would have on a tree. Two of the Northeast's leading pathologists, Dr. Richard Compana of the University of Maine at Orono, and Dr. Alex L. Shigo, of the U.S. Northeast Forest Experiment Station were asked to give their knowledge on the subject. Their letters of response are found on pages 30 and 31. Both agree that injury to the tree was possible; however, a tree has mechanisms that limit the spread of decay or damage.

Plate 1

Increment core being taken from a 35 inch white pine in a white pine-hemlock stand in Old Orchard Beach. John Grena demonstrates the use of a fourteen inch increment corer.

Photo by Hank Tyler
OLD GROWTH FOREST DATA FORM

Area:

Date:

Composition

Disturbance

Forest Floor

Slope:

Aspect:
OLD GROWTH FOREST DATA FORM

Area:

Date:

Soils

Landform-Topography

Ground cover-Regeneration

Insects-Disease

-24-
OLD GROWTH FOREST DATA FORM

Area: 

Date: 

CROWN CONDITION-PRUNING

Height (feet)

Overstory

<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>1st Dead Branches</th>
<th>Live Crown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
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<td></td>
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</table>

Understory

<table>
<thead>
<tr>
<th>Species</th>
<th>Total</th>
<th>1st Dead Branches</th>
<th>Live Crown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OLD GROWTH FOREST DATA FORM

Area:

Date:

County __________________________

Town __________________________

Quad __________________________

Ownership:

Owner's Comments:

History:
OLD GROWTH FOREST DATA FORM

Area:

Date:

Pictures

Additional Work Needed

Successional Tendency

Other Values
OLD GROWTH FOREST DATA FORM

<table>
<thead>
<tr>
<th>CORE SAMPLES:</th>
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<tbody>
<tr>
<td>No.</td>
<td>Species</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>UNEVEN AGED</th>
<th>EVEN AGED</th>
</tr>
</thead>
</table>

Age classes:

SIZE (hectare = 2.47 acres)
<table>
<thead>
<tr>
<th>Species Code</th>
<th>dbh</th>
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<tbody>
<tr>
<td>Aspen</td>
<td></td>
</tr>
<tr>
<td>W. Ash</td>
<td></td>
</tr>
<tr>
<td>Basswood</td>
<td></td>
</tr>
<tr>
<td>Beech</td>
<td></td>
</tr>
<tr>
<td>W. Birch</td>
<td></td>
</tr>
<tr>
<td>Y. Birch</td>
<td></td>
</tr>
<tr>
<td>Cedar</td>
<td></td>
</tr>
<tr>
<td>Fir</td>
<td></td>
</tr>
<tr>
<td>Hemlock</td>
<td></td>
</tr>
<tr>
<td>R. Maple</td>
<td></td>
</tr>
<tr>
<td>S. Maple</td>
<td></td>
</tr>
<tr>
<td>R. Oak</td>
<td></td>
</tr>
<tr>
<td>W. Oak</td>
<td></td>
</tr>
<tr>
<td>R. Pine</td>
<td></td>
</tr>
<tr>
<td>W. Pine</td>
<td></td>
</tr>
<tr>
<td>R. Spruce</td>
<td></td>
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<tr>
<td>W. Spruce</td>
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</tr>
<tr>
<td>9</td>
<td></td>
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<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
April 2, 1980

Mr. John Grena
Critical Areas Program
State Planning Office
State House Station 38
184 State Street
Augusta, ME 04333

Dear John:

I am pleased to have your letter and I am sorry to have missed your visit. Yes, I would indeed be interested in the reports on forest tree species rare in Maine. Also, I shall be glad to see that you get a copy of one of the publications Lance Conklin and I plan to get out on chestnut and chestnut blight in Maine. Thank you for the report on chestnut at Fayette. We look forward to tracking it down.

Concerning detrimental effects from increment borings on old-growth specimens, I have two views: good and bad. The good first. The boring wound is small enough that it may easily be compartmentalized and sealed off, if the tree has good capacity for this. Thus, no significant damage or threat is likely.

The bad aspect: if the tree does not compartmentalize well, the wound could initiate decay which over a long time could predispose the tree to mechanical instability. The new decay column from a boring could be as large in diameter and the size of the tree when the wound was made, thus very likely a large column of decay. I will be interested in Dr. Shigo's view here, and if we differ, I defer to him.

Sincerely,

Richard J. Campana
Richard J. Campana, Professor
Botany and Forest Pathology

RJC:dw
April 15, 1980

Mr. John Grenna
Critical Areas Program
State Planning Office
State House Station 38
184 State Street
Augusta, Maine 04333

Dear Mr. Grenna:

Here are a few comments about increment borings. In general I agree with Dr. Campana's statements. If a person does bore a tree there are some procedures that will ease the injury. If you are going to bore, make certain the boring is made above a vigorous root. Make the boring during the dormant season if possible. The best time would be very late in the dormant season. Avoid boring during the leafing-out period. Make sure the cutting edge of the borer is very sharp. Do not twist the bark or you will get a large canker. Do not put borings into areas close to the visible wounds. Do not bore directly below an obvious large open branch stub. Do not plug the bore hole with a wooden dowel.

I hope this information is of some help. If you have some specific additional questions, please do not hesitate to contact me, or give us a call.

Sincerely,

ALEX L. SHIGO
Chief Scientist

cc: Dr. R. Campana
DESCRIPTIONS OF THE NATURAL OLD-GROWTH FORESTS OF MAINE

The following descriptions of the forest types and stands visited are summaries of data collected in the field by John Grena in 1980 and 1981, and by Charles Cogbill in 1982. In 1983 these notes have been compiled and presented in a consistent manner as possible.*

Thoroughness of field checking varied with each field crew as well as with the potential values of a particular site as an old-growth forest stand. Each site was evaluated relative to the criteria set forth. Occasionally, sites did not completely meet these criteria, and other factors were considered in the stand evaluation. For example, old-growth forest stands of any kind are extremely rare in southern Maine. The existence of very old, but slightly disturbed or manipulated stands in these areas may prove to be valuable pockets of old-growth and worthy of critical area evaluation.

Sites have been RECOMMENDED either for evaluation as a critical area or for further field study before evaluation, or NOT RECOMMENDED due to lack of fulfillment of the criteria for old-growth. Some stands visited for their old-growth component have been previously REGISTERED for other natural features or are located adjacent to registered critical areas. These areas bear the recommendation to have the area recognized for the old-growth component or the registered area expanded to include the old-growth feature.

Age categorization of the stand was aimed at characterizing the maximum age class where possible. Otherwise, maximum ages of individual trees, average tree age or stand age, or age ranges from increment core analysis are indicated.

*The forest types inventoried are based on the Society of American Foresters descriptions of forest cover types occurring in Maine, containing an old-growth component.
Introduction

Eastern hemlock (*Tsuga canadensis*) is essentially an Appalachian species ranging from Nova Scotia to Indiana and Southern Quebec to Alabama. It usually occurs in a relatively dominant position on moist soils in sheltered conditions or where drainage is impeded. The most characteristic location for hemlock is in ravines or along damp river banks. Although it occurs in mixture with a variety of transition temperate species, it tends to form exclusive stands throughout its range. These stands are species poor and only young hemlock seems able to survive in the understory. It is an extremely long lived species and the sites are relatively immune from fire or other major disturbance.

Inventory Results

Sixteen old-growth hemlock forests were field checked as part of the forest inventory (Figure 1 and Table 1). Eleven areas are recommended for critical area evaluation.

The hemlock stands inventoried were located primarily in the southern half of the state. These areas were often on slopes, or flat saddles between hills, and along riversides and lakeshores. These locations were generally at elevations of 500 feet or less.

The ages of old-growth hemlock stands identified in Maine ranged from about 150-300 years in age. The oldest hemlock tree identified is at the No. 3 Pond site in Penobscot County, with an age of 326 years. Median ages in healthy hemlock stands at different locations were about 150-200 years. The health of all the pure hemlock stands was generally quite good.

These stands were usually confined to relatively small areas, ranging in size from about 5-50 acres.

An obvious gap regarding information on old-growth hemlock exists for the northern half and western portions of the State of Maine.
# TABLE 1

OLD-GROWTH HEMLOCK STANDS INVENTORIED

<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mattawamkeag</td>
<td>Peno</td>
<td>Winn</td>
<td>112-236 (range)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200-250 (max. age class)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>No. 3 Pond</td>
<td>Peno</td>
<td>T3 R1</td>
<td>300+ (max. age class)</td>
<td>26</td>
<td>Rec.</td>
</tr>
<tr>
<td>3</td>
<td>Mattamiscoontis</td>
<td>Peno</td>
<td>T2 R8</td>
<td>130-140 (avg.)</td>
<td>15</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>4</td>
<td>Prentiss Wood</td>
<td>Peno</td>
<td>Bangor</td>
<td>150+ (max.)</td>
<td>30</td>
<td>Rec.</td>
</tr>
<tr>
<td>5</td>
<td>Pleasant Lake</td>
<td>Wash</td>
<td>T6 R1</td>
<td>Not determined</td>
<td>50</td>
<td>Rec./F.C.</td>
</tr>
<tr>
<td>6</td>
<td>Farm Cove Mountain</td>
<td>Wash</td>
<td>T6 ND</td>
<td>300 (max.)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>7</td>
<td>Sabao Lake</td>
<td>Hanc</td>
<td>T41 MD</td>
<td>150-250+ (max. age class)</td>
<td>50</td>
<td>Rec.</td>
</tr>
<tr>
<td>8</td>
<td>Waldoboro</td>
<td>Linc</td>
<td>Waldoboro</td>
<td>170-240 (range)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>9</td>
<td>Thomas Point</td>
<td>Linc</td>
<td>Westport</td>
<td>150 (est.)</td>
<td>5</td>
<td>Rec./F.C.</td>
</tr>
<tr>
<td>10</td>
<td>Ellis Pond</td>
<td>Kenn</td>
<td>Belgrade</td>
<td>250 (max.)</td>
<td>10</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>11</td>
<td>Mt. Christopher</td>
<td>Oxfo</td>
<td>Greenwood</td>
<td>170 (max.)</td>
<td>3</td>
<td>Rec.</td>
</tr>
<tr>
<td>12</td>
<td>Adams Pond</td>
<td>Cumb</td>
<td>Bridgton</td>
<td>128-260 (range)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>13</td>
<td>Bonney Woods</td>
<td>Fran</td>
<td>Farmington</td>
<td>140-200 (max. age class)</td>
<td>10</td>
<td>Not Rec.</td>
</tr>
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<td>14</td>
<td>Ocean Park</td>
<td>York</td>
<td>Old Orchard B.</td>
<td>120-140 (max. age class)</td>
<td>8</td>
<td>Rec.</td>
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<tr>
<td>15</td>
<td>Vaughn Woods</td>
<td>York</td>
<td>S. Berwick</td>
<td>Not determined (not old-growth)</td>
<td>-</td>
<td>Not Rec/F.C.</td>
</tr>
<tr>
<td>16</td>
<td>E. Parsonfield</td>
<td>York</td>
<td>Parsonfield</td>
<td>Not determined (not old-growth)</td>
<td>5</td>
<td>Not Rec.</td>
</tr>
</tbody>
</table>
FIGURE 1
OLD-GROWTH HEMLOCK STANDS INVENTORIED

- Recommended for evaluation as a critical area
- Recommended for further study and evaluation
- Not Recommended

-35- Miles 25
The hemlocks in the Waldoboro Town Forest range in age from 170 to 240 years old. There has been some cutting in the Town Forest in the past, but a 5 acre portion left relatively undisturbed is home to these large hemlocks. These trees comprise the second oldest hemlock stand known in Maine. This hemlock site is unusual in its association with yellow birch and red maple on a richer soil site, rather than along a lake or stream.

Photo by Hank Tyler
1. **MATTAWAMKEAG RIVER HEMLOCK STAND**

Forest type: Hemlock

Town: Winn Twp.

County: Penobscot

Quad: Mattawamkeag 15' (1940)

Age: 112 - 236 (range), 200-250 years (maximum age class)

Stand Size: 5 acres

Elevation: 280'

Date Field Checked: August 8, 1980 by John Grena

Status: Recommended.

Description

An old-growth and uncut pure hemlock (*Tsuga canadensis*) stand grows from the crest of an esker down to the flatland at the banks of the Mattawamkeag River in Winn. This mature stand (average age, 182 years) has ample hemlock regeneration in three areas where blowdown has opened the canopy and disturbed the soil to provide a seedbed. The narrow band of old-growth is located on the south banks of the river, between Gordon Falls and Little Gordon Brook, at an elevation of 280 feet.

Both the hemlock and the associated red spruce (*Picea rubens*) exhibit good form and health, occupying the dominant or codominant position in the canopy. Thus, the single canopy level formed and the uniform spacing of the trees creates a picturesque view through this uneven-aged stand. The trees are straight, single-trunked and range between 66 and 78 feet in height. The tallest trees are found on the flat near the river, only because their boles do not curve to compensate for the slope as those on the esker's 50% slope. The specimens exhibit good self-pruning of lower branches, considering that hemlock characteristically retains its dead branches. Most trees are branch free for 1/5 of their entire height.

The stand is growing on a 1 1/2 inch organic pad with a sandy skeletal surface mineral layer that contains cobbles and pebbles of quartly mineralogy. Here, between the steep incline of the esker and the river's edge, the stand receives protection from harvesting.
1. MATTAWAMKEAG (continued)

Plants and small trees in the stand include: Canada mayflower (Maianthemum canadense), with striped maple (Acer pensylvanicum) and white birch (Betula papyrifera) saplings scattered in the openings.

Data collected from four prism plots stratified throughout the stand appears below:

Increment corings taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Height (feet)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemlock</td>
<td>17</td>
<td>70</td>
<td>153</td>
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<tr>
<td>hemlock</td>
<td>19</td>
<td>75</td>
<td>194</td>
</tr>
<tr>
<td>hemlock</td>
<td>14</td>
<td>68</td>
<td>236</td>
</tr>
<tr>
<td>hemlock</td>
<td>11</td>
<td>--</td>
<td>215</td>
</tr>
<tr>
<td>red spruce</td>
<td>11</td>
<td>--</td>
<td>112</td>
</tr>
</tbody>
</table>

Number of trees by species and d.b.h. Classes

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
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<th>18</th>
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<td>6</td>
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<td>7</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>red spruce</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status:

This stand meets all the criteria for natural old-growth forest stands. This area was recommended because: 1) the stand has never been logged, 2) the stand contains sufficient regeneration to insure the continuation of the stand, and 3) the trees are located between an esker and the Mattawamkeag River, in a very scenic setting.

2. NO. 3 POND HEMLOCK STAND

Forest type: Hemlock

Town: T3 R1 NBPP

County: Penobscot

Quad: Winn 15' (1960), Springfield 15' (1931)
2. NO. 3 POND (continued)

Age: 300+ (maximum age class)
Stand Size: 26 acres
Elevation: 3001
Date Field Checked: August 8, 1980 by John Grena
Weather: Warm, sunny
Status: Recommended.

Description

A pure hemlock (Tsuga canadensis) stand containing the oldest tree (326 years) discovered in the 1980 old growth forest stands inventory is located on the north shore of No. 3 Pond. No. 3 Pond is 4 miles from Lincoln. There is no record of any cutting operations: protection is offered by large boulders, rock outcrops, and an 11 percent slope that makes the site inaccessible.

Although the trees are not unusually large, (the largest hemlock is 20 inches at breast height and 80 feet tall), it can be termed virgin. The stand is distinctly different from the surrounding spruce-fir forest: the hemlocks are fairly uniform in diameter, well spaced, and are of excellent helath and form. All trees have straight, single trunks and good, healthy crowns. The branch free trunks, 20 to 25 feet up from the ground add to the visual appeal of the stand; especially since the lower branches on hemlock tend to remain on the trunk longer after they have died. Because of its location, sufficient size, and the spacing of the trees, this stand should survive for many decades. The dense shade created by the canopy has pronounced effects on the stand. Very little direct sunlight is available for plants in the understory. As a result, the balsam fir (Abies balsamea), white birch (Betula papyrifera), and red spruce (Picea rubens) that occur as scattered, single trees are in poor health. The only groundplants found in the stand are mosses, liverworts, creeping snowberry (Gaultheria hispidula) and hemlock seedlings.

Hemlock seedlings survive under these conditions because they are very shade tolerant. The stand's uneven-aged condition, indicated by the increment cores taken, illustrate this tolerance and the ability hemlock trees to respond and grow after being suppressed for many years. Understory hemlock can survive, although showing very little growth, decades in the shade of the overstory. Once the canopy is opened, allowing more direct sunlight to enter, the growth rate of the suppressed trees increase, allowing them to grow into the overstory.

This ability to respond to release has produced a stand where trees of the same size differ markedly in age. Increment corings taken of three, 19 inch d.b.h. hemlock indicated ages of 143, 231, and 326 years. Because of the poor site, the trees' growth stagnated after reaching a certain size, thus allowing the suppressed trees, once found in the understory, to obtain

-39-
2. NO. 3 POND (continued)

the size of the older overstory stand.

Three prism plots were selectively placed to cover as much of the stand as possible. Data collected appears below.

<table>
<thead>
<tr>
<th>d.b.h. (inches)</th>
<th>hemlock</th>
<th>white pine</th>
<th>red spruce</th>
<th>white birch</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Increment corings taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Height (feet)</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemlock</td>
<td>19</td>
<td>70</td>
<td>326</td>
</tr>
<tr>
<td>hemlock</td>
<td>19</td>
<td>80</td>
<td>143</td>
</tr>
<tr>
<td>hemlock</td>
<td>19</td>
<td>80</td>
<td>231</td>
</tr>
<tr>
<td>red spruce</td>
<td>11</td>
<td>80</td>
<td>102</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status:

This stand meets all the criteria for natural old-growth forest stands. The pure hemlock stands represents an uncommon forest type in Maine. The type is uncommon first, because the type is restricted to a narrow band that extends across central Maine, and secondly, because of the exploitation of the trees for tannins from the bark in the 30's and 40's. In addition, there is no history of any cutting in the stand.
3. MATTAMISCONTIS HEMLOCK STAND

Forest Type: Hemlock
Town: T2 R8 NWP
County: Penobscot
Quad: Lincoln 15' (1957)

Stand Age: 130-140 years (average)
Stand Size: 15 acres
Elevation: 200'

Date Field Checked: August 6, 1980 by John Grena
Status: Not Recommended.

Description

An undisturbed hemlock (Tsuga canadensis) stand containing trees as old as 156 years grows between Mattamiscontis Stream and Halfway Brook in T2 R8. This stand is west of I-95 and the Penobscot River, near Seboeis, and is being preserved by the owner. It contains only a few stumps, and also four large white pine (Pinus strobus) that are approximately 130 years old. This flat site is characterized by a high water table and a silty loam soil that impedes drainage.

The hemlock create one canopy level with their crowns, so that it is possible to look completely through the stand. Characteristically, the hemlock are limby, but these are also of poor form, some having forked trunks and dead branches as close as 8 feet to the ground. Most of the hemlock bored for age data had shake. The live crown begins 36 feet up on their total height of 65 feet.

Average stand diameter (d.b.h.) excluding the four pine, is 12 inches, while the hemlock, which comprise 70% of the stand, average 15 inches in diameter. The tallest hemlock is 69 feet tall, and the four white pine average 81 feet, with a live crown that begins 51 feet up from the ground.

The overstory trees in this even-aged stand include: northern white-cedar (Thuja occidentalis), balsam fir (Abies balsamea), white birch (Betula papyrifera), red maple (Acer rubrum), and big tooth aspen (Populus grandidentata). Because of a high water table, the birch exhibit poor health and loss of vigor early in their life, and the white pine are restricted to growth on the higher microsites.
MATTAMISCONTIS (continued)

Hemlock seedlings occupy the reproduction stratum, replaced by red maple (Acer rubrum), and white birch (Betula papyrifera) in the openings. Ground plants include: bluebead lily (Clintonia borealis), Canada mayflower (Maianthemum canadense), clubmoss (Lycopodium sp.), trillium (Trillium sp.), Indian pipe (Monotropa uniflora), starflower (Trientalis borealis), lesser pyrola (Pyrola minor), wood sorrel (Oxalis sp.), and seven different mushrooms.

Data collected on d.b.h. and ages from four prism plots appears below.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8  9 10 11 12 13 14 15 16 17 18 19 20</td>
</tr>
<tr>
<td>Hemlock</td>
<td>3  2  1  3  5  4  5  5  1  3  2  1</td>
</tr>
<tr>
<td>Cedar</td>
<td>1</td>
</tr>
<tr>
<td>Red maple</td>
<td>1  1</td>
</tr>
<tr>
<td>White Birch</td>
<td>1  1  1</td>
</tr>
<tr>
<td>Aspen</td>
<td>2</td>
</tr>
<tr>
<td>Red Spruce</td>
<td>1  1  1  1</td>
</tr>
</tbody>
</table>

*d.b.h. of the four white pine are: 26, 30, 31, 32 inches.

Increment Corings Taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Core extracted (inches)</th>
<th>Rings</th>
<th>Estimated Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemlock</td>
<td>14</td>
<td>4</td>
<td>85</td>
<td>148</td>
</tr>
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<td>7.5</td>
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<td>hemlock</td>
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<td>5</td>
<td>98</td>
<td>156</td>
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<tr>
<td>hemlock</td>
<td>18</td>
<td>7</td>
<td>108</td>
<td>130</td>
</tr>
<tr>
<td>white pine</td>
<td>30</td>
<td>9</td>
<td>79</td>
<td>131</td>
</tr>
</tbody>
</table>

Criteria met and reasons for NOT RECOMMENDED status:

This stand does not met the age criteria, but does met the criteria for stand identity and naturalness. It is not recommended because more significant stands are found in Penobscot County.
4. PRENTISS WOODS WHITE PINE - HEMLOCK STAND

Forest type: White pine - hemlock

Town: Bangor

County: Penobscot

Quad: Bangor 15' (1955)

Age: 150+ years (maximum)

Stand Size: 30 acres

Elevation: 200'

Date Field Checked: August 14, 1980 by John Grena

Status: Recommended

Description

Prentiss Woods is a 30-acre softwood stand reserve located within the city limits of Bangor. Located on Grand View Avenue (elevation 200') between Essex and Broadway Street, the reserve has remained untouched except for removal in the 1960's of a few white pine (Pinus strobus) damaged by the white pine blister rust. Throughout the stand white pine and hemlock (Tsuga canadensis) are the predominate components.

Other associated species in the stand are: white birch (Betula papyrifera), red maple (Acer rubrum), and scattered red spruce (Picea rubens). One red spruce in the stand is 24 inches at d.b.h., 90 feet tall and of superior form.

White pine in the stand are of good health and excellent form. Average diameter is 21 inches d.b.h. and the straight, cylindrical trunks are branch-free for a 1/3 of the entire trunk height of 90 feet. Blister rust seems to be absent from the stand as most pine have healthy-looking crowns.

The hemlock average 13 inches d.b.h. and are between 45 and 75 feet tall. The lower trunk is branch-free 12 to 15 feet from the ground and the crowns create a single canopy, shading out most of the sunlight.

Most of the ground under the hemlock is bare because of the shade created by the dense canopy. Hemlock saplings comprise the majority of the reproduction, in these areas, rising six inches to twenty feet in height.
4. PRENTISS WOODS (continued)

Groundplants found in other areas of the stand include: bluebead lily (Clintonia borealis), Canada mayflower (Maianthemum canadense), starflower (Trientalis borealis), wild sarsaparilla (Aralia nudicaulis), sensitive fern (Oncoclea sensibilis), cinnamon fern (Osmunda cinnamomea) and hobblebush (Viburnum alnifolium).

In the northern section of the stand, where the soil is slightly wetter, the following tree and groundplants are found: balsam fir (Abies balsamea), northern white-cedar (Thuja occidentalis), Jack-in-the-pulpit (Arisaema sp.), Indian cucumber root (Medeola virginiana), winterberry (Ilex sp.) and downy rattlesnake plantain (Goodyera pubescens).

Data collected on increment cores and diameters is listed below:

Increment Cores Taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemlock</td>
<td>8</td>
<td>78</td>
</tr>
<tr>
<td>hemlock</td>
<td>11</td>
<td>118</td>
</tr>
<tr>
<td>hemlock</td>
<td>13</td>
<td>115</td>
</tr>
<tr>
<td>hemlock</td>
<td>15</td>
<td>140</td>
</tr>
<tr>
<td>white pine</td>
<td>21</td>
<td>150</td>
</tr>
<tr>
<td>white pine</td>
<td>25</td>
<td>145</td>
</tr>
</tbody>
</table>

Number of Trees by Species and d.b.h.
From four Prism Plots Stratified Throughout the Stand

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>hemlock</th>
<th>white pine</th>
<th>white birch</th>
<th>red maple</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
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</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>13</td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
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<td>1</td>
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<tr>
<td>18</td>
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</tr>
<tr>
<td>19</td>
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<td></td>
</tr>
<tr>
<td>21</td>
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<td>22</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-44-
4. PRENTISS WOODS (continued)

Criteria met and reasons for RECOMMENDED status:

This stand meets all the criteria for natural old-growth forest stands. Although several white pine were removed in the 1960's, these trees were dead or dying. Thus, this salvage operation actually duplicated the natural processes, and also prevented the spread of the white pine blister rust to other pines.

5. PLEASANT LAKE HEMLOCK

Forest type: Hemlock
Town: T6 R1 NBPP
County: Washington
Quad: Scraggly Lake, ME 15', (1941)
Age: Not determined
Stand Size: 50 acres
Elevation: 390' (approximately)
Date Field Checked: June 24, 1982, Cogbill
Status: Recommended pending further age analysis.

Description

The Birch Point peninsula in Pleasant lake is covered with a forest of hemlock (Tsuga canadensis), white pine (Pinus strobus) and red spruce (Picea rubens). The area was burned at an undetermined time in the past and the white birch (Betula papyrifera) are mostly dead and decaying on the forest floor. The hemlock and pine are relatively open grown, 65 feet tall and average 18 to 26 inches in diameter. The area is relatively undisturbed, but more data is needed to assess the significance of this stand.

Criteria met and reasons for RECOMMENDED status:

This large area meets the criteria for stand identity and naturalness, but because ages were not taken, we cannot determine if the stand meets the age criteria. It is recommended that the age of the stand be determined as part of the evaluation of the stand. This stand is recommended for further evaluation before designation proceeds.
6. FARM COVE MT. HEMLOCK

Forest type: Hemlock
Town: T6 ND
County: Washington
Quad: Wabassus Lake, 15' (1963)
Age: 300 yrs. (maximum)
Stand Size: 5 acres
Elevation: 450'
Date Field checked: June 24, 1982, Cogbill
Status: Recommended.

Description

The upper west slope (300) of Farm Cove Mt. contains some large (13-23") hemlock (Tsuga canadensis). These are mixed with red spruce (Picea rubens) to 18 inches diameter, beech (Fagus grandifolia) to 14" diameter and yellow birch (Betula lenta) to 8 inches diameter. The hemlock are uneven-aged, including some individuals of more than 300 years old; while the spruce is 93 to 120 years old. The stand is restricted to the talus slope. Areas above and below it have been cut in the past. It is a small, heterogenous area fairly typical of the region.

Criteria met and reasons for RECOMMENDED status:

This small area meets the criteria for age, stand identity and naturalness, and thus is recommended for critical area designation. This stand supports some of the oldest hemlock trees in the State.

7. SABAO LAKE HEMLOCK

Forest type: Hemlock
Town: T41 MD
County: Hancock
Quad: Nicatous Lake, ME 15' (1932)
Age: 150-250 (maximum age class)
Stand Size: 50 acres
Elevation: 500'
Date Field checked: June 24, 1982, Cogbill
Status: Recommended.
7. **SABAO LAKE HEMLOCK** (continued)

**Description**

A stand is located in the area between Upper Sabao Lake and Pughole Pond. It is dominated by medium sized hemlock (*Tsuga canadensis*) 12-16 inches with some red spruce (*Picea rubens*) and dying white birch (*Betula papyrifera*). The largest trees are 24 inches in diameter; they are mostly hollow, but some are over 250 years old. The stand might have had minor cutting in the past, but is in a relatively undisturbed condition. More data is needed to assess the significance of this stand.

**Criteria met and reasons for RECOMMENDED status:**

This area supports a small but relatively undisturbed stand, and is recommended for critical area designation because it meets the criteria for age, stand identity and naturalness.

8. **WALDOBORO HEMLOCK**

**Forest type:** Hemlock-Yellow birch

**Town:** Waldoboro

**County:** Lincoln

**Quad:** Waldoboro West 7.5' (1965)

**Stand Size:** 5 acres

**Age:** 170-240 (range, hemlock)

**Elevation:** 270'

**Date Field checked:** Dec. 7, 1981, Charles Cogbill, Leslie Hyde, Hollis Tedford

**Status:** Recommended.

**Description**

The Waldoboro Town Forest is a 325 foot wide strip running between the intersections of Rt. 1 and Rt. 220 west of Waldoboro down to the Medomak River. A woods road runs from a gate at the intersection southeast through the forest. About 100 feet from the beginning of the road is a 5 acre section of the forest which is composed of large hemlocks. The stand is on fairly flat terrain on the saddle between Benner Hill and Cordwood Hill. The headwaters of Beaverdam Brook form a wet, badly drained section just west of the stand. The area was acquired by the town in 1968 from G. Jordan. The land at the other end of the tract had been farmed for generations and the remainder of the forest is a combination of old fields and cut woodlots. The knoll to the west of the hemlocks was recently selectively cut and a hiking trail has been constructed through it.
The stand is mostly large hemlocks (Tsuga canadensis) with some yellow birch (Betula lutea) and red maple (Acer rubrum). There are also scattered white pine (Pinus strobus), red spruce (Picea rubens), sugar maple (Acer saccharum), beech (Fagus grandifolia), and white birch (Betula papyrifera). The hemlocks are between 22 inches diameter and 40 inches diameter at breast height (dbh) and average of 65 to 80 feet high. The canopy is fairly open (80% coverage), but there are clumps of densely growing hemlocks giving an extremely dark forest interior in places. The big yellow birch are 22 inches to 26 inches dbh and red maples are relatively large at 10 inches dbh. An exceptionally large striped maple (Acer pensylvanicum) at 7.2 inches dbh was also found. The understory is dominated by seedlings, scattered clubmosses (Lycopodium obscurum and L. annotinum), ferns (Dryopteris spinulosa), and herbs (Pyrola sectunda). The soil is a deep, but poorly drained silt loam (Scantic series). There is a 1 inch thick humus (A1) layer over a discontinuous 5 inch grey leached layer (A2). The mineral soil has a dark, reddish brown deposited upper 2 cm. (B1) and a mottled yellowish brown lower layer. The pH of the B horizon is less than 4.2.

Some 7 trees were cored to determine their ages. The median age was 170 years and ranged from a 110 year old red maple to a 150 year old yellow birch to a 240 year old hemlock. Most of the hemlocks were 170 to 240 years old with a disturbance indicated at about 170 years ago. About half of the hemlock have rotten cores. Yellow birch have stilt roots indicating germination on fallen trees from a previous generation. The hardwoods appear to be about the same age as the youngest hemlock. Due to the dark interior, there is presently no replacement of these old trees except in the few blowdown gaps in the stand.

Criteria met and reasons for RECOMMENDED status:

This stand is uncut and contains a small segment of old-growth forest. It is completely natural and a well developed hemlock forest on flat, poorly drained terrain. Most old hemlock stands in the state are either associated with white pine on sandy soil near wetlands or on steep banks of rivers or ravines. These two habitats are described as the dominance types for mature hemlock forest in eastern North America, but Rogers (1978) had no sites in Maine. He states that this tree occurs on thin or sandy soils and rarely on rich sites. The Waldoboro site is unusual, associated with richer yellow birch and red maple and not bordering a lake or stream. It is much like the younger Bonney Woods in Farmington in this respect, these two hemlock stands being on flat hillsides.

The Waldoboro stand is also relatively old; only 4% of the trees in Rogers (1978) mature hemlock sites were over 240 years old. Except for the No. 3 Pond stand in Lee, this is the oldest hemlock stand inventoried in the State. More importantly, it contains trees which are larger than those in all other stands inventoried; this perhaps due to the rich substrate. The rarity of hemlock stands, the southern location, and the
8. WALDOBORO (continued)

remarkable composition with birch and maple make this stand a prime example of the virtually unknown wet flat hemlock forest. The robust trees, old-age character and beginnings of old-aged dynamics all contribute to the value of this site.

9. THOMAS POINT HEMLOCK

Forest type: Hemlock

Town: Westport

County: Lincoln

Quad: Boothbay Harbor 7.5' (1970)

Age: 150 years (estimated)

Stand Size: 5 acres

Elevation: 50'

Date Field checked: July 26, 1982, Charles Cogbill

Status: Recommended for further field checking.

Description

The hill on the east side of Thomas Point sustains a stand of hemlock (Tsuga canadensis) facing the Sasanoa River. The stand includes white pine (Pinus strobus) and red spruce (Picea rubens). The hemlock occur on the rocky northeast facing ledges and are mostly 16-18 inches in diameter (maximum 15 inches). The trees are open-grown and probably successional and as old as 150 years. The area is fairly small and the immediate vicinity has been cut or farmed at some time. This stand is an interesting mixture of species right along the coast and probably represents much the same aspect as the original coastal forest. However, it is relatively small in extent and young, thus of borderline significance as old-growth.

Criteria met and reasons for RECOMMENDED status:

This area supports a young and possibly undisturbed stand, and is recommended to be evaluated for critical area status because it meets the criteria for stand identity and naturalness. However, additional data should be collected on the age of the stand as part of its evaluation.
10. ELLIS POND HEMLOCK

Forest type: Hemlock
Town: Belgrade
County: Kennebec
Quad: Norridgewock, 15' (1956)
Age: 250 (maximum)
Stand Size: 10 acres
Elevation: 340'
Date Field checked: December, 1981, Charles Cogbill
Status: Not Recommended.

Description

Hemlock (Tsuga canadensis) are scattered among the cabins on the southeast shore of Ellis Pond. The trees are up to 36 inches in diameter and over 250 years old. However, only a few large trees are here and the area is developed and highly disturbed.

Criteria met and reasons for NOT RECOMMENDED status:

This area does not form a coherent forest stand and it is disturbed, and thus is not recommended because it does not meet the criteria.

11. MT. CHRISTOPHER HEMLOCK

Forest type: Hemlock
Town: Greenwood
County: Oxford
Quad: Greenwood 15' (1967)
Age: 170 (maximum)
Stand Size: 3 acres
Elevation: 1100-1200'
Date Field checked: May 19, 1982, Charles Cogbill
Status: Recommended.
11. MT. CHRISTOPHER (continued)

Description

On the northern slope (250°) of Mt. Christopher above Bryant Pond is a small patch of hemlock (Tsuga canadensis). The 14 to 20 inches diameter hemlock are mixed with white pine (Pinus strobus) to 26 inches diameter, and much dead white birch (Betula papyrifera) to 10 inches. The area is underlain by charcoal and obviously resulted from a fire. The large trees are all approximately 170 years old. The area is relatively small (3 acres) and restricted to the steeper rocky slope. Areas above and below have been cut and sustain more white pine and red oak.

Criteria met and reasons for RECOMMENDED status:

This area is relatively small although it does form a coherent stand, and is relatively old. Since the area does meet the criteria, it is recommended for critical area designation.

12. ADAMS POND HEMLOCK

Forest Type: Hemlock
Town: Bridgton
County: Cumberland
Quad: Sebago Lake 15' (1942); Sebago Lake NW 7.5' (1975)
Age: 128-260 (range)
Stand Size: 5 acres (approximately)
Elevation: 640'
Date Field Checked: 3 June 1982; 18 August 1982, Charles Cogbill
Status: Recommended.

Description

This hemlock stand is located on the southwest side of Adams Pond in South Bridgton. Several old stone walls extend through the second-growth forests down to the edge of the pond. A plot of about 5 acres lies around a low, flooded inlet extending south from the southwest corner of the lake. Both a point of land between the lake and inlet as well as a 250 foot strip to the east and south of the inlet are neither within the old field lines or cut over as those trees further from the water. The land is gently rolling, facing NNW, with 50 foot ledges mixed with damp drainage ways down to the lake. The stand is easily reached by walking north from Ingalls Road (opposite the first house to the south of the road) downhill 1000 feet through two now wooded fields, to the stand.
12. ADAMS POND (continued)

The stand is mostly hemlock (Tsuga canadensis) with a mixture of beech (Fagus grandifolia), yellow birch (Betula lutea), red spruce (Picea rubens), and red maple (Acer rubrum). The hemlock occur in all size classes up to 32 inches in diameter while the other species in general reach 16 to 20 inches in diameter. The stand is fairly open with few shrubs. The herbs are dominated by partridgeberry (Mitchella repens) wintergreen (Gaultheria procumbens), Canada mayflower (Maianthemum canadense), and painted trillium (Trillium undulatum). In the areas under thick hemlock canopy (cover is 85%), there is little ground cover. Overall there is only about 15% cryptogan (mostly Bazzania trilobata) cover. Most of the herbaceous species occur in the damp swales, or on the common fallen logs near windthrow openings.

A 0.1 ha plot on the rocky ledge to the south of the inlet contains 920 trees (more than 4 inches diameter) and a basal area of 72 m²/ha. The dominance of hemlock is 80%. Beech has 5%, white and yellow birch, red maple and spruce have 3%. Birch and spruce have larger trees thus a basal area of 5% each while beech has 4% and red maple 4% dominance. The majority (84%) of the saplings are hemlock with the remainder (16%) beech. Many of the beech are dying and some are decaying on the forest floor. There are common tip-ups with old pits and mounds abundant. The soils are shallow with moderately developed (1/2 - 2 1/2 inches) A₂ horizons. The organic mat is deep and charcoal is abundant throughout the stand.

Despite obvious stumps of a former selective cut nearby, the stand has little to indicate any recent disturbance. The ages of 11 hemlock trees range from 128 to over 260 years. The median age is 177 years. Significantly most hemlock show a release in 1855 indicating some sort of incomplete disturbance. One spruce shows an 1809 release and is over 290 years old. The stand appears to have resulted from a burn at least 300 years ago and supported a mixed hemlock forest since that time.

This stand contains an old hemlock forest over 260 years old. It is a prime example of hemlock along lake shores in southern Maine. The tall stockiness and dominance of hemlock in a fresh ledge habitant all add to the significance of the stand. The stand is showing replacement of hemlock and has ample examples of windthrown regeneration as well as an uneven-aged character.

Criteria met and reasons for RECOMMENDED status:

This stand meets all the criteria for age, stand identity and naturalness, and thus is recommended for critical area status.

13. BONNEY WOODS

Forest type: Hemlock

Town: Farmington
13. BONNEY WOODS (continued)

County: Franklin
Quad: Farmington 15' (1956)
Age: 140-200 (max. age class)
Stand Size: 10 acres
Elevation: 500'
Date Field checked: December 9, 1981, Charles Cogbill
Status: Not Recommended.

Description

This town forest contains a hemlock forest with some 29 yellow birch (Betula lutea) and other hardwoods. The hemlock (Tsuga canadensis) to 29 inches in diameter appear open-grown and most are approximately 140 years old. At least one tree exceeds 200 years. The stand is relatively well-developed, but young and subject to recent cutting to improve the park.

Criteria met and reasons for NOT RECOMMENDED status:

This area is a fairly disturbed area, and does not meet the criteria for naturalness. Even though the stand meets the criteria for age and stand identity, it is not recommended for critical area status.

14. OCEAN PARK WHITE PINE - HEMLOCK STAND

Forest type: White Pine - Hemlock
Town: Old Orchard Beach
County: York
Quad.: Old Orchard Beach 7.5' (1970)
Maximum Age class: 120-140 years
Stand Size: 8 acres
Elevation: 20'
Date Field checked: March 26, by John Grena and Hank Tyler
Status: Recommended.
14. OCEAN PARK (continued)

Description

An old-growth white pine (Pinus strobus) and eastern hemlock (Tsuga canadensis) stand grows between the Boston and Maine Railroad tracks and Temple Avenue in Old Orchard Beach. The eight-acre stand has had cutting in the past to remove dead trees, and receives considerable use as a nature area in town. Despite these disturbances, the area retains its integrity as a stand containing large-sized, old-growth specimens that are uncommon in this section of Maine. Because the trees constitute a stand and are between 120 and 140 years old, the area has value as an educational site.

Both the white pine and hemlock are of good health and form. White pine are between 75 and 81 feet tall, with clear boles 33 feet up from the ground. The pine range in diameter from 13 to 27 inches, with 21 inches as the average. Hemlock in the stand average 75 feet tall, and are branch-free up to ten feet from the ground. Average diameter for this species is 19 inches, while the range is between 14 and 28 inches.

This even-aged stand is probably a portion of a larger stand that existed over a century ago. The present stand constitutes the offspring of this original stand, and would therefore be considered as second growth.

The forest floor beneath the trees is covered with a 1/4 inch needle layer, and is devoid of any regeneration or shrubs except the following plants: winterberry (Gaultheria procumbens), partridgeberry (Mitchella repens), bunchberry (Cornus canadensis), and goldthread (Coptis groenlandica). To the east and north of the stand, the composition changes to hardwoods, especially yellow birch (Betula lutea), northern red oak (Quercus rubra) and red maple (Acer rubrum).

Increment corings taken at d.b.h. (4-1/2')

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Height (feet)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemlock</td>
<td>28</td>
<td>75</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>78</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>75</td>
<td>133*</td>
</tr>
<tr>
<td>White pine</td>
<td>21</td>
<td>75</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>75</td>
<td>135</td>
</tr>
</tbody>
</table>

*Incomplete increment core, no estimate of actual age possible.

Criteria met and reasons for RECOMMENDED status:

This stand meets all the criteria for natural old-growth forest stands. Although the stand may be considered marginal in meeting the
naturalness criteria because of past cutting and the disturbance it receives from visitor use, it was felt that the stand was worthy of evaluation since it contained trees of a size and composition that are uncommon in this developed section of Maine.

15. VAUGHN WOODS STATE PARK

Forest type: Hemlock
Town: South Berwick
County: York
Quad: Dover East 7.5' ME., NH (1944)
Age: Not determined (not old-growth)
Stand Size: Not determined
Elevation: 20'
Date Field checked: March 18, 1982, Charles Cogbill
Status: Not Recommended. Further field work is suggested to determine the actual age of this stand.

Description

Hemlock occurs right along the shore of the Salmon Falls River and in some moderate sized ravines leading down to the river in Vaughn Woods State Park. Most of the park is a mixture of medium-aged hardwoods and hemlock is only found several trees deep near wetter sites. The trees are up to 32 inches in diameter and 80 feet tall, however they do not form a stand. Other large hardwoods occur such as red oak - 36 inches diameter; black birch 21 inches diameter, and yellow birch to 10 inches diameter. The area has old barbed wire right down along the river and multiple stumps indicate a long history of disturbance throughout the forest.

Criteria met and reasons for NOT RECOMMENDED status:

Despite the large trees this area does not have either undisturbed history or a coherent stand. However, this area has several different species present and should be noted for this unique character. Because the ages were not determined, especially the trees immediately adjacent to the shoreline, it is recommended that this be done.

16. E. PARSONSFIELD HEMLOCK

Forest type: Hemlock
Town: Parsonsfield
County: York
16. E. PARSONSFIELD HEMLOCK (continued)

Quad: Newfield 15', (1958)
Age: Not determined (second growth)
Stand Size: 5 acres
Elevation: 1000'
Date Field checked: May 28, 1982, Charles Cogbill
Status: Not Recommended.

Description

Four large hemlocks (to 36 inches diameter) grow scattered in a second-growth, forest of about 5 acres. The former farm land is still used as a woodlot and the few open-grown holdover trees do not form a significant stand.

Criteria met and reasons for NOT RECOMMENDED status:

This area is not a forest stand and is disturbed, and hence not recommended since it does not meet the criteria.
WHITE SPRUCE FORESTS IN MAINE

Introduction

White spruce (Picea glauca) is a northern boreal forest tree species found from northern New England to Alaska and at treeline in Canada. In Maine it is found along the immediate coast, on the banks of northern rivers, and scattered in the northern red spruce forest. The only conditions where it becomes dominant over any extent is in old-fields in the north. In Maine most of the white spruce stands are the result of man's abandonment of farm land and not from natural processes.

Inventory Results

Of the three white spruce stands inventoried, all of which are in the Caribou area, none warrant consideration for critical area status, due to their occurrence on what was probably abandoned farmland (Table 2 and Figure 2). Two of the areas are relatively small, one with little chance of persisting and the other with high probability of interference by the owner. One stand contains large and old white spruce, but plays only a minor role in the forest dynamics and the entire stand exists in what was probably an old field.

The significance of white spruce stands in Maine could be further refined if other stands are found and inventoried.

TABLE 2
OLD-GROWTH WHITE SPRUCE STANDS INVENTORIED

<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No. 1 Caribou</td>
<td>Aroo</td>
<td>Caribou</td>
<td>Not determined</td>
<td>10</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>2.</td>
<td>No. 2 Caribou</td>
<td>Aroo</td>
<td>Caribou</td>
<td>105 (avg.)</td>
<td>12</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>3.</td>
<td>Prestile Hill</td>
<td>Aroo</td>
<td>Caribou</td>
<td>95 (max.)</td>
<td>2.5</td>
<td>Not Rec.</td>
</tr>
</tbody>
</table>
FIGURE 2
OLD-GROWTH WHITE SPRUCE STANDS INVENTORIED
○ Not Recommended
DESCRIPTIONS OF WHITE SPRUCE FOREST STANDS INVENTORIED

1. NO. 1 CARIBOU MIXEDWOOD STAND

Forest Type: Mixedwood
Town: Caribou
County: Aroostook
Quad: Caribou 15' (1953)
Stand Size: 10 acres (approx.)
Elevation: 640'
Date Field checked: July 22, 1980 by John Grena and Chester Gage
Status: Not Recommended.

Description

An 86 acre woodlot is located west of Route 1 and north of Prestile Hill on a relatively flat site and contains both wet and well-drained soils. On the moist sites, a rich layer of plants and shrubs covers the ground. Some of these include: wild sarsaparilla (Aralia nudicaulis), common wood sorrel (Oxalis montana), ostrich fern (Matteuccia struthiopteris), jack-in-the-pulpit (Arisaema atrorubens), mountain maple (Acer spicatum) and striped maple (Acer pensylvanicum) cover the ground.

More data needs to be collected on the section of the woodlot containing old-growth white spruce (Picea glauca). The spruce are the predominant feature in this section as their 80 foot height towers above the understory and shrub layer.

The remainder of this 86 acre woodlot contains stands of hardwoods such as beech (Fagus grandifolia), sugar maple (Acer saccharum), and yellow birch (Betula lutea); areas of softwood growth of red spruce (Picea rubens), northern white cedar (Thuja occidentalis), and white birch (Betula papyrifera); as well as sections with a composition of both hardwoods and softwoods. The owner's management plan is to salvage any blowdown in the woodlot and to periodically remove trees for firewood.

Criteria met and reasons for NOT RECOMMENDED status.

The area containing white spruce is very small (10 acres), and at this stage of the inventory it is recommended that information on the locations of other stands containing white spruce be found and the areas field checked before another visit is made to this site.
2. NO. 2 CARIBOU WHITE SPRUCE

Forest Type: White spruce

Town: Caribou

County: Aroostook

Quad: Fort Fairfield 15' (1951)

Age: 105 years (average)

Stand size: 12 acres

Elevation: 540'

Date Field Checked: July 22, 1980, by John Grena & Chester Gage

Status: Not Recommended.

Description

A mixed softwood stand containing 105 year old white spruce (Picea glauca) grows on a flat between potato fields, one-half mile east of the Aroostook River in Caribou. The spruce are only a minor component, but their large size (75 to 80 feet), conical crowns, and straight trunks make them the noticeable feature as one views the stand.

This uneven-aged stand, growing on shallow clay soils, predominates along with northern white-cedar (Thuja occidentalis) and balsam fir (Abies balsamea), with a few white pine (Pinus strobus) scattered through the stand.

The stand is undisturbed except for some very light cutting on the perimeter and blowdown in the center. Within the blowdown, cedar and fir regeneration have filled the areas where trees once stood. The owners plan to leave the stand intact and construct a nature trail through it.

White spruce are of good health, and average 14 inches at d.b.h. The boles are branch-free until the crown develops 35 to 40 feet up from the ground. An increment coring of a 17 inch d.b.h., 70 foot white spruce indicates an age of 105 years.

Beneath the canopy, the following groundplants and shrubs were found starflower (Trientalis borealis), bluebead lily (Clintonia borealis), wild sarsaparilla (Aralia nudicaulis), common wood sorrel (Oxalis montana), mountain maple (Acer spicatum), and mountain ash (Sorbus americana).
2. NO. 2 CARIBOU WHITE SPRUCE (continued)

Criteria met, and reasons for NOT RECOMMENDED status:

Although this stand meets the criteria for old-growth forest stands, the naturalness of such a stand remains in doubt. It was the best of three white spruce areas that were inventoried in 1980-1981. The trees are in good health, are at least 80 feet tall, and have not been logged. In addition, the owners plan to construct a nature trail through the stand; enhancing the educational value of the area. However, the minor role played by the white spruce in the stand, and the probable initiation of the stand by man's abandonment of agricultural land reduces its significance in this inventory as a natural old-growth forest stand. Hence, it is not recommended for evaluation as a critical area.

3. PRESTILE HILL WHITE SPRUCE

Forest Type: White spruce - Balsam Fir
Town: Caribou
County: Aroostook
Quad: Caribou 15' 1953
Age: 95 (maximum, white spruce)
Stand Size: 2.5 acres
Elevation: 540'
Date Field Checked: July 22, 1980, by John Grena and Chester Gage
Status: Not Recommended.

Description

This uneven-aged white spruce-fir stand grows alongside Route 161 in Caribou. The 2 acre stand is bordered on the north by Prestile Brook.

The small stand contains white spruce (Picea glauca) exhibiting good self-pruning. Average diameter in the stand is 10 inches, with white spruce averaging 14 inches d.b.h. The largest spruce is 22 inches d.b.h. Height of the spruce ranges from 70 to 80 feet, while the fir is between 40 and 50 feet tall.

In the southern portion of the stand, an old roadway has grown in with balsam fir (Abies balsamea). Here, the trees have stagnated, and the stunted fir are in poor health.

Increment corings taken from two white spruce indicated 95 years for an 81 foot tree and 38 years for a 40 foot understory spruce.
3. PRESTILE HILL WHITE SPRUCE (continued)

Windthrow of spruce has opened the canopy allowing more light to reach the forest floor. Beneath this canopy, the following groundplants and shrubs were identified: red baneberry (Actaea rubra), whorled aster (Aster acuminatus), Canada mayflower (Maianthemum canadense), raspberry (Rubus sp.), red elderberry (Sambucus pubens) and mountain ash (Sorbus americana).

Criteria met and reasons for NOT RECOMMENDED status.

Although this stand may be borderline on meeting the criteria for natural old-growth stands, it was rejected because of its size and condition. The small extent of the stand and the windthrow present in the stand are indications that the qualities of the stand for persistence are marginal. It was felt that a larger stand, even if less populated with white spruce, would be more valuable on a state level.
RED SPRUCE FORESTS IN MAINE

Introduction

Red Spruce (Picea rubens) is an Appalachian species found from the Maritimes to southern Ontario and southern Quebec southward to Tennessee. It is more common at the southern limits of the northern boreal forest composed of black spruce (Picea mariana) and balsam fir (Abies balsamea). Stands of red spruce occur in almost all moisture and nutrient conditions. Composition of these sites is varied although the most common associate is balsam fir. To the south, the mixed hardwood forest has scattered red spruce trees. Southern stands dominated by red spruce occur only along the immediate coast, in swamps, and shallow soil sites on mountain sides. To the north of central Maine red spruce becomes more prominent on richer, well drained sites. The northern part of the state is essentially dominated by forests comprised of some red spruce. Here cedar swamps occur in wet areas, hardwoods on rich deep soils, and mixed spruce forests on the remaining sites.

Inventory Results

Twenty-one old-growth red spruce stands were selected for field checking (Table 3 and Figure 3). Seventeen areas are recommended for critical area evaluation, and one stand is already registered (Dry Town). The oldest red spruce were found in Baxter State Park aged at 320+ years.

Most of the old-growth red spruce forests identified were at elevations greater than 1500 feet, with many sites above 2000 feet and generally on steep mountain slopes. Habitats generally offering the most protection from the harsh alpine environment were saddles between mountain tops and sheltered ravines or slopes. Stands located at higher elevations or on more exposed slopes show adverse affects upon their stature and vigor. However, if left undisturbed, these and the better sites will harbor red spruce trees of substantial age, even over 300 years in some cases.

The oldest maximum age class found, as previously mentioned, was at Basin Ponds in Baxter State Park, and was 190-320 years. Most of the old-growth sites had trees with a maximum age class falling within the range of 150-250 years old. These red spruce sites varied in size from 4 to 92 acres with 20 acres as the medium stand size.

Red spruce occurred on these sites either as the dominant species or codominant with balsam fir or occasionally with other species.

The old-growth red spruce sites identified were mostly in the northern and northwestern parts of the state. A few sites were found along coastal Maine as well.
<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dry Town</td>
<td>Aroo T13 R11</td>
<td>170-190 (max. age class)</td>
<td>92</td>
<td>Reg.</td>
<td></td>
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<tr>
<td>2.</td>
<td>Chandler Mountain</td>
<td>Aroo T9 R8</td>
<td>Not determined</td>
<td>5</td>
<td>Rec./F.C.</td>
<td></td>
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<tr>
<td>4.</td>
<td>No. 9 Mountain</td>
<td>Aroo TD R2</td>
<td>120-140 (avg. max. age)</td>
<td>30</td>
<td>Rec.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Wassataquoik Lake</td>
<td>Pisc T4 R10</td>
<td>200-250 (max. age class)</td>
<td>20</td>
<td>Rec.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Traveler Mountain</td>
<td>Pisc T5 R9</td>
<td>250-300 (max. age class)</td>
<td>6</td>
<td>Rec.</td>
<td></td>
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<tr>
<td>8.</td>
<td>Basin Ponds</td>
<td>Pisc T3 R9</td>
<td>190-320 (max. age class)</td>
<td>4</td>
<td>Rec.</td>
<td></td>
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<tr>
<td>10.</td>
<td>Mooseleuk Mtn.</td>
<td>Pisc T9 R9</td>
<td>not deter. (est. 125 yr)</td>
<td>40</td>
<td>Rec./F.C.</td>
<td></td>
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<tr>
<td>14.</td>
<td>Elephant Mtn.</td>
<td>Fran Twp D</td>
<td>300+ (max. age class)</td>
<td>30</td>
<td>Rec.</td>
<td></td>
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<tr>
<td>15.</td>
<td>Sugarloaf</td>
<td>Fran T4 R2</td>
<td>200 (max. red spruce)</td>
<td>-</td>
<td>Rec./F.C.</td>
<td></td>
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<tr>
<td>16.</td>
<td>Bernard Mountain</td>
<td>Hanc Southwest Hbr.</td>
<td>135-200 (max. age class)</td>
<td>20</td>
<td>Rec.</td>
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<tr>
<td>17.</td>
<td>Buckle Island</td>
<td>Hanc Swan's Island</td>
<td>Not deter. (125 est.)</td>
<td>-</td>
<td>Rec./F.C.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Jonesborough</td>
<td>Wash Jonesborough</td>
<td>150-200 (max. age class)</td>
<td>30</td>
<td>Rec.</td>
<td></td>
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<tr>
<td>20.</td>
<td>Cathedral Woods</td>
<td>Linc Monhegan</td>
<td>143-165 (max. age class)</td>
<td>10</td>
<td>Rec.</td>
<td></td>
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</tbody>
</table>
FIGURE 3
OLD-GROWTH RED SPRUCE STANDS INVENTORIED
- Registered as a critical area
- Recommended for evaluation as a critical area
- Recommended for further study and evaluation
- Not Recommended
At 1400 feet elevation in a shallow flat saddle between two rounded ridgetops in T13 R11 WELS, there exists a mature forest of red spruce (Picea rubens) and balsam fir (Abies balsamea). These red spruce are up to 200 years in age. The forest is reproducing itself and is in an undisturbed condition, except for cutting of several white pine in the 1860's.

Photo by Hank Tyler
DESCRIPTIONS OF RED SPRUCE FOREST STANDS INVENTORIED

1. DRY TOWN (T.13 R.11) OLD-GROWTH SPRUCE FOREST

Forest Type: Spruce-fir

Town: T.13 R.11 Wels

County: Aroostook

Quad.: Allagash Falls 15' (1932)

Maximum Age Class: 170-190 years

Stand Size: 92 acres

Elevation: 1400'

Date Field Checked: September 13, 1978 by Hank Tyler and Alec Giffen

Status: Registered

Description

In a shallow saddle between two rounded ridge tops (1460 feet, and 1500 feet) on the southern town line of T.13 R.11 and T.12 R. 11 there is an undisturbed old-growth, red spruce (Picea rubens) forest. The area between the saddle is relatively flat, with a gradual slope to the south. The site is within the Allagash River drainage basin.

The forest is dominated by old-growth red spruce. The forest is uneven age with spruce replacing itself. Increment cores and size measurements were taken on four large red spruce as follows: 170 years old, 21 inches d.b.h., and 90 feet high; 190 years old, 21.5 inches d.b.h., and 85 feet high; and, 140 years old, and 11 inches d.b.h. and 87 feet high with an age of 120 years.

The spruce-fir forest (Picea rubens and Abies balsamea) is on flat land with a high water table. A rich growth of mosses is present on fallen trees and the ground. A rich undisturbed ground cover of hobble bush, (Viburnum alnifolium), snowberry, and Lycopodium annotinum. Trees in this portion of the forest also include paper birch (Betula papyrifera), beech (Fagus grandifolia) and striped maple (Acer pensylvanicum).

The western ridge contains an old-growth beech, sugar maple (Acer saccharum), and yellow birch (Betula lutea), hardwood forest. The largest sugar maples are 31 inches d.b.h., and the largest yellow birch is 24 inches d.b.h. The understory of the hardwood stands is composed of oak fern (Gymnocarpium sp.), broad beech fern (Thelypteris hexagonoptera), northern beech fern (T. Phegopteris), grape fern (Botrychium sp.), bedstraw (Galium sp.), wild sarsaparilla (Aralia nudicaulis), wintergreen (Gaultheria procumbens), creeping snowberry (G. hispidulum), wood sorrel (Oxalis montana), bunchberry (Cornus canadensis), white baneberry (Actaea pachypoda),
1. DRY TOWN (T.13 R.11) OLD-GROWTH SPRUCE FOREST (continued)

beaked hazelnut (*Corydalis cornuta*), and stiff club-moss (*Lycopodium annotinum*).

The only evidence of timber harvests in the area are the presence of several white pine (*Pinus strobus*) stumps and trunks. The area was apparently cut for pine in the 1860s. Since then, there is no record of timber operations in this immediate area. The area is included on the Register because it is an old-growth, virgin spruce fir forest.

Criteria met and reasons for RECOMMENDED status

This stand was registered as a critical area on April 20, 1979. In June 1981, the T.13 R.11 Old-Growth Spruce Stand was reevaluated using the criteria for natural old-growth forest stands. It was found to meet all these criteria and had a significant score in the ranking to warrant registration as a natural old-growth stand.

2. CHANDLER MOUNTAIN RED SPRUCE

Forest type: Red spruce - balsam fir

Town: T9 R8 Wels

County: Aroostook

Quad: Grand Lake Seboeis 15', (1954)

Age: No data

Stand Size: approximately 5 acres

Elevation: 1900'

Date Field Checked: July 26, 1980 by John Grena and Barbara Levesque

Status: Recommended for further field check and evaluation.

Description

An uncut red spruce (*Picea rubens*) stand containing large trees (largest 26 inches d.b.h.) of good form grows on the south slopes of Chandler Mountain. Chandler Mountain is 20 miles southwest of Ashland. The stand is located below the highest (1900 feet) peak protected from harvesting by a 50% slope and granitic, bouldery terrain.
2. CHANDLER MOUNTAIN RED SPRUCE (continued)

The spruce in the stand exhibit straight trunks, good pruning on the lower portion of the bole, and healthy crowns that occupy the dominant or codominate position in the canopy. Height of the tallest spruce trees is 75 feet, and the largest diameter class is 10 inches d.b.h. The trees appear healthy, but some have broken off at the base as a result of butt rot.

Components of this uneven-aged stand include balsam fir (Abies balsamea), yellow birch (Betula lutea), sugar maple (Acer saccharum) and beech (Fagus grandifolia). Fir is the second major species in the stand and is well-represented, as is red spruce, in the understory and regeneration strata. Shrubs in the lower understory include striped maple (Acer pensylvanicum), and mountain maple (Acer spicatum).

The forest floor contains a 2 to 3 inches organic pad of needles and moss. Beneath this a rocky albic and thin spodic (orange-yellow) horizon comprise the surface mineral soils.

<table>
<thead>
<tr>
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</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria of naturalness and stand identity for natural old-growth forest stands. This stand is recommended despite its small size. However, it is recommended that age data be collected when the area is evaluated.

3. NIGHTHAWK MOUNTAIN

Forest Type: Red Spruce

Town: TD R2

County: Aroostook

Quad: Howe Brook 15' (1965)

Age: No data

Stand Size: No data
3. NIGHTHAWK MOUNTAIN (continued)

Elevation: 1000'+

Date Field Checked: November 12, 1981, Cogbill

Status: Not Recommended.

Description

The summit of Nighthawk mountain is recently cut-over and contains no stand of any integrity. It is uncertain if this forest was ever dominated by red spruce as the remaining are a moderately dense forest of beech, birch and maple with little spruce.

Criteria met and reasons for NOT RECOMMENDED status

This area does not meet any of the criteria because it was recently cut for timber.

4. NUMBER NINE MOUNTAIN RED SPRUCE STANDS

Forest Type: Red Spruce

Town: TD R2

County: Aroostook

Quad: Howe Brook 15' (1965)

Age: 120-140 (avg. max. age)

Stand Size: 60 acres

Elevation: 1400'

Date Field Checked: July 24, 1980 by John Grena

Status: Recommended.

Description

The northwest slope of Number Nine Mountain supports two relatively uncut stands of red spruce (Picea rubens) that exhibit good form and health. Each stand covers 30 acres; signs of cutting are absent in the northern stand, while the stand to the south of it has stumps remaining from a cut performed over 30 years ago. Both are located approximately eight miles west of the town of Bridgewater.
4. NUMBER NINE MOUNTAIN RED SPRUCE STANDS (continued)

Each contains scattered balsam fir (Abies balsamea) and white birch (Betula papyrifera) throughout. The 45 percent slope and ledgy terrain protects both of these even-aged stands. In contrast, the southern stand is lower in elevation by 100 feet, steeper and rockier than the northern area. The latter has a few mature sugar maple (Acer saccharum) trees growing on the better microsites.

All spruce have good, healthy crowns showing only minor defoliation from the spruce budworm. Collectively, the trees range from 65 to 70 feet tall. Most are clear of branches for 20 feet and have a live crown that occupies 40 percent of the total bole (trunk). The largest specimen is 16 inches at d.b.h. and 70 feet tall. Most were between 10 inches and 16 inches in diameter.

Ten red spruce were cored in the northern stand and all were between 120 and 138 years old.

Beneath the trees, the forest floor is covered with 1/2 inch of needle litter and moss. Groundplants and shrubs include: oxalis (Oxalis spp.), wild sarsaparilla (Aralia nudicaulis), striped maple (Acer pensylvanioum), mountain ash (Sorbus americana) and regeneration of spruce and fir.

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria of age, stand identity, and naturalness, and hence is recommended to be evaluated as a critical area.

5. WASSATAQUOIK LAKE RED SPRUCE

Forest Type: Red spruce - balsam fir
Town: T4 R10 Wels
County: Piscataquis
Quad: Traveler Mtn. 15' (1955)
Maximum Age Class: 200 - 250 years
Stand Size: 20 acres
Elevation: 1900'
5. WASSATAQUOIK LAKE RED SPRUCE (continued)

Status: Recommended.

Description

A red spruce-balsam fir stand on the northwestern ridge rising from Wassataquoik Lake contains one of the three oldest red spruce (Picea rubens) components of all the stands inventoried during 1980. In addition it is a virgin stand, in the sense that it has never been cut. It also contains spruce with the largest average diameter for spruce (22 inches) of any stand inventoried in 1980.

These spruce (largest 28 inches d.b.h.) are impressive specimens, showing excellent form as they tower over the balsam fir (Abies balsamea) understory. Their trunks are straight, cylindrical, and branch-free for 32 to 48 feet up on their 80 to 90 foot total height. Increment corings showed the trees to contain sound wood through to the center.

The annual growth rings also illustrate the increased growth of the spruce in some years, resulting from the removal of competing vegetation. One such period of increased growth was evident 60 to 70 years ago in several of the cores examined, and would coincide with the 1912 spruce budworm outbreak. As the fir died, the more resistant spruce were able to capitalize on the growing space and nutrients now available on the site. Thus, balsam fir's short life span, coupled with the periodic budworm attacks have created a two-aged, two-storied stand in which the firm component dies and is replaced while the old-growth spruce remains as the dominant tree in the stand.

Groundcover consists of common wood sorrel (Oxalis montana), ferns, and mosses.

Increment corings taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>red spruce</td>
<td>23</td>
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<td>balsam fir</td>
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<tr>
<td>balsam fir</td>
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*Incomplete core.

Diameter samples of Red spruce, in inches

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<th>Diameter</th>
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<td>21 (2)</td>
<td>28 (3)</td>
</tr>
<tr>
<td>22</td>
<td>29</td>
</tr>
</tbody>
</table>
5. WASSATAQUOIK LAKE RED SPRUCE (continued)

Criteria met and reason for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. This stand was recommended for four reasons: 1) it contains spruce over 200 years old, 2) the stand has never been cut, 3) the average diameter of the red spruce is the largest of any stands inventoried in 1980-1981, and 4) the spruce are of excellent form and sound condition.

6. TRAVELER MTN. RED SPRUCE

Forest Type: Red spruce - balsam fir
Town: T5 R9 WELS
County: Piscataquis
Quad: Traveler Mtn. 15' (1955)
Maximum Age Class: 250-300 years
Stand Size: 6 acres
Elevation: 2400' - 2600'
Date Field Checked: May 13 and 15, 1980 by John Grena
Status: Recommended.

Description

Red spruce (Picea rubens) aging 252 years is located on Traveler Mountain between North Traveler Mountain and The Traveler. This uneven-aged spruce-fir stand grows at an elevation between 2400 and 2600 feet, within a valley at the source of Howe Brook. This valley faces west and has a slope between 30 and 40 percent.

Ice and wind have influenced the stand by restricting the height growth (maximum 65 feet), and thinning to create openings in the stand. Within these openings red spruce and fir (Abies balsamea) regeneration of all ages has replaced the fallen trees. Most trees are in fair health and of good form. The best specimens of red spruce are found along the Howe Brook ravine. Although the sides of the ravine have a 50% slope, the area offers protection, along with a water supply enabling trees in the ravine to have better form than others in the stand.
6. TRAVELER MTN. RED SPRUCE (continued)

Ten prism plots were stratified throughout the stand after a boundary had been traversed with hand compass and sketched. Data on species, diameters and increment corings appears below.

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>Red spruce</th>
<th>Balsam fir</th>
<th>Hardwood</th>
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<th>Red spruce</th>
<th>Balsam fir</th>
<th>Hardwood</th>
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Average d.b.h. 13.1 10.5 7.9

Increment Corings

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<tr>
<td>d.b.h.</td>
<td>age (yrs.)</td>
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<td>6&quot;</td>
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<td>6&quot;*</td>
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<td>164</td>
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<tr>
<td>19&quot;</td>
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*Incomplete core. Estimated age 216 years; calculated by multiplying 1/2 d.b.h. by the average rings/inch (24).
6. TRAVELER MTN. RED SPRUCE (continued)

Other tree species in the stand include: red maple (Acer rubrum) and white birch (Betula papyrifera). Groundplants found were bunchberry (Cornus canadensis), oxalis (Oxalis sp.) and sphagnum moss (Sphagnum sp.).

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. It was recommended because it contains very old spruce trees, and has never been cut. In addition, it has a beautiful cascading brook dissecting it, and is replenishing itself with spruce and fir in an uneven-aged condition.

7. NORTH TRAVELER RED SPRUCE

Forest Type: Red Spruce

Town: T5 R9 WELS

County: Piscataquis

Quad: Traveler Mountain 15' (1955)

Age: 230-300 (max. age class)

Stand Size: 25 acres

Elevation: 2000' - 2450'

Date Field Checked: 29 Oct. 1981, Charles Cogbill, Fred Rooney, Sally Rooney

Status: Recommended.

Description

This red spruce stand is along a small stream on the north slope of North Traveler Mountain. It lies on a line from the highest point of Barrell Ridge to the wet flat on the ridge just west of North Traveler Peak. It is a 0.6 mile bushwack due north from North Traveler. The "V" shaped valley has facing slopes of 15° to 25° and opens to the north. It drains onto the saddle (at 1820 feet) between Dry Brook and Middle Fowler Pond. The stand occupies the seepy slopes about 300 feet to the east and 700 feet to the west of the stream from 2450 feet down to about the 2000 feet contour. It is uncertain how this portion is related to Big Black Ravine, but the stand appears to be an upper extension of the forest on the saddle below. The ridge to the east of the stand was burned (1905?) and supports white birch (Betula papyrifera). The slope crest itself has a young stand of balsam fir (Abies balsamea) with lesser amounts of red spruce (Picea rubens). The west slope (Facing NNE) has a less dense, but slightly larger growth of old spruce then the east side (facing NNW) of the brook. Above 2450 feet the forest becomes very open with...
blowdowns common, and containing much yellow birch (Betula lutea) and fir. This smaller growth continues on the ledges to North Traveler peak.

The stand is dominated by red spruce of median size of 9 inches diameter at breast height (dbh) with scattered fir (median 7 inches dbh). There are commonly large red spruce (maximum 24 inches dbh) and fir (maximum 16 inches dbh) emerging above the general 60 foot canopy. Some of these tall spines are dead and fallen. A majority of the stand is red spruce covering all size classes up to 16 inches, with fir secondary up to 8 inches dbh. Saplings are mostly 2 inches dbh spruce with the more common fir represented as 2 foot tall seedlings covering 30% of ground surface. The ground is covered (85%) with moss, predominantly Hylocomnium splendens, with common herbs (e.g. Coptis groenlandica, Cornus canadensis). The soil is a shallow and imperfectly drained loamy silt. The pH is 4.8 and it is filled with small gravel fragments of Traveler Rhyolite. The humus layer is thick (average 3 inches) and covers a scattered layer of charcoal. Many downed logs cover the ground as the dead trees fall and are being incorporated into the soil surface.

A sample of 680m² divided between two plots on the two slopes indicates an average of 824 trees (more than 4 inches dbh) and 37.5 m² basal area per hectare. Red spruce comprises 77% of the number of trees and 87% of the basal area while balsam fir has 16% density and 9% of the basal area in the stand. Obviously, spruce is dominant and relatively larger than fir. Several medium sized white birch contribute to the remaining 7% density and 4% basal area. Along the stream are several cedar (Thuja occidentalis, maximum 13 inches dbh) which were not included in the plots. The median age of 9 trees covered is 230 years and the oldest is 301+ years. The stand appears to be even-aged and started 300 years ago. The larger trees have good form, although they are limited in height by the rugged mountain climate. The stand is becoming ragged as the initial individuals are blown down.

Criteria met and reasons for RECOMMENDED status

This stand appears to be uncut, but initiated after a fire long ago. It is old-growth with trees 300 years old. The forest along a narrow drainage way might extend onto the saddle below. There it might exhibit massive growth, and certainly enlarge the stand considerably. Within its known boundaries it is an excellent example of lower elevation mountain spruce forest and form a nice comparison with the nearby Howe Brook stand on Traveler Mt. The latter stand is an upper ravine (2400 - 2600 feet) forest with more birch (14% of basal area) and fir (12% of basal area). Together they form a continuous variation of elevational types in the same topography above and below 2400 feet. With the possible stand on the saddle and stunted forest at higher elevations, this series is an excellent example of spruce forests from 1700 feet to 3000 feet in Baxter State Park. Both these pockets have escaped recent fires and form the only known continuous series of old-growth forest up a mountainside in the Katahdin region.
8. **BASIN PONDS RED SPRUCE**

Forest type: Red Spruce  
Town: T3 R9 WELS (Mt. Katahdin Twp.)  
County: Piscataquis  
Quad: Katahdin 15' (1949)  
Age: 190-320 (max. age class)  
Stand Size: 4 acres  
Elevation: 2600-2800'  
Status: Recommended.

**Description**

This ragged stand of red spruce (*Picea rubens*) lies above Basin Ponds just below North Basin on the eastern side of Mt. Katahdin. It is on the east facing slope which is capped by the moraine at Blueberry Knob. It is reached by following the Chimney Pond Trail from Roaring Brook Campground. The North 2.3 miles Basin cutoff trail goes across the contour west of Basin Ponds and then climbs steeply up to the knob. The stand abuts the trail to the North after it begins the steep ascent. It extends 260 feet along the trail and the same distance to the north. The ground is rugged and ledgy with scattered talus and boulder fields.

Between the Basin Ponds and Hamlin Ridge in Baxter State Park is an old-growth, undisturbed stand of red spruce and balsam fir (*Abies balsamea*). The red spruce average 190 years in age, with the oldest specimen over 320 years old. The stand lies north and adjacent to the Cutoff trail on a ridge that forms North Basin. The ages of trees cored are: 240, 154, 225, 111, 177, 211, 255, 274 and 141 years old.

Growing at an elevation of 2700 feet, the condition of the trees in the stand reflects the severe environment on this site. The soils are extremely shallow, and the terrain is strewn with granitic boulders and rocks that create crevices and mounds. Beneath these boulders and within these crevices are underground streams and pools that collect and store the runoff and snowmelt. The trees are rarely taller than 50 feet, although there are some 60 foot specimens. The largest spruce measures 18 inches d.b.h. All of the trees have windblown crowns, and many exhibit broken tops as a result of wind and ice storms. This site has one of the oldest best developed old-growth red spruce stands in the state.
8. **BASIN PONDS RED SPRUCE (continued)**

Criteria met and reasons for **RECOMMENDED** status

This very significant stand is highly recommended for critical area status because it meets all the criteria of age, stand identity and naturalness.

9. **PRIESTLY MOUNTAIN RED SPRUCE STAND AND SUGAR MAPLE STANDS**

Forest Type: Red Spruce

Town: T10 R13 WELS

County: Piscataquis

Quad: Umsaskis Lake 15' (1932)

Age: 120-230 years

Stand Size: 6 acres

Elevation: 1500' (red spruce-balsam fir), 1350'-1406' (sugar maple)

Date Field Checked: October 1, 1980, John Grena, Tom Eubanks

Status: Recommended.

**Description**

The eastern slope of Priestly Mountain contains two small old-growth stands along the fire tower trail: a red spruce-balsam fir stand (elevation 1500 feet) and a sugar maple stand (elevation approximately 1350-1400 feet). Priestly Mountain borders Priestly Lake to the west and is 2-1/2 miles south of Umsaskis Lake.

The red spruce (Picea rubens) - balsam fir (Abies balsamea) stand contains overstory red spruce that averages 16.5 inches d.b.h., with 24 inches as the largest. The trees in this 6 acre stand (approximately) show fair form and health.

The sugar maple (Acer saccharum) stand, 2-3 acres in size, contain trees 20 inches or more at d.b.h. The maple are straight, 70 feet tall and in fair health. The trunks are branch-free 25 feet up from the ground until the crown begins. Other species in this shallow ravine are: yellow birch (Betula lutea), beech (Fagus grandifolia) and red spruce (Picea rubens).

Soils on the mountain consist of 1/2 inch thick organic pad followed by a sandy loam surface mineral layer. Beneath this layer the soil texture changes to a light clay strewn with many rocks and pebbles.
9. PRIESTLY MOUNTAIN RED SPRUCE STAND AND SUGAR MAPLE STANDS (continued)

Groundplants and shrubs in the stands include: striped maple (Acer pensylvanicum), oxalis (Oxalis sp.), Canada mayflower (Maianthemum canadense), bluebead lily (Clintonia borealis), bunchberry (Cornus canadensis), wild sarsaparilla (Aralia nudicaulis), hobblebush (Viburnum alnifolium), starflower (Trientalis borealis), polypody fern (Polypodium vulgare), and spinulose shield fern (Dryopteris spinulosa).

Date collected in the stand appears below

<table>
<thead>
<tr>
<th>Increment Corings taken at d.b.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
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<td>red spruce</td>
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<tr>
<td>red spruce</td>
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<tr>
<td>sugar maple</td>
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*partial core, estimated age.

D.b.h. of Red Spruce

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<th>D.b.h. of Red Spruce</th>
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<tr>
<td>11 (2)</td>
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<td>13 (2)</td>
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<td>18</td>
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<tr>
<td>19</td>
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</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

This area meets the criteria for age, stand identity and naturalness, and thus is recommended for critical area designation.

10. MOOSELEUK MOUNTAIN MIXEDWOOD STAND

Forest Type: Red spruce - Balsam Fir

Town: T9 R9 WELS

County: Piscataquis

Quad.: Millinocket Lake 15' (1954)

Age: Not determined

Stand Size: Not determined

Elevation: 1500'-2000'

Date Field Checked: July 26, 1980 by John Grena
10. MOOSELEUK MOUNTAIN MIXEDWOOD STAND (continued)

Status: Recommended for further field check and elevation.

Description

The east side of Mooseleuk Mountain contains an uncut, 40 acre spruce-fir stand composed primarily of red spruce (Picea rubens) and balsam fir (Abies balsamea). Mooseleuk Mountain is located in the northeast corner of Piscataquis County. At 45 percent slope, boulders, and ledges protect the stand. Although no increment corings were taken of the spruce, they are estimated to age over 125 years, based on field work done at similar elevations.

The other principal associated species found at the lower elevations include: white birch (Betula papyrifera), yellow birch (Betula lutea), sugar maple (Acer saccharum), and American beech (Fagus grandifolia).

The most healthy and well-formed spruce are found at the lower elevation. The trees display good crowns, and are branch-free for 12 feet up from the ground. The largest spruce is 22 inches d.b.h. and 80 feet tall. Average diameter is 15 inches, while 67 is the average height. At an elevation of 2000 feet, the form and health of the trees become poor, reflecting the harsh growing conditions present at this site. Most are small, with windblown crowns.

The area is sufficient in size to persist, barring any cutting operations. The potential for logging in the near future seems unlikely due to the small size of the spruce, the inaccessibility, and the low percentage of fir, which precludes the need for any budworm salvage cuts.

Variety of species and undisturbed nature create favorable conditions for wildlife habitat. South of the stand, near Willard Mountain, however, has been cut and is evidenced by a winter logging road. Plants and shrubs recorded include: violets (Viola spp.), oxalis (Oxalis spp.), wild sarsaparilla (Aralia nudicaulis), marginal wood fern (Dryopteris marginalis), hobble bush (Viburnum alnifolium), mountain maple (Acer spicatum), and striped maple (Acer pensylvanicum).

Another field check is recommended to adequately evaluate this stand. Information on ages and acreage needs to be collected. Only 40 of an estimated 200 acres were surveyed, and it was felt that additional stands of the same quality exist on the mountain.

Measurements taken on this 40 acre area appear below:

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>r. spruce</th>
<th>fir</th>
<th>w. birch</th>
<th>y. birch</th>
<th>beech</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-80-
10. MOOSELEUK MOUNTAIN MIXEDWOOD STAND (continued)

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>r. spruce</th>
<th>fir</th>
<th>w. birch</th>
<th>y. birch</th>
<th>beech</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>13</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>15</td>
<td>8</td>
<td>7.3</td>
<td>7.0</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria of naturalness and stand identity for natural old-growth forest stands. No data is available on ages, although the spruce are estimated to be over 100 years old. It is recommended that the area be re-field checked and the age of the trees determined as part of the evaluation.

11. NESUNTABUNT RED SPRUCE – WHITE PINE STAND

Forest Type: Red spruce – White pine
Town: T1 R11 WELS, Rainbow Town
County: Piscataquis
Quad: Harrington Lake, 15', (1954)
Age: 140 to 170 years
Stand Size: 10 acres
Elevation: 950'
Date Field Checked: June 24, 1980 by John Grena
Status: Recommended.
Description

An old-growth stand of red spruce (*Picea rubens*) and white pine (*Pinus strobus*) displaying excellent form and health grows on the northern Nesuntabunt Mountain. The steep, 42 percent slope and ledges found on these eastern slopes near Nahmakanta Lake have protected the stand from harvesting. The Appalachian Trail will be rerouted through the stand, and its corridor should offer protection to the trees in the future.

The trees occupy the best micro-sites, growing in the deepest soils among the boulders and ledges. Both the spruce and the pine are of high quality, exhibiting cylindrical trunks, good crowns, and natural pruning that makes this an exemplary natural stand. Trees are at least 140 years old.

The stand is even-aged, occupying a ten acre area. Throughout the stand, red spruce is the dominant plant on the needle-covered forest floor.

Data collected on twenty trees appears below. Average d.b.h. (diameter at breast height) of red spruce is 17 inches and 23 inches for white pine.

<table>
<thead>
<tr>
<th>d.b.h. (inches)</th>
<th>Red Spruce</th>
<th>White Pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Increment corings at d.b.h.**

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Age (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red spruce</td>
<td>16</td>
<td>142</td>
</tr>
<tr>
<td>Red spruce</td>
<td>16</td>
<td>145</td>
</tr>
<tr>
<td>White pine</td>
<td>18</td>
<td>167</td>
</tr>
</tbody>
</table>
11. NESUNTABUNT RED SPRUCE - WHITE PINE STAND (continued)

Criteria met and reasons for RECOMMENDED status

This modest size stand is recommended for critical area designation because it meets the criteria for age, stand identity and naturalness.

12. HURD MOUNTAIN RED SPRUCE STAND

Forest Type: Red spruce
Town: T6 R15 WELS
County: Piscataquis
Quad: Caucomgomoc Lake 15', (1958)
Age: 150-200 years (max. age class)
Stand Size: 15 acres
Elevation: 980'
Date Field Checked: September 16, 1980, by John Grena
Status: Recommended.

Description

Large diameter old-growth red spruce (Picea rubens) grow east of Hurd Mountain (elevation 980 feet) within a stand containing a mixture of species. The stand is located six tenths of a mile northwest of Hurd Pond on a 5% slope. The area shows no signs of man-made disturbance except for a few scattered spruce stumps left from cutting many decades ago. The spruce in the stand are 150 years old.

Approximately ten white pine (Pinus strobus), all larger than 30 inches d.b.h. (diameter at breast height), are scattered through the stand. A 47 inch d.b.h. white pine found in this stand is the second largest white pine discovered during the 1980 inventory. On the lower portion of the trunk, axe cuts, now partially covered with callus growth were discovered. It is estimated that the pine was cut into a hundred years ago to test whether the pine was solid.

Red spruce is the major component, but grows in association with hemlock (Tsuga canadensis), northern white-cedar (Thuja occidentalis), white birch (Betula papyrifera), white pine, red maple (Acer rubrum) and balsam fir (Abies balsamea). The spruce are of good health and excellent form, with the largest diameter class at 26 inches and the tallest trees, 80 feet. The trunks are free of branches 21 feet up from the ground.
12. HURD MOUNTAIN RED SPRUCE STAND (continued)

Diameters at breast height observed for the associate species are as follows: red maple, 3 to 8 inches; hemlock, 9 to 12 inches; northern white cedar, 6 to 11 inches; and white birch, 9 to 15 inches.

Red spruce increment corings taken at D.b.h.

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18&quot;</td>
<td>100</td>
</tr>
<tr>
<td>19&quot;</td>
<td>112</td>
</tr>
<tr>
<td>19&quot;</td>
<td>130</td>
</tr>
<tr>
<td>20&quot;</td>
<td>156</td>
</tr>
</tbody>
</table>

Number of Red spruce by d.b.h. (inches) classes

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>number</th>
<th>d.b.h.</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>26</td>
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</tr>
<tr>
<td>17</td>
<td>1</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>8</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Soils are a Spodosol type with a heavy clay texture in the surface layer. The ground is covered with an organic pad and a litter layer of needles and hardwood leaves.

Shrubs and ground plants include:

- ironwood (Ostrya virginiana)
- spinulose woodfern (Dryopteris spinulosa)
- gold thread (Coptis groenlandica)
- creeping snowberry (Gaultheria hispidula)
- shining clubmoss (Lycopodium lucidulum)
- bluebead lily (Clintonia borealis)
- starflower (Trientalis borealis)
- wild sarsaparilla (Arabia nudicaulis)
- trillium (Trillium sp.)
- Canada mayflower (Maianthemum canadense)

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. It is valuable because of both its location and the old-growth component. The stand is found in flat terrain within an intensively managed area.
12. HURD MOUNTAIN RED SPRUCE STAND (continued)

In addition, it is the only stand in this portion of Maine that contains trees of this size, found in an undisturbed site; and it is one of the few red spruce areas inventoried that is not found on a harsh site, such as a steep mountain slope.

13. FIRE WARDEN'S TRAIL-BIGELOW MOUNTAIN

Forest Type: See below

Town: Wyman T4 R3 BKP WKR and Dead River T3 R3 BKP WKR

County: Somerset

Quad.: Stratton

Age: 60-80 (avg)

Date Field Checked: June 15, 1980 by John Grena, Caren Caljouw and Terry McGovern

Status: Not Recommended.

Elevations and Descriptions

A study of the vegetation along the Fire Warden's Trail was conducted using an altimeter. Below are the notes collected at various elevations along the trail.

1600 feet: A mixed hardwood stand that had been high-grade logged for red spruce (Picea rubens) and white pine (Pinus strobus) approximately 35 years ago.

1800 feet: Balsam fir (Abies balsamea) and red spruce predominant species, along with associated white birch (Betula papyrifera). An increment core of a 15 inches diameter red spruce showed it was 60 years old.

2200 feet-2600 feet: Small-diametered, mixed hardwood species such as red maple (Acer rubrum), striped maple (Acer pensylvanicum) and white birch. A few scattered 18 inches diameter red spruce.

2700 feet: Spruce-fir stand averaging 8 inches in diameter at breast height, and 80 years old. One, 20 inches diameter red spruce aged 100 years.

3000 feet-3300 feet: Even-aged spruce-fir stand, averaging 70 years in age.

3700 feet: Spruce-fir stand with an average diameter at breast height at 7 inches. A 14 inches white birch was 125 years old, and 9 inches red spruce had 103 annual rings.
13. **FIRE WARDEN'S TRAIL-BIGELOW MOUNTAIN (continued)**

- 3950 feet: Spruce-fir stand averaging 9 inches in diameter at breast height.
- Bigelow col, 4000 feet: Spruce-fir averaging 5 inches in diameter at breast height.
- West Peak, 4150 feet: Increment core taken from a 5-inch diameter balsam fir indicated 55 years of growth.

Criteria met and reasons for **NOT RECOMMENDED** status

No old-growth stands were discovered on this survey.

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14. **ELEPHANT MOUNTAIN OLD-GROWTH RED SPRUCE**

Forest Type: Red spruce - Balsam Fir

Town: Twp. D

County: Franklin

Quad.: Oquossoc 15' (1940)

Age: 300+ years (max. age class)

Stand Size: 30 acres

Elevation: 2880'-3000'

Date Field Checked: June 19, 1980 by John Grena, John DelVecchio, and Alec Giffen

**Status:** Recommended.

**Description**

An uncut stand containing old-growth red spruce (*Picea rubens*) grows in the saddle between Elephant Mountain and Old Blue Mountain, along the Appalachian Trail near South Arm. Some of the spruce in this balsam fir (*Abies balsamea*) stand are over 300 years old and have a diameter larger than 27 inches at breast height. Average diameter of the fir, which is the predominant species, is 10 inches at breast height.

The old-growth red spruce are found on either side of the Appalachian Trail, near the junction of the Clearwater Brook Trail. From this junction, the trees extend 700 feet north, and 1000 feet south along the Appalachian Trail. Elevation is between 2880 and 3000 feet.
This fir stand is uneven-aged, containing an old-growth spruce component and younger age classes of fir spruce. The oldest spruce is 22 inches at d.b.h. and 284 years old. This is the tree's age at breast height; and estimating the years needed to reach breast height from a seedling would easily place the tree at 310 years or older. Since this diameter is well represented in other trees in the stand, it is assumed that there are other trees in the stand of this age. Increment corings of other trees are listed following.

### Increment Corings at D.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h.</th>
<th>Age</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>red spruce</td>
<td>22&quot;</td>
<td>284</td>
<td>75'</td>
</tr>
<tr>
<td>red spruce</td>
<td>21&quot;</td>
<td>200+</td>
<td>--</td>
</tr>
<tr>
<td>red spruce</td>
<td>19&quot;</td>
<td>141</td>
<td>69'</td>
</tr>
<tr>
<td>red spruce</td>
<td>15&quot;</td>
<td>161</td>
<td>66'</td>
</tr>
<tr>
<td>red spruce</td>
<td>6&quot;</td>
<td>160</td>
<td>57'</td>
</tr>
<tr>
<td>balsam fir</td>
<td>9&quot;</td>
<td>65</td>
<td>45'</td>
</tr>
</tbody>
</table>

The present structure and composition in the stand illustrates the dynamics involved in this climax stand. The structure, revealed through the increment corings and tree height; along with the climax condition controlled by site, species adaptability, and disturbances are two characteristics used to interpret the development in this stand.

Data from increment corings indicates that at least 4 age classes are present in the stand. These are represented by the ages; 280, 160, 140 and 60 years. This data reveals that the stand is uneven-aged because the trees originated at different times. In addition, because the stand has not been harvested and is old, the irregular canopy level present when the stand was young has grown into one main canopy (50 feet). The only trees higher than this are the oldest spruce that are 75 feet tall.

The stand maintains itself as a climax, directed by the site, the species adapted to the site, and the natural disturbances. The protected location between two peaks enables the long-lived red spruce to obtain its large size and old age. The high elevation offer some protection from the spruce budworm, enabling old age to be the major cause of fir mortality as the tree reaches 80 years of age.

Thus, the fir and spruce seedlings, both of which are tolerant of shade, can respond when released from competition with the overstory trees. These seedlings replace the dead trees in these areas by growing into the site. In this way, the stand replenishes itself with new growth in small pockets throughout the stand (uneven-aged condition), instead of the whole stand being replaced at one time by a major disturbance, characteristic of an even-aged stand.

The red spruce averages 19 inches d.b.h., and the largest tree is 28 inches d.b.h. The diameter class with the most trees and largest size is 21
14. ELEPHANT MOUNTAIN OLD-GROWTH RED SPRUCE (continued)

inches. Sixteen of the approximately 45 old-growth red spruce were measured. Most show signs of old age, having crowns that are dying. However, the boles of all trees bored were found to be solid.

Scattered throughout the stand are rocks and boulders, possibly carried here by glaciers, that contain quartz, biotite and muscovite. These erratics are either granite or quartzite. Surface soils on the site consist of a rich, dark 3 inch organic layer, a 1/4 inch leached, albic horizon, followed by a dark red spodic horizon. Surface texture is a loam.

Regeneration on the site is predominately fir that is one foot high. Red spruce seedlings are also found on the forest floor. A fir seedling was found to be 13 years old, illustrating the ability fir and spruce have to establish themselves and survive for many years in the shade.

Groundplants include: bryophytes, oxalis (Oxalis montana), Canada mayflower (Maianthemum canadense), blue-bead lily (Clintonia borealis), twinflower (Linnaea borealis), goldthread (Coptis trifolia), and shield fern (Dryopteris sp.).

The following species are located near two underground streams that surface in the stand: sphagnum moss (Sphagnum spp.), whorled aster (Aster acuminatus) and starflower (Trientalis borealis).

Trees scattered throughout include: white birch (Betula papyrifera) and mountain-ash (Sorbus americana).

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. The major reasons that this stand is placed in the recommended category are: 1) the stand contains trees over 300 years old, and 2) the area is located along the Appalachian Trail, where it can be readily viewed by hikers. It is important to note that the red spruce are senescent, and not among the healthier red spruce trees examined during the 1980-1981 inventory. However, their location along the Appalachian Trail enhances the value of the area because the trees can be viewed by the public; whereas, some of the more healthier spruce are located in inaccessible areas.

15. SUGARLOAF MOUNTAIN—BURNT HILL SURVEY

Forest type: Red spruce

Town: Crockettown - T4 R2 BKP WKR

County: Franklin

Quad.: Stratton 15', (1956)

Age: 200 years (max. age class)
Elevations and Descriptions

A survey of the vegetation between the peak of Sugarloaf Mountain and Burnt Hill was conducted to gain information on the composition and ages of the stands in this uncut area.

The composition at the lower elevations (3200 feet) between these two peaks was predominantly balsam fir (Abies balsamea) with a mixture of red spruce (Picea rubens), white birch (Betula papyrifera), striped maple (Acer pensylvanicum), red maple (Acer rubrum) and mountain ash (Sorbus americana).

Below is the data collected on age, progressing from Sugarloaf Mountain east to Burnt Hill.

a) The eastern slope of Sugarloaf Mountain at 4100 feet elevation. A 2 inches diameter (at 1 foot above ground level) fir, 13 feet tall, was 62 years old.

b) On the rise (elevation 3200 feet) between the mountains. A 17 inches diameter (at breast height — 4.5 feet) fir was 77 years old and 40 feet tall.

c) West of the summit of Burnt Hill at an elevation of 3200 feet. A 18 inches diameter (at breast height) red spruce was 200 years old and 55 feet tall.

d) Southwest of Burnt Hill Peak at an elevation of 2600 feet. A red spruce with a diameter at breast height of 20 inches and a height of 60 feet was 150 years old.

Criteria met and reasons for RECOMMENDED status

This high elevation saddle does represent a virgin forest; however, it is felt that it does not fit the definition of a natural old-growth stand because the trees found to be over 100 years of age were isolated, scattered specimens and were not located within a stand.

It is recommended that additional high elevation areas be inventoried on Sugarloaf and Crocker Mountains as part of the evaluation of this area.
16. BERNARD MOUNTAIN RED SPRUCE

Forest Type: Red Spruce

Town: Southwest Harbor

County: Hancock

Quad: Mount Desert 15 feet (1965)

Age: 135-200 (max. age class)

Stand Size: 20 acres

Elevation: 700 - 1050'

Date Field Checked: October 30, 1980 John Grena; April 30, 1982 Charles Cogbill, Ed Cook

Status: Recommended.

Description

This stand covers part of Bernard Peak (1065 feet) on Western Mountain. The area extends from across Knight Nubble (1069 feet) the drainage valley south of Little Notch (870 feet) and around to the south ridge of Western Mountain. It lies on the upper slopes (above 800 feet) of the southeast side of Bernard Peak. It is an heterogenous area of exposed ridges and protected notches and supports a forest variously blowndown, on an old burn, or on a talus slide. The best developed forest is on the slopes in small notches, but despite structural differences, the entire slope seems to have much the same forest history and composition. In 1959 R. B. Davis (Ph.D. thesis, Cornell University, 1961) sampled several small plots in the vicinity and all indications (including Davis' memory) are that at least some of the Western Mountain site was scattered within the present area. The area is most easily reached by the Sluiceway Trail (red metal blaze) 1 mile from the Western Mountain Truck Road to Little Notch. At the base of the last slope (1500 feet before Little Notch), an abandoned trail diverges to the west across a small stream and up to a small notch just south of Bernard Peak. Another trail passes over the entire ridge of Western Mountain. The stand has an arbitrary boundary as follows: starting on the flat (700 feet elevation) at the base of the small stream from Little Notch following the abandoned trail west up to east slope of Bernard Mountain to the small dip on the south ridge then north along the ridge trail to Bernard Peak then northeast along the trail through Little Notch to Knight Nubble then south-southwest to the starting point. The primary stand used for characterization is in Little Notch on the eastern to southeastern face of Knight Nubble at about 875 feet. The total area is roughly 20 acres.

The stand is dominated by red spruce (Picea rubens) with a mixture of yellow birch (Betula lutea), red maple (Acer rubrum), balsam fir (Abies balsamea) and some residual white birch (Betula papyrifera). The stand is variably affected by windthrow, being almost completely blowndown on Bernard
16. BERNARD MOUNTAIN RED SPRUCE (continued)

Peak to scattered downed trees with an 80% canopy cover (70 feet tall) in the notches. The openings are filled with fir and secondary spruce seedlings along with ferns (Dryopteris spinulosa). The rest of the forest floor is covered with feathermoss and Dicranum mosses and liverworts (Bazzania trilobata) with only an occasional vascular plant (i.e., Vaccinium vitis idaea, Lycopodium obscurum). The soil is a mottled silty loam with a pH of 4.2 and scattered charcoal. There is a moderately developed A2 horizon but the majority of the site is shallow to bedrock over ledge or talus. Cedar (Thuja occidentalis) are found along the stream and on seepy ledges. Remains of white birch trees are common in the forest floor.

Two sample plots of 0.06 ha area each indicate an average of 833 trees (more than 4" diameter at breast height -dbh) per hectare and 42.1 m²/ha basal area. Red spruce comprises 83% and 85% of the density and dominance, respectively. Yellow birch make up about 8% of the stand while red maple makes up 7%. There are numerous dead trees and much of the small red maple, fir saplings are dead. In the notch there is a moderate amount of windthrow. The dominant spruce are found in all size classes up to 21" dbh. The ages of the trees show distinct establishment for short periods after 1740 and 1785, and general ages dating from after 1820. The average age of the trees is 135 years. About 190 year old trees dominate the stand in Little Notch and the entire area seems to have the same history even if lacking some old trees.

This stand is uncut and appears to have started after a fine long-age. It contains old-growth with trees over 200 years old. Although there are abundant blowdowns, especially on exposed ridges, the stand in the protected notches is reasonably intact. The almost pure red spruce composition in the notch is rare in old sites. This is one if not the only stand near the coast with no history of logging. It also contains forests in a variety of conditions after wind damage. There are several different age classes possibly dating past wind storms and hurricanes. The relatively short trees and exposed sections of the stand are classic examples of the processes limiting other coastal spruce forests. This is a very good example of such forests as well as the processes forming them.

Criteria met and reasons for RECOMMENDED status

This outstanding old-growth forest stand meets all the criteria for age, stand identity and naturalness. It is highly recommended for critical area designation.

17. BUCKLE ISLAND

Forest Type: Red spruce - Balsam fir

Town: Swan's Island

County: Hancock

Quad: Swan's Island 15' (1943)
17. BUCKLE ISLAND (continued)

Age: Not determined (est. 125)

Stand Size: Not determined.

Elevation: 0-20'

Date Field Checked: September 8, 1981, Chris Davis, Janet McMahon

Status: Recommended for further study.

Description

A stand of red spruce (Picea rubens) with Balsam fir (Abies balsamea) occurs on Buckle Island, NW of Swan's Island near Casco passage; Grey birch (Betula populifolia) occurs sporadically. The site is relatively flat and has a rocky acidic soil with a thin humus layer. Regeneration of red spruce and fir is very good, with some areas having a very dense thicket of young fir, and mosses carpeting the stand. There are however, many dead and dying trees, including some of the largest specimens. The largest trees measured ranged in d.b.h. from 14 inches to 22.5 inches with an average d.b.h. of about 18 inches.

The stand appears to be coherent, with large fir about 15-20 feet apart from each other. All trees displayed open crowns, and the lowest dead branches were about 12-14 feet above ground.

Criteria met and reasons for RECOMMENDED status

This stand appears to meet the criteria for naturalness and stand identity. It is recommended that the area be field checked and age data collected before evaluation for critical area registraton.

18. JONESBOROUGH RED SPRUCE STAND

Forest Type: Red spruce

Town: Jonesborough

County: Washington

Quad: Whitneyville 7.5' (1948)

Age: 150-200 years (max. age class)

Stand size: 30 acres

Elevation: 100'

Date Field Checked: June 23, 1980 by John Grena

Status: Recommended.
18. JONESBOROUGH RED SPRUCE STAND (continued)

Description

A red spruce (Picea rubens) stand with the oldest trees being 186 years, grows west of the Chandler River in Jonesborough. There has been no cutting in the stand for over 70 years. At that time, white pine and spruce were harvested, and fragments of their stumps are present in some portions of the stand.

The spruce compose the majority of the stand and exhibit excellent form and health. Most contain good crowns and have branchfree trunks (boles) for 20 to 30 feet on their total height of 80 feet. Average d.b.h. is 13 inches, with the largest tree at 20 inches.

The stand is of sufficient size to be valuable as a protected area. The trees grown on a flat terrain with poorly drained rocky soils as well as deeper, glacial till deposits with better drainage. It is on these till deposits that white pine (Pinus strobus) and white birch (Betula papyrifera) are found. White pine average 90 feet in height. Other associated species include: balsam fir (Abies balsamea), eastern hemlock (Tsuga canadensis), red maple (Acer rubrum), yellow birch (Betula lutea), and northern white cedar (Thuja occidentalis).

Number of Trees by species and d.b.h. classes.
Based on 5, 10-factor prism plots systematically placed throughout the stand. This data represents the actual tally.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>d.b.h. (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6   7   8   9   10 11 12 13 14 15 16 17 18 19 20</td>
</tr>
<tr>
<td>red spruce</td>
<td>1   1   3   3   2  8  5  5  8  5  5  1  2  2  3</td>
</tr>
<tr>
<td>hemlock</td>
<td>1   1   3   2   1  3  1  1  1  1</td>
</tr>
<tr>
<td>white birch</td>
<td>1   2   1   1   1</td>
</tr>
<tr>
<td>balsam fir</td>
<td>1   1</td>
</tr>
<tr>
<td>red maple</td>
<td>1   1   1   2   1</td>
</tr>
<tr>
<td>yellow birch</td>
<td>1</td>
</tr>
<tr>
<td>white pine</td>
<td>2   1   1   1</td>
</tr>
<tr>
<td>cedar</td>
<td>1   1</td>
</tr>
</tbody>
</table>
18. JONESBOROUGH RED SPRUCE STAND (continued)

Increment Corings at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red spruce</td>
<td>14</td>
<td>75</td>
</tr>
<tr>
<td>Red spruce</td>
<td>14</td>
<td>115</td>
</tr>
<tr>
<td>Red spruce</td>
<td>14</td>
<td>121</td>
</tr>
<tr>
<td>Red spruce</td>
<td>14</td>
<td>143</td>
</tr>
<tr>
<td>Red spruce</td>
<td>20</td>
<td>186</td>
</tr>
<tr>
<td>White pine</td>
<td>14</td>
<td>160</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. This stand is recommended because it meets all the criteria and is the only old growth red spruce stand discovered in Washington County. Also, it is one of only two red spruce sites that is found on a good site, and not on a steep mountain slope.

19. ROQUE ISLAND RED SPRUCE

Forest Type: Red Spruce - Balsam Fir

Town: Jonesport

County: Washington

Quad: Columbia Falls 15' (1941)

Age: 215 years (max.)

Stand Size: 30 acres

Elevation: 0-40'

Date Field Checked: May 5, 1982, Charles Cogbill, Chris Davis, Alec Giffen

Status: Recommended.

Description

Most of Roque Island has been repeatedly cut over the past two centuries. Combined with repeated pulpwood cutting and a fire on Great Head about 1900, little old forest is left. The most recent extensive cutting took place in 1953 by the St. Regis Co. One stand which survived these disturbances is around Paradise Cove, (cf. R. Davis's study in 1959) which is the southwest extension of Shorey Cove, on the northwest arm of the island. The stand extends up the creek, past the ice house and pond just south of the
19. ROQUE ISLAND RED SPRUCE (continued)

Cove. Paradise Cove had a tidal sawmill on it until 1827 and the trees in the stand were affected by cutting until then. However, it appears that trees directly along the stream and around the ice-pond escaped being cut. The stand is easily reached by a trail along the shore from the houses on Squire Point, or the woods road from 1/2 mile north of the homestead which goes to the ice house and across the stand. Another trail leads from the ice pond along the stream directly through the southern part of the stand. The stand is easily recognized by the tall red spruce (*Picea rubens*) contrasting with younger growth to the east and west. The stand is delineated by the old cut lines which are approximately 380 feet apart on opposite sides of the stream at the ice pond. The stand extends about 750 feet south of the ice pond where the road crosses the stream and 250 feet north of the pond to the cove. Similarly red spruce forest occurs as a 150 feet strip and also along the east shore of Paradise cove almost to the mouth on the west side of the cove. This entire area is designated as a natural area in the forest management plan for the island.

The stand is generally flat with low-lying damp areas along the stream. The stand is dominated by large (to 23 inches dbh) red spruce and smaller (to 10 inches diameter) balsam fir (*Abies balsamea*). The overstory is about 70% spruce boles, but 85% to 95% of the basal area is spruce. The remainder of the stand is fir, with some scattered medium sized white birch (*Betula papyifera*) and red maple (*Acer rubrum*).

A sample of 2-0.05 ha plots indicates an average 880 trees (more than 4 inches diameter) and 50.6 m² basal area per hectare. There are some dead or downed yellow birch (*Betula lutea*) and maple. The understory is almost a pure thicket of 3 feet tall spruce with some fir in more open areas. The canopy is about 75 feet tall and has an average 80% closure coverage. The ground has an almost continuous cover of feathermoss and *Bazzania trilobata*. The only common herbs are *Oxalis montana* and *Maianthemum canadense*. The presence of *Vaccinium vitis-idaea* is characteristic of the coastal location. The soil is rocky, deep and moist.

The medium age of 6 bored trees is about 145 years old and the oldest is more than 215 years old.

The majority of the stand appears to have been disturbed when the sawmill was operating (before 1825). However, the trees along the stream more than 300 years old and representatives of the original forest. The stand is presently in good condition with few blowdowns. It has an open interior with tall trees in a coastal location. There is no indication of much replacement as only a few gaps have formed and they are filled with fir seedlings.

Criteria met and reasons for RECOMMENDED status

1) This stand is influenced by man at its initial stages, but appears to have had a long period of natural development.

2) It is at least 150 years old and was only disturbed by cutting before that time. The condition of the forest is remarkable for being on a coastal location.
island and is one of a few sites of old-growth near the coast. The growth of red spruce on a moist flat and the very old trees along the stream are unusual remnants of a long history of logging.

3) This exact stand was studied in 1959 by R. Davis and its present natural area status all contribute to its value as an historic and educational resource.

20. CATHEDRAL WOODS SPRUCE

Forest Type: Red Spruce
Town: Monhegan Plt.
County: Lincoln
Quad: Monhegan 7.5 (1955)
Age: 143-165 (max. age class)
Stand Size: 10 acres
Elevation: 120-140’

Date Field Checked: September 4, 1981 by Janet McMahon and Chris Davis.

Status: Recommended

Description

A tall red spruce stand is located along a hiking trail. (Cathedral Woods Tr.) in the north-central part of the island. The trees are 60 feet tall and 10 to 18 inches in diameter. The stand is almost pure spruce and the widely spaced trees form a scenic attraction. The stand appears even-aged and increment cores indicate trees 143 to 165 years old. The history of the island indicates that this area was once a cleared field and the forest developed after abandonment some 160 years ago. This is a moderately long time for a coastal forest to survive undisturbed, although not significantly old considering its origin. The good condition and long documented history make this site worthy of consideration as significant.

Criteria met and reasons for RECOMMENDED status

Although the stand developed after field abandonment, in its current condition, it meets the criteria for old-growth forests. The trail adds to the educational value of the site. It is therefore recommended for evaluation as a critical area.
21. **HOG ISLAND RED SPRUCE**

Forest Type: Red Spruce

Town: Bremen

County: Lincoln

Quad: Louds Island 7 1/2' (1955)

Age: 83-125 years (avg.)

Stand Size: Not determined

Elevation: 30-98'

Field Check: June 4, 1982, Charles Cogbill

Status: Not Recommended.

Description

The interior of Hog Island, in eastern Muscongus Bay, is a heterogenous stand of widely spaced red spruce (*Picea rubens*) (Variations in density and understory composition is due mostly to topography as the ground is alternately ledgy with low damp hollows). Much the same type of forest covers the central third of the island. The area is circumscribed by trails on both eastern and western shore and across the island from Sand Cove to Indian Cove. The southern boundary is marked by an old stone wall north of second growth forest and fields south of Hog Island Ledge. This was the site of the eighteenth century Keene house. north of the cross island, trail there are several cottages and the forest is young, second growth or mildly disturbed by activity from the presently inhabited area. The area consists of 50-60 feet more or less open grown red spruce. There are scattered balsam fir (*Abies balsamea*) with a few white spruce (*Picea glauca*), red oak (*Quercus rubra*), white pine (*Pinus strobus*), red pine (*Pinus resinosus*) and birch (*Betula lutea* and *B. papyrifera*). Most of the trees are 10 inches to 14 inches in diameter with an occasional isolated tree to 22 inches in diameter. A 0.05 ha plot along the cross-trail indicates 600 trees per hectare with a basal area of 33 m²/ha. Some 97% of the trees and 99% of the basal area is red spruce. Moss covers 95% of the ground area and prolific (30% cover) tree seedlings (spruce and fir) occur. The understory is dominated by *Maianthemum canadense*, *Vaccinium angustifolium*, *Trientalis borealis* and *Pteridium aquilinum*.

Cones from 12 trees indicate ages from 83 to 125 years. These trees live from throughout the central third of the island and are mostly 105 to 112 years old. This corresponds with R.B. Davis' 1959 study in the same stand showing 76-92 year old trees (would be equivalent to 88-104 years presently). The whole area seems to be relatively even-aged and young, despite the common occurrence of windthrown. These openings are apparently due to the open limby nature of the second-growth trees. The entire area is underlain by charcoal and appears to have been burned over at sometime about 125-130 years ago. This could be either in conjuction with land clearance or as a result of
21. HOG ISLAND RED SPRUCE (continued)

settlements on the island. Significantly there are old stumps with charcoal
on their outside. It is predictable that the island was open in the middle of
the last century.

This forest stand has been used for study by National Audubon Society for
over 50 years and is an important reference site for coastal forests (Davis
1960). It is an area representative of islands and their cultural history.
Although fairly tall and large trees occur, the whole center of the islands
shares the same rather young history.

Criteria met and reasons for NOT RECOMMENDED status

Although this stand meets the criteria for stand identity and naturalness,
it does not meet the criteria for age, and hence is not recommended.
WHITE PINE FORESTS IN MAINE

Introduction

White pine (Pinus strobus) is found from Newfoundland to Minnesota and central Quebec south to Alabama. Throughout its range it can dominate a stand, except in unusual circumstances such as on well-drained floodplains where it occurs naturally in pure composition. The vast majority of pine stands are the result of field abandonment and directly related to human settlement. Therefore, natural white pine stands are a mixture of a few pine trees in an essentially different matrix. The best expression of this type are emergent pines over northern hardwoods in the temperate transition forests in the northern tier of states around the Great Lakes. This region extends eastward to the coast in southern Maine. Pine can also occur in combination with spruce to the north, or with a wide variety of species and types in Maine. A more detailed account of white pine is provided in the planning report on old-growth white pine (Conkling 1978).

Old-Growth White Pine Inventory Results

Twenty-three potential sites for old-growth white pine have been inventoried with twelve sites being recommended for evaluation as potential critical areas (Table 4, Figure 4). Two more sites will require further field checking to determine their worthiness for such recommendation.

In several cases the old-growth white pines were present as components of red spruce-balsam fir forest, in which the aged pine trees towered above the second growth spruce-fir understory. In one case, the red spruce present were of an age considered to be old-growth as well (i.e. at the site near Moosehorn Stream in Piscataquis Co.).

On other sites, the White Pine occurred within mixed woods forests or in association with Hemlock. In a few cases old-growth pine stands mixed with other softwood tree species have been or are being harvested to varying degrees.

The maximum age class of the significant old-growth sites ranged from about 150-300 years, with most sites having white pine between the ages of 200 and 250 years. In many of these cases, the ages are extrapolations of partial increment core dating from older trees with hollow centers.

The elevations at which old-growth white pine were found vary greatly, from about 20 feet at a site near the coast (Newcastle) to about 1,500 feet on hill and mountain sides.

The old-growth white pine sites identified by this inventory were concentrated in north central Maine, some in western Maine, one in southern Maine, one in central coastal Maine and two in Washington Co.

As a result of Phil Conkling's work on old-growth white pine stands, 11 such sites have been included on the Critical Areas register. These sites are listed in Table 5 and their locations illustrated in Figure 5.
<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Cuxabexis</td>
<td>Pisc.</td>
<td>T5 R12</td>
<td>250(max age class)</td>
<td>90’ res. strips</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>3 Pine Stream Flowage</td>
<td>Pisc.</td>
<td>T5 R13</td>
<td>200-250 (max age class)</td>
<td>50</td>
<td>Rec.</td>
</tr>
<tr>
<td>4 Gero Island</td>
<td>Pisc.</td>
<td>T5 R13</td>
<td>150-200 (max age class)</td>
<td>70</td>
<td>Rec.</td>
</tr>
<tr>
<td>5 Chesuncook Lake</td>
<td>Pisc.</td>
<td>T5 R13</td>
<td>250 (est avg.), 406 (max)</td>
<td>45</td>
<td>Rec.</td>
</tr>
<tr>
<td>6 Moosehorn Stream</td>
<td>Pisc.</td>
<td>T4 R14</td>
<td>120-150 (pine max age class) 93-130 (red spruce)</td>
<td>25</td>
<td>Rec.</td>
</tr>
<tr>
<td>7 Soper Brook (E)</td>
<td>Pisc.</td>
<td>T4 R11</td>
<td>Not det.</td>
<td>3</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>8 Soper Brook (W)</td>
<td>Pisc.</td>
<td>T4 R11</td>
<td>300</td>
<td>3</td>
<td>Rec.</td>
</tr>
<tr>
<td>9 Wassataquoik Stream</td>
<td>Penob.</td>
<td>T3 R7</td>
<td>150+ (max age cl.)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>10 Spencer Lake</td>
<td>Somer.</td>
<td>T4 R6 (Hobbstown)</td>
<td>160 (avg.)</td>
<td>10</td>
<td>Rec.</td>
</tr>
<tr>
<td>11 Cold Brook</td>
<td>Somer.</td>
<td>T3 R3</td>
<td>Not det.</td>
<td>Not det.</td>
<td>Rec./F. C.</td>
</tr>
<tr>
<td>12 Huston Brook</td>
<td>Fran.</td>
<td>T3 R2</td>
<td>Not det.</td>
<td>Not det.</td>
<td>Rec./F. C.</td>
</tr>
<tr>
<td>13 French Island</td>
<td>Oxfo.</td>
<td>Roxbury</td>
<td>Not det.</td>
<td>3</td>
<td>Not Rec./F. C.</td>
</tr>
<tr>
<td>15 Narrows</td>
<td>Oxfo.</td>
<td>T4 R1</td>
<td>150-200 (max age class)</td>
<td>23</td>
<td>Rec.</td>
</tr>
<tr>
<td>16 Bear Lake</td>
<td>Oxfo.</td>
<td>Waterford</td>
<td>100 (est. avg.)</td>
<td>5</td>
<td>Not Rec./F. C.</td>
</tr>
<tr>
<td>17 Big Lake</td>
<td>Wash.</td>
<td>Grand Lake Stream</td>
<td>150 (est. avg.)</td>
<td>6</td>
<td>Rec.</td>
</tr>
<tr>
<td>18 Bald Mountain</td>
<td>Wash.</td>
<td>Baring Plt.</td>
<td>150 (est. avg.)</td>
<td>1</td>
<td>Rec.</td>
</tr>
<tr>
<td>19 Newcastle</td>
<td>Linc.</td>
<td>Newcastle</td>
<td>Not det.</td>
<td>6</td>
<td>Rec./F. C.</td>
</tr>
<tr>
<td>20 Bridgeton</td>
<td>Cumb.</td>
<td>Bridgeton</td>
<td>Not det.</td>
<td>0.5</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>21 Hollis</td>
<td>York</td>
<td>Hollis</td>
<td>150</td>
<td>12</td>
<td>Rec.</td>
</tr>
</tbody>
</table>
FIGURE 4
OLD-GROWTH WHITE PINE STANDS INVENTORIED

- Recommended for evaluation as a critical area
 triturated for further study and evaluation
- Not Recommended
<table>
<thead>
<tr>
<th>Name</th>
<th>County</th>
<th>Town</th>
<th>Size (hectares)</th>
<th>Date Registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>238. Mullen Woods</td>
<td>Penobscot</td>
<td>Newport</td>
<td>1.97</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>239. Salisbury Cove</td>
<td>Hancock</td>
<td>Bar Harbor</td>
<td>10.8</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>240. Corinna Old-Growth White Pine Stand</td>
<td>Penobscot</td>
<td>Corinna</td>
<td>0.71</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>241. Falmouth Old-Growth White Pine Stand</td>
<td>Cumberland</td>
<td>Falmouth</td>
<td>1.6</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>242. Ordway Grove</td>
<td>Oxford</td>
<td>Norway</td>
<td>3.6</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>243. The Hermitage</td>
<td>Piscataquis</td>
<td>T7 R10</td>
<td>1.9</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td>(East Bowdoin College Grant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>244. Presumpscot River</td>
<td>Cumberland</td>
<td>Falmouth</td>
<td>2.2</td>
<td>April 20, 1979</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>297. Ziegler Campground</td>
<td>Piscataquis</td>
<td>T8 R13</td>
<td>19.7</td>
<td>March 21, 1980</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>298. Vaughan Estate</td>
<td>Kennebec</td>
<td>Hallowell</td>
<td>5.0</td>
<td>March 21, 1980</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>299. Bowdoin Pines Old-Growth White Pine Stand</td>
<td>Cumberland</td>
<td>Brunswick</td>
<td>72.5</td>
<td>March 21, 1980</td>
</tr>
<tr>
<td>300. Cobbossecottee</td>
<td>Kennebec</td>
<td>Monmouth</td>
<td>27.5</td>
<td>March 21, 1980</td>
</tr>
<tr>
<td>Old-Growth White Pine Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This 54 inch diameter white pine is one of several large white pines which are scattered throughout the Cobbosseecontee hardwood stand in Monmouth. The occasional white pine is immersed in a mixture of sugar maple, American beech, red oak and white ash. The pines towering above the hardwoods are over 200 years old at this site, and may characterize the presettlement white pine-northern hardwood forests of this region. There are about two large white pine per acre.

Photo by Hank Tyler
1. CAUCOMGOMOC DAM WHITE PINE

Forest Type: White Pine
Town: T6 R14 WELS
County: Piscataquis
Quad: Caucomgomoc 15', (1958)
Age: 250 years+ (est. max)
Stand Size: Not Determined
Elevation: 1,100 feet
Date Field Checked: September 17, 1980 by John Grena
Status: Not Recommended.

Description

On either side of a major logging road in northern Piscataquis County are twenty old white pine trees. The pines grow on a gently sloping ridge (elevation 1,100 feet) and are situated 15 feet from either side of the road. The stand is one mile south of Caucomgomoc Dam between Caucomgomoc Lake and Black Pond.

The stand has recently been selectively cut. Within the residual stand, the composition consists of red spruce (Picea rubens), balsam fir (Abies balsamea), northern white cedar (Thuja occidentalis), and red maple (Acer rubrum). Diameters of these species range from 4 to 12 inches d.b.h., while the height is between 40 and 50 feet. The white pine average 23.7 inches d.b.h. and 80 feet in height. They are of fair form, but all have hollow centers.

Beneath, bluehead lily (Clintonia borealis) and Canada mayflower (Maianthemum canadense) grow on a forest floor covered with slash, needles and hardwood leaf litter. The surface mineral soil is a clay loam.

Data collected on age and diameters for white pine appears below.

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>Increment corings taken at d.b.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d.b.h. (inches)</td>
</tr>
<tr>
<td>19</td>
<td>25 (2)</td>
</tr>
<tr>
<td>21</td>
<td>26</td>
</tr>
<tr>
<td>23</td>
<td>27</td>
</tr>
</tbody>
</table>

*Incomplete cores. Estimated age based on growth is 250+ years old.
1. CAUCOMCOCOMOC DAM WHITE PINE (continued)

Criteria met and reasons for NOT RECOMMENDED status

The area did not meet the naturalness criteria for natural old-growth stands because: 1) the area has been selectively cut, and 2) the major logging road dissecting the area destroys the integrity of the pines as part of a stand.

2. CUXABEXIS STREAM WHITE PINE AREA

Forest Type: White Pine

Town: T5 R12 WELS

County: Piscataquis

Quad: Chesuncook 15' (1958)

Age: 250 (est. max.)

Stand Size: 90' residual strips from strip clearcut

Elevation: 1,140'

Date Field Checked: September 26, 1980 by John Grena

Status: Not Recommended.

Description

The pines are located on flat wet soils south of Cuxabexis Stream and west of Logan Bog.

The white pine are found in a growth of mixed softwood within strips of trees left after a strip clearcut. The 1976 harvest left alternating strips of cut and uncut areas each 90 feet in width. The residual strips are scheduled for harvest in ten years. A partial increment core taken from a 39.5 inches d.b.h., 85 foot pine indicated 143 years. Estimated age of the pine derived from the growth rate of this partial core would place the tree at 250 years old.

Criteria met and reasons for NOT RECOMMENDED status

The area does not meet the naturalness nor stand identity criteria for natural old-growth stands because it is in an intensively managed strip cut area that was harvested in 1979, and hence is not recommended for critical area status.
3. PINE STREAM FLOWAGE OLD-GROWTH WHITE PINE

Forest Type: Red Spruce - Balsam fir
Town: T4 R13 WELS
County: Piscataquis
Quad: Ragged Lake 15' (1954)
Age: 200-250 years (max. age class)
Stand Size: 50 acres
Elevation: 1,000'
Date Field Checked: September 18, 1980 by John Grena
Status: Recommended.

Description

Old-growth white pine (Pinus strobus) averaging nearly 3 feet in diameter are found in a red spruce (Picea rubens) - balsam fir (Abies balsamea) stand on the west side of Pine Stream Flowage. This area north of Little Pond shows no signs of old logging roads. However, the presence of numerous well-decayed stumps suggests that pine and spruce were cut many decades ago.

The stand is located on a wet site covered with Sphagnum and other mosses. The peaty organic layer has a fine sandy clay spodic horizon (dark orange-yellow) beneath it. Because of the wet conditions, white pine, which prefer well-drained sites, are found on the hummocks or ledges that offer better drainage.

The large number of pines in this 50 acre area, along with their large diameter and height are the outstanding features of this stand. In comparison, an 85-acre spruce-fir stand to the west is so sparsely stocked with old-growth pine that locating pine in the stand was difficult.

Growing in association in the 50 acre uneven-aged stand is red maple (Acer rubrum) and northern white-cedar (Thuja occidentalis). The height of these trees is between 50 and 65 feet. Average diameter observed for balsam fir, red maple and cedar was between 5 and 6 inches d.b.h. while red spruce was between 8 and 9 inches. Groundplants include: starflower (Trientalis borealis), bunchberry (Cornus canadensis), and wild sarsaparilla (Aralia nudicaulis).

Measurements taken in the stand on diameters and ages appears below.
3. PINE STREAM FLOWAGE OLD-GROWTH WHITE PINE (continued)

Diameter (inches) of White pine trees at breast height

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>no.</th>
<th>d.b.h.</th>
<th>no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>2</td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>1</td>
<td>43</td>
<td>1</td>
</tr>
</tbody>
</table>

Increment Corings Taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Age (years)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>White pine</td>
<td>11</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>179</td>
</tr>
<tr>
<td>Red spruce</td>
<td>12</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>80</td>
</tr>
<tr>
<td>Fir</td>
<td>8</td>
<td>54</td>
</tr>
</tbody>
</table>

*All pine over 20 inches d.b.h. were hollow, thus age given is only part of the total age. Estimated age of these pines is between 200 and 250 years of age.

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. Although the area has been selectively cut, this operation took place many decades ago and has not altered the composition to the extent that its integrity as an old-growth has been harmed. In addition, the average diameter of the pine is the largest of any stand discovered during 1980-1981.

4. GERO ISLAND OLD-GROWTH WHITE PINE STAND

Forest Type: White Pine

Town: T5 R13 WELS (Chesuncook Twp.)

County: Piscataquis
4. GERO ISLAND OLD-GROWTH WHITE PINE STAND (continued)

Town: T5 R13
Quad: Chesuncook 15' (1958)
Age: 150 - 200 years
Stand Size: 70 acres
Elevation: 1,040'
Date Field Checked: May 22, 1983
Status: Recommended.

Description

The Gero Island old-growth white pine area is an excellent example of old-growth white pine in a classically northern Maine habitat; as large scattered trees towering over a spruce-fir forest. Old-growth white pine stands in Maine are outstanding natural features, as remnants of the pine forests which shaped Maine's early history. These forests, which developed over several centuries, have been greatly reduced since Maine's colonization. Furthermore, these stands may be scientifically significant in the future as remnants of previous stands. As such, they may illustrate important points of forest ecology such as mechanisms of forest establishment and development, the effects of site factors on stand growth, and forest successional patterns.

The pines on the north end of Gero Island are between 150 and 200 years old. They have been estimated to stand 100-120 feet tall, and range up to 38 inches dbh (diameter at breast height). They are straight, forest-grown trees, with a long clear bole. These large pines are scattered throughout the spruce-fir forest which forms the second story of the two storied stand. Also present in the second story are scattered northern white cedar (Thuja occidentalis) and yellow and white birch (Betula lutea and B. papyrifera). The age of the second story trees is 75-100 years.

Summary of Values

1) This is one of the very few areas in the state with pine maintained in its natural presettlement condition.

2) In addition to their historical and scientific significance, the pines are a valuable scenic resource as well. This is particularly important in light of the use of the area for canoeing, camping and fishing.

Criteria met and reasons for RECOMMENDED status

The Gero Island old-growth white pine stand meets all the criteria and thus is recommended for critical area status.
5. **CHESUNCOOK LAKE OLD GROWTH WHITE PINE**

Forest Type: Red Spruce - Balsam Fir

Town: T5 R13, Chesuncook

County: Piscataquis

Quad: Chesuncook 15' (1958)

Pine Age: 250 years

Stand Size: approximately 45 acres

Elevation: 1,060'

Date Field Checked: September 9, 1980 by John Grena

Status: Recommended.

**Description**

White pine (*Pinus strobus*), aging 250 years with the oldest pine estimated to be 406 years old, is a component within a red spruce-balsam fir stand 6/10 mile west of Chesuncook Lake. The area is west of Baxter State Park. The stand grows on a flat, shallow-soiled site between Caucomgomoc and Little Longley streams. Old harvesting roads, now covered with fir, spruce or white birch, and the remains of stumps indicate that the area was harvested.

The pine appear to be quite dense when viewed from the lake shore but are actually widely scattered over 100 acres. The heaviest concentration occurs in the 40 acres in which measurements were taken.

Within this area, the poor site conditions and the overstocking of trees per area have resulted in small, stunted (6 inches d.b.h. or less) red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), northern white cedar (*Thuja occidentalis*), yellow birch (*Betula lutea*), and white birch (*Betula papyrifera*). These species comprise the understory in this uneven aged stand.

The white pine are tall and straight, averaging 90 to 95 feet in height, with the tallest specimens rising 100 feet. D.b.h. averages 30.2 inches with the largest tree measuring 34 inches. In form the trunks show little taper, although some exhibit sweep. Nearly all are hollow with very small crowns.

The stand's visual appearance varies markedly in relation to one's perspective. Viewed from the air or the lake's shore, the pine are impressive as they tower over the dwarfed understory spruce-fir. Once in the stand, the image changes for the pines are widely scattered in the dense spruce-fir forest, and the impact received from a distant view is lessened as one views only individual trees with marginal visual appeal.

Data collected on d.b.h. and ages appears as follows.
5. CHESUNCOOK LAKE OLD GROWTH WHITE PINE (continues)

Number of white pine by d.b.h. class

<table>
<thead>
<tr>
<th>d.b.h. (inches)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>2</td>
</tr>
</tbody>
</table>

Because most pines were hollow, the exact age could not be determined from the core. Therefore, following the annual ring count obtained from the core, the estimated age and length of the core (inches) is given in parentheses.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. (inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>white pine</td>
<td>30</td>
<td>56 (210-4 inches)</td>
</tr>
<tr>
<td>white pine</td>
<td>31</td>
<td>156 (284-8.5 inches)</td>
</tr>
<tr>
<td>white pine</td>
<td>32</td>
<td>184</td>
</tr>
<tr>
<td>white pine</td>
<td>32</td>
<td>189 (406-7 1/4 inches)</td>
</tr>
<tr>
<td>white pine</td>
<td>33</td>
<td>200 (356-9 1/4 inches)</td>
</tr>
</tbody>
</table>

Groundplants and shrubs found in the stand include:

- Starflower
- Oxalis
- Canada mayflower
- Bracken fern
- Bunchberry
- Striped maple

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria for age and stand identity, however it is slightly disturbed from past harvesting. This stand is recommended for critical area designation because it is the best mainland old-growth white pine stand in the upper Chesuncook Lake region.

6. MOOSEHORN STREAM OLD-GROWTH WHITE PINE AND RED SPRUCE

Forest Type: Red Spruce - Balsam fir

Town: T4 R14 WELS

County: Piscataquis
6. MOOSEHORN STREAM OLD-GROWTH WHITE PINE AND RED SPRUCE (continues)

Quad: Ragged Lake, 15', 1954

Age: white pine 120-150, red spruce 93-130

Stand Size: 25 acres

Elevation: 1,220'

Date Field Checked: September 20, 1980 by John Grena

Status: Recommended.

Description

Second growth white pine (Pinus strobus) and red spruce (Picea rubens) comprise the overstory in a red spruce-balsam fir stand in the southwest corner of T4 R14, west of Salmon Pond. The area lacks signs of harvesting roads, but contains decayed red spruce and pine stumps remaining from a selection cut performed an estimated 80 years ago. The health of these trees and size of the stand should enable them to persist for many decades.

The form of the overstory pine and spruce is good: both have straight, cylindrical trunks and full, healthy crowns. Some specimens do contain decay fungi (Phellinus pini), woodpecker holes or limby trunks. Those pines of better quality rise 90 feet and are branch-free 36 to 42 feet above the ground. The live crowns cover an average of 45% of the entire bole (trunk). The better red spruce average 72 feet in height, with the tallest being 81 feet. Branches are pruned from the trunk 36 feet from the ground.

Data collected for red spruce and white pine appears below.

Increment corings at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h. inches</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>white pine</td>
<td>22</td>
<td>150</td>
</tr>
<tr>
<td>white pine</td>
<td>24</td>
<td>125</td>
</tr>
<tr>
<td>white pine</td>
<td>25</td>
<td>120</td>
</tr>
<tr>
<td>red spruce</td>
<td>8</td>
<td>105</td>
</tr>
<tr>
<td>red spruce</td>
<td>17</td>
<td>93</td>
</tr>
<tr>
<td>red spruce</td>
<td>17</td>
<td>129</td>
</tr>
<tr>
<td>red spruce</td>
<td>17</td>
<td>130</td>
</tr>
</tbody>
</table>
6. MOOSEHORN STREAM OLD-GROWTH WHITE PINE AND RED SPRUCE (continues)

Number of Trees by Species and d.b.h.

<table>
<thead>
<tr>
<th>D.b.h. inches</th>
<th>Red spruce</th>
<th>White pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
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<td>1</td>
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<td>22</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Average 15.7 23.0

The old-growth pine and spruce are termed second growth as a result of their relatively young age, and the selective cut that took place, removing the larger and older trees. The lack of any signs in the vegetation or surface soil representing an old road, plus the advanced decay in these resistant stumps suggests that the operation took place many decades ago.

The understory in this uneven-aged stand contains red spruce, red maple (Acer rubrum), American beech (Fagus grandifolia), balsam fir (Abies balsamea), and yellow birch (Betula lutea). Because of the crowded growing conditions, the understory trees are of inferior quality, health and form compared to the overstory pine and spruce.

Beneath this dense canopy and growth only a sparse population of trillium (Trillium sp.), Canada mayflower (Mahanthemum canadense), starflower (Trientalis borealis), and red spruce and fir regeneration are found.

The site is moderately well drained, covered with a 2 inch organic pad. Beneath this is a very fine sandy loam, grey albic (leached) horizon. Directly below this layer, the drainage becomes poorer as the texture changes to a clay loam within a spodic (yellow-orange colored) horizon.

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria for age, stand identity and naturalness, and thus is recommended to be evaluated for critical area status.
7. SOPER BROOK (EAST FORK) WHITE PINE

Forest Type: Red Spruce - Balsam Fir

Town: T4 R11 WELS

County: Piscataquis

Quad: Telos Lake 15' (1957)

Age: Undetermined

Stand Size: 3 acres

Elevation: 1,280'

Date Field Checked: September 27, 1980 by John Grena

Status: Not Recommended

Description

This area contains 15 white pine trees within a budworm-infested spruce-fir thicket. It is located 2 1/2 miles southwest of Nesowadnehunk Lake, on the east side of Soper Brook.

Diameters measured of 11 trees is given below. The 32 inches d.b.h. pine appeared to have ax and crosscut saw marks on the butt.

<table>
<thead>
<tr>
<th>D.b.h. (inches) of White pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
</tr>
<tr>
<td>25 (3)</td>
</tr>
<tr>
<td>28</td>
</tr>
<tr>
<td>29 (3)</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>32</td>
</tr>
</tbody>
</table>

Criteria met and reasons for NOT RECOMMENDED status

Although the area contains large-diametered pine, it was rejected for two reasons: 1) the small number of pine in this 3 acre area did not fit the stand identity criteria, and 2) the poor health and form of the pine which made the appearance of the stand far inferior to other areas viewed, and reduced the potential for this feature to persist.

8. SOPER BROOK (WEST FORK) OLD-GROWTH WHITE PINE

Forest Type: Black Spruce - Balsam Fir

Town: T4R11 WELS

County: Piscataquis
8. **SOPER BROOK (WEST FORK) OLD-GROWTH WHITE PINE** (continues)

Quad: Telos Lake 15' (1957)

Age: 225-300 (max. age class)

Stand Size: 2-3 acres

Elevation: 1,140'

Date Field Checked: September 21, 1980 by John Grena

Status: Recommended.

**Description**

A black spruce (Picea mariana) balsam fir (Abies balsamea) stand with associated northern white-cedar (Thuja occidentalis) and old-growth white pine (Pinus strobus) scattered throughout grows between Ripogenus Stream and the west fork of Soper Brook. The stand is two miles north of Soubunge Mountain. Both the pine and spruce are of poor vigor and health. As a result, the stand has not been harvested, and thus provides a suitable habitat for pileated woodpeckers (Dryocopus pileatus), evidenced by oblong holes drilled in the trunks of the diseased trees.

The twenty pines in the stand are 85 to 90 feet tall and have branch-free trunks for 2/3 of this distance. The poor health and decreasing vigor are indicated in the yellowing branches in the crown, resinosis from the trunk, small annual growth rings, and deep fissures of the bark. The pines are approximately 225 years old, with the largest (27 inches d.b.h.) pine estimated to be over 300 years old.

The stagnant spruce and fir average six inches at d.b.h. Both species exhibit poor self-pruning.

The stand grows on a ledgy, poorly drained site at an elevation of 1140 feet. The soil horizon contained a 2 to 3 inch sphagnum layer, then a two inch organic pad, followed by a fine sandy loam albic (bleached, gray) horizon and finally a clay loam spodic (yellow-orange) horizon.

Groundplants include: bunchberry (Cornus canadensis), bluebead lily (Clintonia borealis), trillium (Trillium sp.), bracken fern (Pteridium aquilinum), and creeping snowberry (Gaultheria hispidulum).

Measurements taken appear below.

<table>
<thead>
<tr>
<th>D.B.H. (inches) of White Pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>19(2)</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>23</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>26(2)</td>
</tr>
</tbody>
</table>
8. SOPER BROOK (WEST FORK) OLD-GROWTH WHITE PINE (continues)

Increment Cores Taken at D.B.H.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.B.H. (inches)</th>
<th>Age from Coring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Spruce</td>
<td>9</td>
<td>93</td>
</tr>
<tr>
<td>White pine</td>
<td>19</td>
<td>201</td>
</tr>
<tr>
<td>White Pine</td>
<td>27</td>
<td>249*</td>
</tr>
</tbody>
</table>

*Estimated age determined from partial core and growth rate was 320 years.

Criteria met and reasons for RECOMMENDED status

This very old stand meets the criteria for age, stand identity and naturalness and thus is recommended for critical area designation.

9. WASSATAQUOIK STREAM WHITE PINE

Forest Type: Beech-sugar maple

Town: T3 R7 WELS

County: Penobscot

Quad.: Stacyville 15' (1953)

Age: 150+ years (max. age class)

Stand Size: 15 acres

Elevation: 500'

Date Field Checked: June 26, 1980 by John Grena, Charles Agnew, Stephen Keane

Status: Recommended.

Description

The northern slopes ascending from Wassataquoik Stream contain old-growth white pine (Pinus strobus) within a younger, deciduous forest. These pines are scattered downstream from the "elbow" for approximately one mile. The majority, however, grow directly across from Hunt Mountain.

These second growth pines grow at an elevation of 500 feet, 100 feet above the streambed. The soil is a loam on a 60% slope. The pines are remnants of other stands or a larger stand that grew along the river up to Deasey Dam and on the northern ridge of Hunt Mountain. Fishermen who frequent the stream state that many pines were cut in these areas during the early fifties.
9. WASSATAQUOIK STREAM WHITE PINE (continues)

Fire has left charcoal in both the organic and mineral soil, as well as pronounced fire scars on the lower portion of the White pine trunks, demonstrating the fire's movement on steep terrain. As the fire advanced up the slope, the flame divided to pass around the trunk. Once past the trunk, the flame combined to form a column hot enough to burn through the bark and into the sapwood.

White pine and hardwood form a two-story, two-aged stand. Pines measure 100 to 105 feet in height in the overstory. The lower canopy, rising 60 to 75 feet contains Striped maple (Acer pensylvanicum), American beech (Fagus grandifolia), Red maple (Acer rubrum), White birch (Betula papyrifera), and Quaking aspen (Populus tremuloides).

In form, the White pine are straight but have developed rot throughout the lower bole as a result of the fire damage. The trees are still beautiful specimens as one views the upper portions of the trunk and the live crown which occupies 30 percent of the total height.

Twenty of the approximately 100 trees on the site were measured. Diameters at breast height ranged from 15 to 42 inches, with 25 inches as the average. Three specimens were bored with a 10-inch borer to obtain an annual ring count:

<table>
<thead>
<tr>
<th>D.b.h.</th>
<th>Age in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 inches</td>
<td>143</td>
</tr>
<tr>
<td>24 inches</td>
<td>125+</td>
</tr>
<tr>
<td>25 inches</td>
<td>110+</td>
</tr>
</tbody>
</table>

Most of the pine reproduction is found on the lower slopes while the hardwood seedlings and saplings occupy the ground on the upper slopes. This area is also part of a nominated white water rapid critical area.

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. The pines represent remnants in a historic and heavily logged section of Maine: the Penobscot River Basin. In addition, the pines create a beautiful scene, lining the banks of Wassataquoik Stream.

10. SPENCER LAKE WHITE PINE

Forest Type: White Pine
Town: T4 R6 EKP WKR
County: Somerset
Quad: Spencer Lake 15" (1958)
10. SPENCER LAKE WHITE PINE (continued)

Age: 160
Stand Size: 10 acres
Elevation: 1240'
Date Field Checked: July 1, 1982, Cogbill, Carlton Moore
Status: Recommended

Description

The area to the east of Fish Pond and the northeast shore of Spencer Lake supports small groups of 100 foot tall white pine. These trees (27 inches to 36 inches in diameter) are about 160 years old. The pines are scattered in a spruce-fir forest and are of moderate (10-16 inches in diameter) size. The area has been thinned and been selectively logged in the past. Although large old pines exist here, it is slightly disturbed.

Criteria met and reasons for RECOMMENDED status

This stand meets the criteria for age and stand identify, but not for naturalness because it is slightly disturbed. However, since it is the only white pine stand currently known in Somerset county, it is recommended to be evaluated for critical area status.

11. COLD BROOK WHITE PINE

Forest Type: Beech-Sugar Maple - Yellow Birch
Town: Dead River T3 R3 BKP WKR
County: Somerset
Age: Not known
Quad: Little Bigelow Mountain 15' (1956)
Stand Size: Not determined
Elevation: 1,500'
Date Field Checked: June 14, 1980 by John Grena and Caren Caljouw
Status: Recommend for further field check.
11. COLD BROOK WHITE PINE (continues)

Description

A half mile north of the Somerset-Franklin County line, and west of Cold Brook are seven old-growth white pine (Pinus strobus) trees. The trees are 21 to 30 inches in diameter at breast height, and at least 90 feet tall. The pine are found in a beech-sugar maple-yellow birch forest type, that contains a few large specimens of sugar maple (Acer saccharum) and balsam poplar (Populus balsamifera). Elevation is 1,500 feet.

Criteria met and reasons for RECOMMENDED FOR FURTHER FIELD CHECK status

The area is an interesting feature on the Bigelow Preserve, and should be protected as a natural old-growth forest stand. The small trees that are in majority and the history of cutting in this area indicate that the pine and few large hardwoods are only cull trees left after the area was logged. Thus the area does not meet the criteria for naturalness, and is a residual stand that can be found in many sections of Maine.

It is recommended that this area is field checked to determine the age of the white pine trees, and evaluate the quality of the hardwoods.

12. HUSTON BROOK WHITE PINES AND WATERFALL

Forest Type: Not determined

Town: Jerusalem - T3 R2 BKP WKR

County: Franklin

Quad: Little Bigelow Mountain 15' (1956)

Age: Not determined

Stand Size: Not determined

Elevation: 1,060'

Date Field Checked: June 17, 1980 by John Grena

Status: Recommended for further field study

Description

On the south side of the Stratton Brook Road, two large white pine (Pinus strobus) trees grow near Huston Brook. The trees measure 48 and 39 inches, respectively at breast height. Both trees are healthy, and at
12. HUSTON BROOK WHITE PINES AND WATERFALL (continues)

least 100 feet tall. The 39 inches d.b.h. pine forks into two main stems beginning 30 feet up from the ground. Elevation is 1,060 feet in this river valley.

Seventy feet west of the larger pine is a 30 foot waterfall. The source of the waterfall is Cold Brook, which begins its flow from the southern slopes of Little Bigelow Mountain and Avery Peak of Bigelow Mountain. Once reaching level ground, the water from Cold Brook flows into Huston Brook.

Criteria met and reasons for RECOMMENDED FOR FURTHER FIELD CHECK status

This area may merit consideration as a natural area with a waterfall and two large pine. It does not constitute an old-growth stand since the old-growth component consists of only two trees.

It is recommended that this area be refield checked along with the Cold Brook White pine stand. This area should be evaluated as a waterfall.

13. FRENCH ISLAND, ELLIS POND

Forest Type: White Pine
Town: Roxbury
County: Oxford
Quad: Rumford 15' (1927)
Age: Not determined
Stand Size: 2 acres
Elevation: 814'
Date Field Checked: March 23, 1979, Sue Gawler and Hank Tyler
Status: Not Recommended. It is suggested that the area be revisited and ages be determined.

Description

A small stand of white pine exists on a two acre island at 814 feet elevation. A few old stumps indicate some cutting many years ago. The canopy is not as dense as some purer pine stands, but the largest trees are all pines, except for 1 or 2 hemlocks. Pines average 30 inches dbh, range 24 inches-37 inches but with fairly tapering bole, unlike strictly forest grown trees. There are about 75 large pines. A notable feature
13. FRENCH ISLAND, ELLIS POND (continues)

is the healthy reproductive state of the pine (due in part to the more or
less open canopy) with pines of 15-30 years, especially at the southeast
end of the island where there are more open spaces. The understory is
heterogenous. At the edges of the stand there is a lot of red maple
(Acer rubrum), white birch (Betula papyrifera) is inward from that along
with moosewood (Acer pensylvanicum) and shadbush (Amelanchier sp.).
There is a camp at the western end of the island. Ages of trees were not
taken.

Criteria met and reason for NOT RECOMMENDED status

This area is not recommended because it is disturbed and not in a
natural condition with the camp on the island. However, in the light of
the need for accurate age data for complete assessment, it is suggested
that the area be field checked, and ages determined.

14. PIKE HILL WHITE PINE

Forest Type: White Pine
Town: Norway
County: Oxford
Quad: Norway 15" (1946)
Age: 85-92
Stand Size: Not determined
Date Field Checked: December 8, 1981, Cogbill
Status: Not Recommended.

Description

The east slope of Pike Hill, just south of Pennessseewassee Lake is
covered with old field pine trees. The forest is 85 to 92 years old and
consists of open grown scattered white pine. The hill was obviously a
farm and abandoned about 90 years ago. No old-growth stands were found.

Criteria met and reason for NOT RECOMMENDED status

This area has a young, disturbed old field forest stand, and thus not
recommended for evaluation as a critical area.
15. STAND NO. 2 - THE NARROWS WHITE PINE

Forest Type: White pine
Town: T4 R1 (Richardstown)
County: Oxford
Quad: Oquossoc 15' (1940)
Age: 150-200 years (max. age class)
Stand Size: 23 acres
Elevation: 1,775'
Date Field Checked: October 16, 1980 by John Grena, Hank Tyler, Ed Meadows and Morris Henderson
Status: Recommended.

Description

This uneven-aged 23 acre softwood stand contains a high stocking of white pine, many of which are 24 inches or more at breast height. The diameters of these overstory pines range from 17 to 26 inches, while the understory of northern white cedar (Thuja occidentalis), red spruce (Picea rubens), and balsam fir (Abies balsamea) contains diameters from 6 to 13 inches. This stand is located at an elevation of approximately 1,775 feet.

The persistence of dead branches on the lower boles of the pines indicates that the understory stocking was sparse when the pines were young (120 years old). These lower branches should have been naturally pruned by competing vegetation. Since the pines are not closely spaced, a budworm epidemic might have removed the spruce and fir in the stand, eliminating the competition, thus allowing the branches to persist on the bole.

White pine in the stand range in height from 85 to 90 feet, with straight, single boles. An increment boring of a 24 inch d.b.h. pine indicated 155 years growth. Understory trees ranged from 40 to 70 feet in height.

Although not examined, the soil is probably a spodosol, and does show slightly better drainage compared with Stand 1.

Groundplants include: Canada mayflower (Maianthemum canadense), striped maple (Acer pensylvanicum), starflower (Trientalis borealis), bunchberry (Cornus canadensis), whorled aster (Aster acuminatus), and creeping snowberry (Gaultheria hispidulum).
15. STAND NO. 2 - THE NARROWS WHITE PINE (continues)

Criteria met and reasons for RECOMMENDED status

This area meets all the criteria for natural old-growth forest stands. This stand was recommended because it was the only old-growth white pine stand discovered in Oxford County.

16. BEAR LAKE WHITE PINE

Forest Type: White Pine
Town: Waterford
County: Oxford
Quad: Norway 15" (1946)
Age: 100 (est.)
Stand Size: Not determined
Date Field Checked: May 28, 1983, Charles Cogbill
Status: Not Recommended. It is suggest that the area be field checked to accurately determine the age of the stand.

Description

The northwest shore of Bear Lake contains a stand of white pine surrounding Wigwam Camp. The trees are 80 feet tall and up to 32 inches in diameter. Some trees are open-grown and the entire area appears to be an old field less than 100 years since abandonment. No old-growth areas were found, and the area not recently disturbed by thinning, cutting or camp buildings is minimal.

Criteria met and reason for NOT RECOMMENDED status

This area is a young, old field stand and is not recommended for critical area status. However, in order to complete an accurate assessment of this site, increment cores should be taken to determine the age of the stand.
17. **BIG LAKE WHITE PINE AREA**

Forest Type: Mixed woods

Town: Grand Lake Stream Plt.

County: Washington

Quad.: Big Lake 15' (1963)

Age: Estimated 150 years

Stand Size: 6 acres

Elevation: 220'

Date Field Checked: July 8, 1980 by John Grena and Janet McMahon

Status: Recommended

**Description**

A mixed wood stand containing 18 old-growth white pine trees is located on Cass Cove, which lies on the north shore of Big Lake. The stand is a portion of the woodlot managed by the owner to enhance the growth and reproduction of white pine.

Stand composition is a mixture of balsam fir (Abies balsamea), white birch (Betula papyrifera), red spruce (Picea rubens), and hemlock (Tsuga canadensis). Beneath the old-growth pine, regeneration of balsam fir, hemlock and small pockets of 15 foot white pine saplings are established. The stand's composition, age, and remaining stumps suggest that a selective pulpwood harvest took place approximately 35 years ago.

The overstory pine are straight, and show excellent form, averaging 20 inches in diameter. Measurements taken by the owner appear on the following chart.

<table>
<thead>
<tr>
<th>White pine diameters (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0</td>
</tr>
<tr>
<td>14.9</td>
</tr>
<tr>
<td>15.3</td>
</tr>
<tr>
<td>15.9</td>
</tr>
<tr>
<td>16.6</td>
</tr>
<tr>
<td>17.5</td>
</tr>
<tr>
<td>18.8</td>
</tr>
<tr>
<td>18.8</td>
</tr>
<tr>
<td>18.8</td>
</tr>
<tr>
<td>20.7</td>
</tr>
<tr>
<td>21.0</td>
</tr>
<tr>
<td>22.9</td>
</tr>
<tr>
<td>22.9</td>
</tr>
<tr>
<td>23.5</td>
</tr>
<tr>
<td>23.8</td>
</tr>
<tr>
<td>28.0</td>
</tr>
<tr>
<td>28.6</td>
</tr>
<tr>
<td>30.3</td>
</tr>
</tbody>
</table>

The owner’s management plan is to leave the overstory pine, while encouraging white pine regeneration. To accomplish this, competing hardwoods are periodically cut for firewood. In 10 to 15 years, the lower limbs on the younger pines will be pruned and the trees will be thinned to create better growing conditions.
17. BIG LAKE WHITE PINE AREA (continues)

Criteria met and reasons for RECOMMENDED status

The stand meets the criteria for age and long-lived species. It does not meet the undisturbed or natural criteria because of the active cutting taking place in the understory.

Pruning and thinning of the stand is a hobby for the owner. The old-growth pine are of superlative form and will not be cut. Although this stand has been disturbed, it is recommended for evaluation as a critical area.

18. BALD MTN. OLD-GROWTH WHITE PINE

Forest Type: Mixed Woods
Town: Baring Plt.
County: Washington
Quad: Calais 15' (1929)
Age: Estimated 150 years (pine)
Stand size: 1 acre
Elevation: 300'
Date Field Checked: July 8, 1980 by John Grena
Status: Recommended.

Description

Remnant old-growth white pine are found within a mixed wood stand on the east side of Bald Mountain. This uneven-aged stand is two-storied: mixed wood and reproduction comprise the lower canopy, while the overstory is formed by the pines. The stand is found within the Wilderness Area, offering protection to the Bald eagle's nest in one of the overstory pine.

Most pines in the stand retain branches in the lower portions of the trunk; or instead of a single trunk, fork to form what is commonly referred to as Wolf trees. The poor form in the pines is a result from the opening of the canopy over 100 years ago. Fire or logging in the past freed the young pine from competing vegetation, slowing natural pruning on the lower bole. In addition, the exposed leader branches on the pines were damaged by ice storms, resulting in forked or crooked trunks. Present damage to the pines is caused by lightning.
18. BALD MTN. OLD-GROWTH WHITE PINE (continues)

An estimated 50 old-growth pines are found within a younger stand of red spruce, balsam fir, striped maple and red maple. Openings in the stand contain red spruce, balsam fir, and white pine reproduction that ranges from 2 to 10 feet in height.

Diameters (d.b.h.) of pines measured in appear below. Average d.b.h. is 28 inches.

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>D.b.h (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>25 (2)</td>
<td>31 (3)</td>
</tr>
<tr>
<td>26</td>
<td>33</td>
</tr>
<tr>
<td>27 (2)</td>
<td>37</td>
</tr>
<tr>
<td>28 (2)</td>
<td></td>
</tr>
</tbody>
</table>

Two inches of needle and hardwood leaf litter cover the 25% slope. Ground plants include bracken fern, cinnamon fern, polypody ferns on rocky sites, and wild sarsaparilla.

No eagles were sighted around the nest for the last two years. However, the nest has potential as a future site for the eagles, and has been given the occupied nest classification by UMO researchers.

Criteria met and reasons for RECOMMENDED status

This remnant old-growth white pine stand meets the criteria for age, stand identity and naturalness. Furthermore, it is used as a nesting area by Bald Eagles. It is recommended for evaluation as a critical area.

19. NEWCASTLE WHITE PINE/NORTHERN RED OAK STAND AND BALD EAGLE SITE

Forest Type: White pine - northern red oak

Town: Newcastle

County: Lincoln

Quad.: Damariscotta 7.5' (1970)

Age: Undetermined

Stand Size: 6 acres

Elevation: 20'

Date Field Checked: March 6, 1980 by John Grena

Status: Recommended. Further field study is also recommended to determine the age of the stand.
Description

A white pine-northern red oak stand containing an active bald eagle's nest and old-growth white pine (Pinus strobus) grows on the west shore of Damariscotta Lake in Newcastle. The pines' average 32.5 inches d.b.h. (largest 43 inches) are estimated to age 200 years and form an important habitat for the eagles.

The stand is two-storied, growing on a terrace that descends with a 9 percent slope to the lake. The overstory is comprised of 40 white pine trees that average 100 feet in height. Northern red oak (Quercus rubra) is the dominant understory tree rising 70 to 80 feet in height and ranging from five to eleven inches d.b.h. Red maple (Acer rubrum), Serviceberry (Amelanchier sp.) and Beaked Hazelnut (Corylus cornuta) are minor components within the understory.

The composition and form of the trees serve to illustrate the factors involved in the stand's development and growth. This second growth stand probably developed in what was once an open field or cut area. Equivalent to the red oak in their tolerance to shade, but slower at initial growth, the pines were able to compete and establish themselves as part of the overstory.

Growing in an open condition, the pines were subject to several biotic and climatic influences during their growth. The forked or crooked trunks display the damaging effects of wind and ice storms. Remaining dead branch stubs protruding out at a sharp angle from the trunk are remnant leader branches killed decades ago by the white pine weevil (Pissodes strobi). Lastly, the straight line of callus growth seen at the base of most of the pines are the healed wounds resulting from winter frost or sunscald injury to the young pines. Despite all these influences coupled with the climatic changes through the years, these pines still remain and should persist for many decades.

Diameter measurements (inches) taken at d.b.h. for white pine appear below:

<table>
<thead>
<tr>
<th>Diameter</th>
<th>22</th>
<th>26</th>
<th>28</th>
<th>29</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35</td>
<td>36</td>
<td>37</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. Although the stand is small in size the stand appears in stable condition and good health. This small sized area also contains a variety of features: an active eagle's nest, an average diameter of 32.5 inches for white pine, and a composition of the white pine - northern red oak type. It is also recommended that the area be revisited and ages determined as part of the evaluation of this site.
20. BRIDGTON TOWN FOREST WHITE PINE

Forest Type: Mixed woods

Town: Bridgton

County: Cumberland

Quad: Norway 15' (1946)

Age: Undetermined

Size: 1/2 acre

Elevation: 500 feet

Date Field Checked: March 3, 1980 by John Grena

Status: Not Recommended

Description:

On either side of Willis Park Road (old Route 32) in Bridgton is a group of twelve old-growth (age undetermined) white pine (Pinus strobus) trees. The pines are of excellent form displaying straight, cylindrical trunks that are branch-free 30 feet from the ground. The trees are located west of Long Lake.

The pines will remain as a scenic highlight in the town forest. Located on a midslope of a ridge (7% slope), the understory growth of beech (Fagus americana), hemlock (Tsuga canadensis), and associated hardwoods that restricted one's view of the pines have been cut. Management plans for continual removal of the understory eliminate the area's value as undisturbed forest stand.

Measurements taken of the pines show on average height of 85 feet and an average d.b.h. of 32 inches (largest 39 inches). All have healthy crowns.

A list of all diameters appears below.

<table>
<thead>
<tr>
<th>D.b.h. (inches) of White Pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
</tr>
<tr>
<td>28 (2)</td>
</tr>
<tr>
<td>29</td>
</tr>
<tr>
<td>31</td>
</tr>
<tr>
<td>35</td>
</tr>
</tbody>
</table>

Criteria met and reasons for NOT RECOMMENDED status

This area does not meet the naturalness nor the stand identity criteria for natural old-growth forest stands. The understory trees have been thinned,
20. BRIDGTON TOWN FOREST WHITE PINE (continues)

thus destroying the character of the areas as a stand. The trees are impressive due to their location next to the road, but do not represent white pine that are of state significance. Thus the area is not recommended for critical area status.

21. HOLLIS WHITE PINE - HEMLOCK STAND

Forest Type: White pine - Hemlock

Town: Hollis Center

County: York

Quad: Buxton 15' (1944)

Age: 160 years+ (max. age class)

Stand Size: 12 acres

Elevation: 200'

Date Field Checked: March 26, 1981 by John Grena and Hank Tyler

Status: Recommended

Description

An old-growth white pine (Pinus strobus) and Eastern hemlock (Tsuga canadensis) stand containing trees over 150 years old is found one mile south of the Saco River in Hollis Center. The only harvesting done in the stand has been the removal of a few trees that have died of old age or because of lightning. Trees in the stand are at least 160 years old.

The trees in this 12-acre stand average 90 feet in height: white pine are 100 feet in height, while the hemlock average from 85-90 feet. White pine boles are branch-free for 40 to 60 feet of this height. Pine averages 27 inches diameter at breast height, and range from 19 to 37 inches. Hemlock in the stand have diameters between 15 and 21 inches, with 18 inches as the maximum. All trees appear in good health.

This uneven-aged stand grows in well-drained soil on a hummocky site. In addition to the old-growth, younger hemlock and white pine, as well as beech (Fagus grandifolia) comprise the understory vegetation. Because these species have developed in an existing stand, the trees exhibit straight, well-pruned boles: the large percentage of hemlock in the understory suggests that the next stand will continue to dominate in hemlock except where a disturbance creates an opening for the less tolerant white pine. The predominant ground plant in the stand is partridgeberry (Mitchella repens).
21. HOLLIS WHITE PINE - HEMLOCK STAND (continues)

An increment coring at breast height of a 32 inch diameter white pine indicated 142 annual rings. This is only a partial age, and the trees are estimated to be over 160 years old.

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. It is the best example of a white pine-hemlock forest type discovered in the inventory during 1980-81. The stand has had only the dead or dying trees removed, and thus is relatively undisturbed. In addition, the stand will be valuable as a site to observe the continuation of this climax type.

22. LIMERICK WHITE PINE

Forest Type: White Pine
Town: Limerick
County: Cumberland
Quad: Newfield 15' (1958)
Age: Not determined
Stand Size: Not determined
Date Field Checked: April 2, 1982, Cogbill
Status: Not Recommended

Description

This old farmland just north of the Little Ossipee River supports a young forest of open-grown white pine. The almost lone pines are 14-18 inches in diameter and mixed with a few red maple, hemlock, yellow birch and beech. The area is obviously old field growth less than 100 years old.

Criteria met and reason for NOT RECOMMENDED status

This area is an old field and disturbed area. Hence, it is not recommended for critical area status.
23. **KITTERY WHITE PINE**

**Forest Type:** White Pine  
**Town:** Kittery  
**County:** York  
**Quad:** York 15' (1956)  
**Age:** Not determined  
**Stand Size:** Not determined  
**Date Field Checked:** April 2, 1982, Cogbill  
**Status:** Not Recommended  

**Description**

About thirty 18 inch white pines 60 feet tall occur in a cleared yard along old Route 1 in Kittery. The trees are neither impressively large nor undisturbed.  

**Criteria met and reason for NOT RECOMMENDED status**

This area does not form a coherent stand and is disturbed. Thus, it is not recommended for critical area status.
Red Pine (Pinus resinosa) is more restricted in habitat than white pine, but has much the same geographic range. Red pine occurs on very well drained soils and seems to need either fire or landslide disturbances to become established. This species was less sought after by loggers and tends to be found in less accessible places, such as on cliffs, than is white pine. Pure stands of naturally occurring red pine is a general expression after a burn on dry lake shores or on clffy soils. These stands start to gain a mixture of other species in old-age. This mix is usually dominated by spruce or fir of northern affinity. Such stands are scattered throughout the region from Maine through northern New York to their best expression in the dry sections of the upper Midwest.

Inventory Results

The ten Red Pine stands inventoried were found either in association with jack pine (Pinus banksiana), white pine (Pinus strobus), or in pure stands. Seven red pine stands meet the old-growth criteria (Table 6 and Figure 6).

The maximum age class found in existing stands of old-growth red pine ranges from 100-250 years. The oldest specimen bored for increment dating was in "The Pines" red pine stand at Sysladobis Lake. The size of these stands varied from four acres to the 220 acre stand in Eustis, Maine the Cathedral Pines. Elevations at which these old-growth red pines occurred were generally greater than 1000 feet.

All of the sites identified as old-growth red pine occurred in north central and northwestern Maine.
<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Debsooneag Lake</td>
<td>Pisc</td>
<td>T2 R10</td>
<td>190-215 (max. age cl.)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>3.</td>
<td>Lobster Lake No. 1</td>
<td>Pisc</td>
<td>T3 R14</td>
<td>150-200 (max age cl.)</td>
<td>0.5</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>4.</td>
<td>Lobster Lake Big Is</td>
<td>Pisc</td>
<td>T3 R14</td>
<td>172 (max.)</td>
<td>20</td>
<td>Rec.</td>
</tr>
<tr>
<td>5.</td>
<td>No. 5 Bog</td>
<td>Some</td>
<td>T4 R7</td>
<td>95-220 (range)</td>
<td>25</td>
<td>Rec.</td>
</tr>
<tr>
<td>7.</td>
<td>Norways</td>
<td>Some</td>
<td>T3 R5</td>
<td>70 (avg.)</td>
<td>40-50</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>8.</td>
<td>Cathedral Pines</td>
<td>Fran Eustis</td>
<td>180-200 (max. age cl.)</td>
<td>220</td>
<td>Rec.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>The Pines</td>
<td>Wash</td>
<td>T5 ND</td>
<td>250+ (est. max age cl.)</td>
<td>6</td>
<td>Rec.</td>
</tr>
</tbody>
</table>
FIGURE 6
OLD-GROWTH RED PINE
STANDS INVENTORIED
- Recommended for evaluation as a critical area
- Not Recommended
Red pine (Pinus resinosa) and jack pine (Pinus banksiana) occur in the Moose River Valley area in Bradstreet and Attean townships. The Society of American Foresters recognizes a section of this Red Pine - Jack Pine stand as a natural area. This 20 inch Red Pine is over 200 years old. The oldest jack pines are over 150 years old.

Photo by Hank Tyler

-136-
DESCRIPTIONS OF RED PINE FOREST STANDS INVENTORIED

1. **CLIFF RIDGE RED PINE - WHITE PINE STAND**

Forest Type: Red pine

Town: T9 R12 WELS

County: Piscataquis

Quad: Spider Lake 15', (1961)

Age: 100-150 years

Stand Size: Estimated 20 acres

Elevation: 1100-1300'

Date Field Checked: September 24, 1980, by John Grena

Status: Recommended.

Description

An undisturbed stand composed of 80% red pine (Pinus resinosa) and 20% white pine (Pinus strobus) grows around the vertical cliffs on Cliff Ridge. The trees are protected from harvesting by the cliffs and the steep (42%) slope found in portions of the stand. Level areas above the stand near the summit have white pine stumps remaining from a harvest cut. This stand was the most northern red pine stand discovered during this inventory; it grows at an elevation between 1100 and 1300 feet.

The stand runs east-west along the ridge. The western portion, with its 4 to 5 inch organic pad, provides better growing conditions, resulting in larger diameter and taller specimens. To the east, the higher elevation is a primary soil site with very shallow soils. Here, red pine are scattered on the exposed, lichen-covered rock face where soil has developed in crevices. The red and white pine have straight, single trunks that are branch-free 15 to 40 feet up on their total height of 45 to 60 feet. The largest diameter class is 18 inches.

Data collected on age and d.b.h. (diameter at breast height) appears below. Annual rings of all borings displayed slow growth do to harsh site conditions. All trees are of good health and form.

<table>
<thead>
<tr>
<th>Red pine</th>
<th>White pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.b.h. (Inches)</td>
<td>age</td>
</tr>
<tr>
<td>11</td>
<td>121</td>
</tr>
<tr>
<td>11</td>
<td>136</td>
</tr>
<tr>
<td>14</td>
<td>125</td>
</tr>
<tr>
<td>18</td>
<td>140</td>
</tr>
<tr>
<td>20</td>
<td>144</td>
</tr>
</tbody>
</table>

-137-
1. **CLIFF RIDGE RED PINE - WHITE PINE STAND (continued)**

Growing in association with the pine are red spruce (*Picea rubens*), northern white-cedar (*Thuja occidentalis*), white birch (*Betula papyrifera*), and red maple (*Acer rubrum*). Shrubs and groundplants include: serviceberry (*Amelanchier sp.*), moosewood (*Acer pensylvanicum*), blueberry (*Vaccinium sp.*), wild sarsaparilla (*Aralia nudicaulis*), starflower (*Trientalis borealis*), Canada mayflower (*Maianthemum canadense*), and polypody ferns (*Polypodium sp.*)

**Criteria met and reasons for RECOMMENDED status**

This stand meets all the criteria for natural old-growth stands. This stand is recommended because it is predominantly red pine, and it is an area that is too inaccessible to cut.

2. **FIRST DEBSCOMEAG RED PINE**

Forest Type: Red Pine  
Town: T2 R10 WELS  
County: Piscataquis  
Quad: Kathadin 15' (1949)  
Age: 190-215 (max. age class)  
Elevation: 550-700'  
Stand Size: 5 acres  
Date Field Checked: June 16, 1982 Hank Tyler, Ed Katz, Dan Corcoran, Charles Cogbill  
Status: Recommended.

**Description**

A stand of red pine (*Pinus resinosa*) is found on the steep slope (25°) leading down to the north shore of First Debsconeag Lake. The area is along an informal trail leading from the shore of the lake (2500 feet from the east outlet) northwestward to ice caves and rock lookout on the ridge north of the lake. The stand starts about 250 feet in from the shore, extends some 500 feet up the slope 500 feet in width. The surrounding areas have a mixture of white pine (*Pinus strobus*) white birch (*Betula papyrifera*) and hemlock (*Tsuga canadensis*). White pine is more prevalent between the shore and the steeper slope while a thick young stand of white birch and hemlock marks the upper extent of the stand. The stand is 5 acres more or less in size.

The stand consists of tall (65-70 feet) widely spaced red pines averaging 16-21 inches in diameter. There are a few white pines about 19 inches in
2. **FIRST DEBSCONAEAG RED PINE (continued)**

Diameter and smaller 8-10 inches diameter red spruce & hemlocks. There is virtually no understory except for scattered red spruce seedlings and *Cypripedium acaule*. There are a few downed logs and some areas with *Bazzania* liverworts and feathermoss. Several large boulders (to 20 feet diameter) are covered with moss and *Cladina* lichens, *Polypodium vulgare* and *Aralia nudicaulis*. The soils are a deep coarse loam with lightly developed depositional red-yellow B, and a moderate 1 1/2 inch A<sub>2</sub> horizon. There is a massive deposit of charcoal and variable thickness of organic matter.

An increment boring of a 15 inch red pine was aged at 178 years, and a 20.3 inch red pine was aged at 188 years. The red pine trees are 190 to possibly 215 years old. Jack pine (*Pinus banksiana*) trees right along the shore are the same age. Despite the extensive fire of 1803 (179 years ago) the entire slope appears to have initiated after a burn over 120 years ago.

This stand is adjacent to a modest stand of jack pine growing along the rock shore of First Debsconeag Lake, (Critical Area Program, 1983).

**Criteria met and reasons for RECOMMENDED status**

1) The stand meets all the criteria for age, stand identity and naturalness.
2) The stand is undisturbed old red pine, in good form.
3) The prevailing stand predates the 1803 fire, which initiated most of the pine stands in the region.

3. **LOBSTER LAKE RED PINE STAND NO. 1**

**Forest Type:** Red pine

**Town:** T3 R14 WELS

**County:** Piscataquis

**Quad:** North East Carry 15' (1954)

**Age:** 150-200 years (max. age class)

**Stand Size:** 1/2 Acre

**Elevation:** 1000'

**Date Field Checked:** September 20, 1980 by John Grena

**Status:** Not Recommended.
3. **LOBSTER LAKE RED PINE STAND NO. 1 (continued)**

**Description**

A one-half acre stand of red pine (Pinus resinosa) and red spruce (Picea rubens) grows on a flat, rocky site 1/5 mile east of Lobster Lake. The trees are situated (elevation 1000 feet) between an area recently cut and bouldery terrain near the lake that prevents harvesting. Trees in the stand are 150 years old.

This small sized area is not a habitat for any rare or unusual species. The stand will most likely succeed to red spruce and balsam fir (Abies balsamea) as these are the predominant and only plants in the understory.

Red pine in the stand have excellent form and health, displaying straight, clear trunks. The first branch on the stem is 55 to 60 feet up on the pine's total height of 65 to 75 feet. Average diameter is 14.7 inches and the largest diameter class is 19.

Conversely, the red spruce are of poor health, with rotten centers. Height of the spruce is between 50 and 55 feet, and average diameter is 9.5 inches. The largest diameter class is 11.

Surface soils consist of an organic pad, 1 to 2 inches thick, an albic (leached layer) horizon with a light clay texture, followed by a loamy clay spodic horizon.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Height (feet)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red pine</td>
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<td>75</td>
<td>152</td>
</tr>
<tr>
<td>Red pine</td>
<td>9</td>
<td>65</td>
<td>160</td>
</tr>
<tr>
<td>Red pine</td>
<td>20</td>
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<td>145</td>
</tr>
<tr>
<td>Red spruce</td>
<td>10</td>
<td>60</td>
<td>142</td>
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<table>
<thead>
<tr>
<th>d.b.h. inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>7  8  9  10  11 12 14 15 16 17 18 19 20 22</td>
</tr>
<tr>
<td>red pine</td>
</tr>
<tr>
<td>2  3  1  1  1 2  3  1  1  4  3  1  1</td>
</tr>
<tr>
<td>red spruce</td>
</tr>
<tr>
<td>5  2  3  1  4 1  1  1  1</td>
</tr>
</tbody>
</table>

**Criteria met and reasons for NOT RECOMMENDED status**

This stand meets all the criteria for natural old-growth forest stands. It is not recommended for critical area designation because of its small size. However, there is a significant red pine and jack pine stand on Big Island in Lobster Lake.
4. BIG ISLAND, LOBSTER LAKE, RED PINE STAND

Forest Type: Red Pine - Jack Pine

Town: T3 R14 WELS

County: Piscataquis

Quad: Northeast Carry 15' (1954)

Age: 172 years (max.)

Stand Size: 20 acres

Elevation: 1000'

Date Field Checked: May 29, 1980, Hank Tyler, John Grena, Liz Thompson

Status: Recommended.

Description

Big Island in Lobster Lake is a bouldery and hummocky island just under two miles long and reaching a height of 240 feet above the lake level. The jack pine and red pine are found scattered along the island's western shore, where soils are thin to nonexistent. Red pine is also found interspersed among the jack pine along the lake shore. The red pines range in diameters from 18-20 inches and were up to 172 years old.

The area along the shoreline shows little signs of disturbance. This is a very significant forest stand because of the old age and presence of the jack pine, (Critical Area Program, 1983).

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria of age, stand identity and naturalness, and thus is recommended for critical area status.
5. **NO. 5 BOG RED PINE**

Forest Type: Red Pine  

Town: T4 R7 WELS  

County: Somerset  

Quad: Attean 15' (1923)  

Age: 95-220 years  

Stand Size: 25 acres  

Elevation: Approximately 1200'

Date Field checked: July, 1982 by Charles Cogbill, Hank Tyler, S. Gawler, Pam Truesdale

Status: Recommended.

**Description**

On the uplands to the east of No. 5 Bog there is a mixed stand of red and jack pine with red spruce. Much of the stand is dominated by spruce 10 to 12 inches in diameter and approximately 95 years old. Scattered, fire scarred red pine trees (18-25 inches in diameter) are about 220 years old. The area is 25 acres and heterogenous with pockets of almost pure red pine, jack pine and spruce. Most of the aspen and white birch is now dead. There are several areas which support enough old red pine and might be considered an old-growth stand.

**Criteria met and reasons for RECOMMENDED status**

This area is heterogenous and an exact stand has not been identified. Further, the area is associated with an old-growth jack pine forest. This fine stand meets all the criteria for age, stand identity and naturalness, and thus is recommended for critical area status.
6. **BAKER POND RED PINE**

**Forest Type:** Red Pine

**Town:** Caratunk

**County:** Somerset

**Quad:** Bingham 15' (1956)

**Age:** 120 years (maximum)

**Elevation:** 1060 - 1120'

**Stand Size:** 4 acres

**Date Field Checked:** June 18, 1982 Charles Cogbill, Hank Tyler

**Status:** Recommend.

**Description**

This red pine stand is located on the east shore of Baker Pond just south of the outlet and west of the T2R3 BKP EKR town line. It is on a knoll which slopes at 20° southwest to the pond. The stand covers about 4 acres on the southwest side of the hill. No trails go through the area, but it is an easy hike 0.3 mile from a woods road to a beach on the southeast shore of the pond, or along the town line from a lumber haul road which branches across Moxie Bog 10 miles northwest of Bingham.

The stand consists of 65 foot tall red pine (*Pinus resinosa*) mixed with red spruce (*Picea rubens*) and some white pine (*Pinus strobus*), hemlock (*Tsuga canadensis*) and a few white birch (*Betula papyrifera*) and red maple (*Acer rubrum*). The pines average 16-20 inches in diameter and the spruce is smaller, averaging 4-10 inches in diameter. The understory is very open with few shrubs and patches of herbs. *Pteridium aquilinum*, *Cornus canadensis*, *Gaultheria procumbens* and *Vaccinium angustifolium* are the common understory plants. Characteristic plants of this habitat are *Pipsissewa* (*Chimaphila umbellata*), cow wheat (*Melampyrum lineare*) and mountain cranberry (*Vaccinium vitis-idaea*). The hill is rocky with large boulders and outcrops. The soil has a well-developed A2 horizon with a mottled, imperfectly drained B, despite the slope. The soil contains abundant charcoal, and fire scars are seen on the east side of many of the red pine trunks. There are several flat topped (cut) stumps in the stand with charred exteriors. the oldest trees are about 120 years old and appear to have started after a major fire. A second fire initiated a second generation but the old red pines survived this disturbance. The forest floor has scattered remains of white birch trees which probably date from those fires.
6. BAKER POND RED PINE (continued)

Criteria met and reasons for RECOMMENDED status

1) The stand is undisturbed and contains old trees.
2) It has a well-developed forest with little blowdown and a recorded fire history.
3) It is adjacent to a registered critical area waterfall of state significance.

7. THE NORWAYS RED PINE

Forest type: Red Pine
Town: T3 R5 BKP WKR
County: Somerset
Quad: Pierce Pond 15' (1958)
Age: 70 years (avg.)
Stand Size: 40-50 acres (approximately)
Elevation: 1100'
Date Field Checked: July 1, 1982 by Charles Cogbill
Status: Not Recommended.

Description

Red pine (Pinus resinosa) occurs along the high bank north of Spencer Stream just before the confluence with the Dead River. The flat uplands have been repeatedly cut and burned. The steep slope has a relatively young (70 years old) stand of red pines about 15 to 17 inches in diameter. Some older white cedar (Thuja occidentalis) occur in the wet seepy areas along the river, but are holdovers from the earlier cutting and burning of the area.

Criteria met and reasons for NOT RECOMMENDED status

This area is young, disturbed and does not form a large stand. Thus it does not meet the criteria and hence is not recommended.
8. CATHEDRAL PINES - OLD-GROWTH RED PINE STAND

Forest Type: Red Pine

Town: Eustis

County: Franklin

Quad.: Stratton 15' (1956)

Age: 180-200 years (maximum age class)

Stand Size: 220 acres

Elevation: 1160'

Date Field Checked: June 15, 1981 by John Grena and Hank Tyler

Status: Recommended.

Description

The "Cathedral Pines" in Eustis is the largest pure red pine (Pinus resinosa) stand found in Maine. The stand of old-growth pines extends over 220 acres, and contains trees between 180-200 years old. A 5 acre section of the stand was thinned in 1980; however, the remainder of the area has had no history of harvesting, except for the trees that were cut in 1940 to create the campground, and the dead trees that have been removed since then.

The campground is found on the east side of state Route 27 and is 70 acres in size. Of this, approximately 20 acres has not been developed for campsites. The stand on the west side of Route 27 is approximately 140 acres in size, 5 of which have been thinned in 1980. The remainder of the 135 acres has had some light salvage operations. The stand as a whole has remained in a natural state in terms of composition and development.

The stand is even-aged, but contains pockets of younger red pine trees that established themselves where dead or dying trees were removed. The stand also contains a mixture of white pine (Pinus strobus), white birch (Betula papyrifera), red spruce (Picea rubens), and balsam fir (Abies balsamea). Spruce and fir are found throughout the stand, while the white pine and birch are represented by only a small portion of the stand. The spruce and fir, found in both the understory and overstory, represent the forest type that will replace the red pine. The red pine will be succeeded by these species unless a disturbance, such as fire, occurs to eliminate the spruce and fir and create openings for red pine regeneration.

The red pine are approaching senescence and have declined in health and vigor. Most trees are 90 feet tall, with a few trees near the entrance to the campground reading 100 feet. The pine are straight and well pruned for most of their height. Average diameter of the dominant red pine is 19 inches at breast height, while the range is between 9 and 24 inches.
8. CATHEDRAL PINES - OLD-GROWTH RED PINE STAND (continued)

The stand grows on a plain, west of the Dead River's North Branch. The forest floor is composed of a 1 inches needle layer, followed by a 3/4 inch organic pad and coarse sandy soils.

Ground plants and shrubs in the stand include: bracken fern (Pteridium aquilinum), pipsissewa (Chimaphila umbellata), twinflower (Linnaea borealis), creeping snowberry (Gaultheria hispidulum), downy rattlesnake plantain (Goodyera pubescens), bunchberry (Cornus canadensis), moosewood (Acer pensylvanicum) and serviceberry (Amelanchier sp.).

Increment Corings Taken at d.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>d.b.h.</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>red pine</td>
<td>13</td>
<td>129</td>
</tr>
<tr>
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<td>127</td>
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<tr>
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<td>21</td>
<td>174</td>
</tr>
<tr>
<td>red spruce</td>
<td>9</td>
<td>98</td>
</tr>
<tr>
<td>red spruce</td>
<td>9</td>
<td>88</td>
</tr>
<tr>
<td>red spruce</td>
<td>10</td>
<td>96</td>
</tr>
<tr>
<td>white pine</td>
<td>23</td>
<td>111*</td>
</tr>
</tbody>
</table>

*Partial core of 6.34 inches.

Criteria met, and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest stands. Although this stand has had salvage cuts through most of the area, the removal has not lessened the integrity of the stand because the salvage only removed dead trees. This removal has not altered the stand in any way that would be much different from the natural processes.

In addition to meeting the criteria, this red pine stand is the largest pure stand in Maine. It contains trees of superlative form and height, even though many contain basal fire scars.

Maintaining a managed and unmanaged section for comparison would be a worthwhile management objective. Although silviculturists can accurately predict the end results of each method (managed vs. natural), the easily accessible location of the stand would make this type of management a valuable living display for the people of Maine.
9. "THE PINES": SYSLADOBSIS LAKE OLD-GROWTH RED PINE STAND

Forest type: Red Pine
Town: T5 ND BPP
County: Washington
Quad: Wabassus lake 15', (1963)
Age: Estimated 250+ years (maximum age class)
Stand Size: 6 acres
Elevation: 320'
Date Field Checked: July 8, 1980 by John Grena
Status: Recommended.

Description

An even-aged stand of red pine (Pinus resinosa) and white pine (P. strobus) displaying excellent form and pruning is found on a point extending onto Sysladobsis Lake. An estimated 60 pines surround the owner's five cabins, located on this flat, sandy site. These trees are survivors from an ice storm that toppled trees in 1945. Ring counts on remaining stumps, after a salvage operation that year, indicate that the existing stand is over 250 years old. The area does not meet the naturalness criteria for old-growth forest stands.

The tall, straight, branch-free trunks are impressive specimens. The first branch on the bole appears 60 to 70 feet up on the red pines and 40 to 50 feet up on the white pines.

Beneath the pines, a few red and white pine seedlings comprise the only ground plants. Both overstory and seedling red pine are healthy, showing no signs of the Scleroderris canker caused by the fungus Gremmeniella abietina (white pine is more resistant than red pine). Signs of disease are a green to yellow stain of the inner bark, and browning of outer needles. Symptoms include defoliation, which may result in death of a branch or entire plant.

A table of d.b.h. in inches of the 14 trees measured appears below. Average d.b.h. for red pine was 19 inches, while white pine averaged 23 inches.

<table>
<thead>
<tr>
<th>d.b.h. (inches)</th>
<th>16</th>
<th>17</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>24</th>
<th>29</th>
<th>30</th>
</tr>
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<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>red pine</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-147-
9. "THE PINES": SYSLADOBSIS LAKE OLD-GROWTH RED PINE STAND

To the south, the cover type changes to a spruce-fir thicket containing 8 old-growth white pine within a one-acre area. The pines measure 100 feet tall and have an estimated 20 inches average d.b.h. Scattered hemlock averaging 13 inches d.b.h. and 50 feet tall, form a transitional band between the thicket and the red pine-white pine stand.

Discussion

The salvage operation has detracted from the naturalness of the area. However, aesthetically, the stand is unparalleled to any red pine area visited in 1980 during the survey. Red pine stands were inventoried around Lobster Lake and on Cliff Ridge. Another known red pine stand in Eustis is presently under management to create conditions favorable for red pine establishment. The Lobster Lake and Cliff Ridge stands remain in the most natural state of the four, but because of harsh site conditions, do not average as large a size tree nor as old an age as the trees on Sysladobsis Lake.

Criteria met and reasons for RECOMMENDED status

It is recommended that the stand be evaluated for critical area status since unusually large trees are present, keeping in mind the following two considerations:

1) The stand loses its natural, undisturbed attributes with the presence of the 5 cabins and the past removal of trees in the salvage operation. However, the protection offered the remaining trees by its owners outweigh the initial disturbance.

2) The side spacing, old age and location on the lake make the stand very susceptible to a windstorm.

10. POCOMOONSHINE LAKE RED SPRUCE - RED PINE STAND

Forest Type: Red Pine
Town: South Princeton
County: Washington
Quad: Big Lake (1963)
Age: 105 years
Stand Size: 7 acres
Elevation: 40'
10. POCOMOONSHINE LAKE RED SPRUCE - RED PINE STAND (continued)

Date Field Checked: July 2, 1980 by John Grena and Janet McMahon

Status: Not Recommended.

Description

A pole-sized red spruce (Picea rubens)-red pine (Pinus resinosa) stand grows on the flat, eastern shore of Brown Cove. This even-aged stand contains healthy, and straight-formed trees. Quaking aspen (Populus tremuloides) and white birch (Betula papyrifera) are minor components.

The mossy forest floor contains decaying stumps, remnants from a thinning cut approximately 30 years ago. Regeneration is limited to open areas and ground plants include bracken fern and bunchberry.

A table of diameters obtained from two, ten factor prism plots appears below.

<table>
<thead>
<tr>
<th>D.B.H. (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 5 6 7 8 9 10 11 12 13</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>red spruce</td>
</tr>
<tr>
<td>1 2 5 3 4 4 1 2 3</td>
</tr>
<tr>
<td>red pine</td>
</tr>
<tr>
<td>1 1 1 2 1 4 4</td>
</tr>
</tbody>
</table>

Red spruce averages 8 inches, while red pine averages 11 inches. Data indicates 50 cord/acre. An increment core from an 11 inch d.b.h. red pine and an 8 inch red spruce both indicated 105 years.

Criteria met and reasons for NOT RECOMMENDED status

This stand meets all the criteria for old-growth forest stands. However, the relatively young age of this stand and presence of exemplary stands elsewhere make evaluation of this area unnecessary.
CEDAR FORESTS IN MAINE

Introduction

Northern white cedar (Thuja occidentalis) is a swamp species found in wet, not poor conditions. It has a northern range from the Maritimes to Minnesota and northern New England to central Quebec. It is usually found in low depressions or along gentle streams where the moisture drainage is poor, but nutrient conditions are adequate. Here it can be mixed with spruce or fir and commonly dominates these swamps. This long-lived species maintains itself in nearly pure composition on many sites. Occasionally stands are found on shallow, nutrient rich dry sites and scattered trees are found in the prevalent spruce/fir forests of the north. In Maine cedar is common in the north and ranges southward to central regions only.

Inventory Results

The only significant old-growth cedar forest identified was the Rocky Brook area in T13 R10, which has been previously registered as an old-growth cedar forest (Table 7 and Figure 7). The site was re-evaluated using the criteria for natural old-growth forest stands which it has met. It ranks highly among natural old-growth forests and warrants registration as such.

There is an obvious lack in the number of old-growth cedar forests found. More such sites should be actively sought.

TABLE 7

<table>
<thead>
<tr>
<th>Rec. Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
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<tbody>
<tr>
<td>T13 R10 Rocky Br</td>
<td>Aroo</td>
<td>T13 R10</td>
<td>200-300 years (avg)</td>
<td>9</td>
<td>Reg.</td>
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<tr>
<td>Clayton Stream</td>
<td>Aroo</td>
<td>T12 R8</td>
<td>Not determined</td>
<td>Not deter Not Rec.</td>
<td></td>
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<tr>
<td>Eagle Lake</td>
<td>Aroo</td>
<td>Eagle Lake</td>
<td>Not determined</td>
<td>5</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>Pocwock</td>
<td>Aroo</td>
<td>T17 R13</td>
<td>200</td>
<td>Not Rec.</td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 7
OLD-GROWTH CEDAR STANDS INVENTORIZED

- Registered as a critical area
- Not Recommended

Miles
Plate 6

Old-growth cedar stand, T 13 R10 WELS

George "Pete" Sawyer of Ashland sits next to a 43 inch diameter cedar in the Rocky Brook Old-Growth Cedar forest, a registered Critical Area. The oldest trees here are aged at 200 to 300 years. There is no evidence of cutting in this stand. It is the only significant natural old-growth cedar forest documented in this report.

Photo by Hank Tyler
1. **ROCKY BROOK OLD-GROWTH CEDAR FOREST**

Forest Type: Northern White Cedar

Town: T13 R10 WELS

County: Aroostook

Quad.: Allagash Falls 15', (1932)

Age: 200-300 years, max. age class, 200+ (average)

Stand Size: 9 acres

Elevation: 1,340'


Status: Registered

**Description**

An old-growth stand of white cedar, or arbor vitae (Thuja occidentalis) grows in the headwaters of Rocky Brook about one-half mile from the western edge of T13 R10. The west swamp is dominated by an uneven-aged stand of arbor vitae. The largest trees measure 33, 36, and 36.5 inches d.b.h. The tallest cedar measured 68 feet. An increment boring of a 29 d.b.h. tree, had 100 years of growth in 2-1/8 inches of wood. Because the largest trees have rotten centers, accurate age determination is impossible. In 1982, increment borings were taken from nine cedar trees:

<table>
<thead>
<tr>
<th>D.b.h. (inches)</th>
<th>Age</th>
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<tbody>
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<tr>
<td>15.0</td>
<td>206</td>
</tr>
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<td>15.8</td>
<td>252+</td>
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<td>215+</td>
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<td>19.8</td>
<td>230+</td>
</tr>
<tr>
<td>17.2</td>
<td>128</td>
</tr>
<tr>
<td>17.5</td>
<td>132</td>
</tr>
<tr>
<td>17.8</td>
<td>258+</td>
</tr>
</tbody>
</table>

The average age of these cedars is therefore greater than 200 years.

Several large red spruce (Picea rubens) also grow on the edge of the cedar forest. The two tallest spruce measured 99 and 109 feet.
1. ROCKY BROOK OLD-GROWTH CEDAR FOREST (continued)

The understory vegetation consists of horsetail (Equisetum sp.), stiff club-moss (Lycopodium annotinum), violets, (Viola spp.), long beech fern (Dryopteris phoebeopteris), wood sorrel (Oxalis montana), gold thread (Coptis groenlandica), mountain maple (Acer spicatum), hobblebush (Viburnum alnifolium), bunchberry (Cornus canadensis), creeping snowberry (Gaultheria hispidulum), alder (Alnus rugosa), wild sarsaparilla (Aralia nudicaulis), clintonia (Clintonia borealis), mountain ash (Pyrus americana), alternate-leaved dogwood (Cornus alternifolia), Labrador-tea (Ledum groenlandicum), gooseberry (Ribes sp.), blue flag iris (Iris versicolor), black spruce (Picea mariana), and oak fern (Dryopteris disjuncta).

There is no evidence of timber harvesting in this forest area other than a few spruce stumps on northwesterly limits. This area is included on the Register because it is an old-growth, virgin cedar forest.

Criteria met and reasons for RECOMMENDED status

This stand was registered as a critical area on April 20, 1979. In June 1980, the T13 R10 Old-Growth Cedar Forest was reevaluated using the criteria for natural old-growth forest stands. It was found to meet all these criteria and had a significant score in the ranking to warrant registration as a natural old-growth stand.

2. CLAYTON STREAM NORTHERN WHITE CEDAR

Town: T12 R8 WELS
County: Aroostook
Quad: Fish River Lake 15' (1931)
Date Field Checked: July 7, 1980 by John Grena
Status: Not Located, Not Recommended

Description

An area of ten, large-sized cedar trees was searched for but not located during this field visit. The said location was placed at the bend in Clayton Stream between the North Branch of Fox Brook and Clayton Lake. From a major logging road, the T12 R8 - T13 R8 townline was followed for 1-3/4 to 2 miles until the stream was reached. Both sides of the stream 1/4 to 1/2 mile north and south of the line were surveyed.
2. **CLAYTON STREAM NORTHERN WHITE CEDAR** (continued)

Criteria met and reasons for **NOT RECOMMENDED** status

This is not a priority site to field check because of the small number of trees and lack of an exact location description. See Clayton Stream file for contact person.

3. **EAGLE LAKE NORTHERN WHITE CEDAR**

Forest Type: Northern-white cedar

Town: Eagle Lake Twp.

County: Aroostook

Quad: Eagle Lake 15' (1928)

Stand Size: 5 acres

Age: Not determined

Date Field Checked: July 23, 1980 by John Grena & Robert Rochester

Status: Not Recommended.

Criteria met and reasons for **NOT RECOMMENDED** status

This five-acre stand west of Eagle Lake was rejected because of its appearance and health. Although it meets the criteria for naturalness and stand identity, it was felt that the poor health and appearance did not rank the stand as a significant natural feature in the State. Like most stagnating thickets, the cedar average no more than 5 inches d.b.h. Active cutting, both clearcutting and selection harvests are presently underway near the stand's border.

4. **POCWOCK STREAM**

Forest Type: Cedar

Town: T17 R13 WELS

County: Aroostook

Quad: Rocky Mtn. 15' (1955)

Age: 200+ (max. age class)

Size: Not Determined.
4. POCKOCK STREAM (continued)

Date Field Checked: June 9, 1982 by Charles Cogbill

Status: Not Recommended.

Description

This heterogenous area contains some pockets of cedar (Thuja occidentalis) in an area of old and new cuts. The cedar have not been cut, but spruce (Picea rubens) and fir (Abies balsamea) around them have. The cedars are over 200 years old while the oldest of the surrounding spruce are approximately 100 years old. There is no coherent stand of old-growth cedar here.

Criteria met and reasons for NOT RECOMMENDED status

This area does not form a coherent stand and it is disturbed by cutting in the immediate vicinity. Therefore, this area is not recommended for evaluation as a critical area.
OAK FORESTS IN MAINE

Introduction

Northern red oak (Quercus rubra) stands are found in well drained, shallow, or dry conditions on the coastal plain and lower mountains in the northeastern United States. This type has a more southern affinity than the mixed northern hardwood forests. Red oak occurs with a number of other oak or hickory species in the part of its range from the mid-Atlantic states through southern Maine. White oak (Quercus alba) is found in slightly richer, and more southern conditions than red oak. It is restricted to the southern part of the state and seldom found in pure stands of more than a limited extent. White oak and shagbark hickory (Carya ovata) the common associates of red oak in York county. North of the range limits of the southern species, red oak alone forms stands on nutrient poor, dry soils usually mixed with some northern hardwood components. Further north or distant from the coast, the oak component becomes less prominent. Small pockets of red oak are found as far north as northern Aroostook county, but forests dominated by oak are not common beyond central Maine. Oak cannot become established except after a disturbance such windthrow from a coastal storm or after a fire. Under typical conditions oak occurs in either relatively pure conditions or a minor component in dry hardwood forests. Stands dominated by red oak are usually restricted to nearby the coast of southern Maine or in areas of consistent disturbances.

Inventory Results

The old-growth criteria were met by only one oak forest, the red oak - American Beech forest in Camden Hills State Park on Mt. Megunticook (Table 8 and Figure 8). An exemplary oak forest stand was found on Little Diamond Island in Casco Bay, with a rather unusual species composition for coastal islands. In this area the trees were slightly younger than those typical for old-growth, and have had previous disturbance by Indian settlements (and later, sheep grazing), but still warrants recommendation by its unusual character. The oak stand in Baxter Park in Portland deserves special recognition as well. Although the stand lacks an undisturbed and therefore natural stature, the age and identity of this stand has been preserved. The occurrence of such an old stand in this populated district of Portland is unusual and is therefore, considered for recommendation.

Clearly, the old-growth oak forests of Maine are sparse, and efforts should be continued to identify more of them.
### TABLE 8

OLD-GROWTH OAK STANDS INVENTORIED

<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mt. Megunticook-Red Oak</td>
<td>Knox</td>
<td>Camden</td>
<td>100-150 (max. age cl)</td>
<td>9</td>
<td>Rec.</td>
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<tr>
<td>2.</td>
<td>Little Diamond Is Cumb-Red Oak</td>
<td>Portland</td>
<td></td>
<td>86-96 (max. age cl)</td>
<td>33</td>
<td>Rec. (not old growth)</td>
</tr>
</tbody>
</table>
FIGURE 8
OLD-GROWTH OAK
STANDS INVENTORIED

- Recommended for evaluation as a critical area
- Not Recommended
The northern red oak stand along the lower eastern slopes of Mount Megunticook are over 100 years old and measure up to 24 inches diameter. The oaks are branch free for up to 40 feet of their total height of 70 to 90 feet. This is the largest known area of mature red oak forest in Maine, encompassing at least 9 acres.

Photo by Hank Tyler
1. MOUNT MEGUNTOCOK NORTHERN RED OAK-BEECH

Camden Hills State Park

Forest type: Red Oak - American Beech

Town: Camden

County: Knox

Quad: Camden 7.5' (1955)

Age: 100-150 years (Red Oak maximum age class), 106 years (Red Oak avg)

Stand Size: Estimated 9 acres

Elevation: 650'

Date Field Checked: August 18, 1980 by John Grena

Status: Recommended.

Location

This stand is found on the lower eastern slopes of Mount Megunticook along the Megunticook Snowmobile trail. Branching from the main trail, the Snowmobile Trail follows the contours of the mountain east for 3/4 mile and then north 3/4 mile before reaching a ski shelter. The most beautiful, as well as the largest concentration of red oak on the mountain begins 1/4 mile from the trailhead. This stand grows along both sides of the trail and continues for approximately 1/8 mile. In addition, a small stand growing both up and down slope of the trail begins at the trailhead and continues for 500 feet.

Description

This red oak (Quercus rubra) - American beech (Fagus grandifolia) stand is an example of a subclimax, undisturbed stand of hardwoods. Although faint signs of an old road (probably an old fire road) are present, no stumps from cutting are found anywhere in the stand. Cutting is prohibited in this area of the park because of the aesthetic value of the oaks.

All of the red oak in the stand have straight, columnar boles with the first line branches appearing 36 to 42 feet up on the total height of 70 to 90 feet. The largest oak measures 24 inches d.b.h., the highest, 90 feet, and the oldest, 132 years.

The trees exhibit excellent form through straight, branch-free boles and disease free conditions. The beech show no apparent signs of Beech-scale-Nectria disease.
The stand is a good example of a stratified or multi-storied red oak-beech association containing five strata of plants. The overstory, 70 to 90 feet tall, is composed of red oak, sugar maple (Acer saccharum), and white ash (Fraxinus americana) trees exhibiting diameters of ten inches or more. The next stratum, rising 30 to 45 feet, consists of pole-sized (5 to 10 inches d.b.h.) beech, red oak, and hophornbeam (Ostrya virginiana). Beneath these, a sapling growth of striped maple (Acer pensylvanicum), beech, and scattered hemlock (Tsuga canadensis) grow to heights between 4 and 15 feet. Lastly, the lowest stratum contains the groundplants: Christmas fern (Polystichum acrostichoides), cinnamon fern (Osmunda cinnamomea), whorled aster (Aster acuminatus), panicled hawkweed (Hieracium paniculatum), and maple-leaved viburnum (Viburnum acerifolium).

The stand is uneven-aged, growing in mesophytic conditions on rocky, well-drained soils. Two inches of hardwood leaf litter cover the ground on this 30% southeast facing slope. Shade tolerant sugar maple, beech and white ash seedlings comprise the reproduction in this red oak forest type with scattered white ash.

Species transition occurs as one moves up or down on the mountain. Upslope, red spruce (Picea rubens) and beech replace the red oak, while on the lower, wetter areas at the base of the mountain, white birch (Betula papyrifera), witch-hazel (Hamamelis virginiana) and butternut (Juglans cinerea) become the associated species.

The following contain data collected from the site.

<table>
<thead>
<tr>
<th>D.B.H. (inches)</th>
<th>R. Oak</th>
<th>W. ash</th>
<th>W. birch</th>
<th>Sugar Maple</th>
<th>Beech</th>
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<tbody>
<tr>
<td>5</td>
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Height in Feet of Representative Trees Measured with a Suunto Clinometer

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<tr>
<th>Species</th>
<th>D.B.H. (inches)</th>
<th>Feet to first live branch</th>
<th>Total feet</th>
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<tbody>
<tr>
<td>Red oak</td>
<td>8</td>
<td>42</td>
<td>75</td>
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<td>36</td>
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<td>Red oak</td>
<td>22</td>
<td>45</td>
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</tr>
<tr>
<td>White ash</td>
<td>14</td>
<td>45</td>
<td>78</td>
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Ages from Increment Corings Taken at D.B.H.

<table>
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<tr>
<th>Species</th>
<th>D.B.H. (inches)</th>
<th>Height (feet)</th>
<th>Age</th>
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</thead>
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</tr>
<tr>
<td>Red oak</td>
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<td>White ash</td>
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<tr>
<td>Sugar maple</td>
<td>11</td>
<td>63</td>
<td>53</td>
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</table>
1. MOUNT MEGUNTICOOK NORTHERN RED OAK-BEECH (continued)

Criteria met and reasons for RECOMMENDED status

This stand meets all the criteria for natural old-growth forest and hence is recommended for critical area status.

2. LITTLE DIAMOND ISLAND - RED OAK STAND

Forest type: Red Oak - American Beech

Town: Portland, Casco Bay

County: Cumberland

Quad: Portland East, 7.5' (1956)

Age: 86-96 years (max. age class)

Stand Size: 33 acres

Elevation Size: 20'

Date Field Checked: June 30, 1980 by John Grena, Harold Hackett & Sister Nola Wells

Status: Recommended.

Description

The northern half of Little Diamond Island contains a mature stand of mixed hardwoods that exhibits good form and contains a high diversity of tree and plant species. Red oak (Quercus rubra) and American beech (Fagus grandifolia) are the major components of the 9 tree and 19 plant species found in this stand. Species uncommon to most portions of Maine such as shagbark hickory (Carya ovata) and pitch pine (Pinus rigida) are also found. For more information on Shagbark hickory, see planning report no. 66, by Roger Stern.

A spring feeding a small brook dissects the stand, thus creating moist conditions favorable for certain plant species. On either side of the brook, spotted jewelweed (Impatiens capensis), Jack-in-the-pulpit (Arisaema atrorubens), sensitive fern (Onoclea sensibilis) and coltsfoot (Tussilago farfara) are found. The moist ground adjacent to the brook has proven to be an excellent site for shagbark hickory regeneration. Because of shagbark's moderate tolerance to shade, these saplings and seedlings have an excellent chance of survival and should comprise a portion of the future stand.
2. LITTLE DIAMOND ISLAND - RED OAK STAND (continued)

The island is known to have had Indian settlements as well as sheep grazing activities in the past. Fire may also be a part of the island's history. As a result, some of the red oak exhibit a form indicative of open grown conditions: trunks that fork or branch within a close distance to the ground. The majority of the stand contains trees that display straight, cylindrical trunks, an average height of 75 feet with a diameter at breast height (d.b.h.) between 10 and 38 inches. The poorer formed trees that branch or fork within a close distance to the ground represent the largest trees on the island: 46, 54, and 61 inches at d.b.h.

Growing in association with the red oak are sugar maple (Acer saccharum), beech, and shagbark hickory. The beech have diameters less than 11 inches, and are in excellent condition, showing no signs of Beech bark disease caused by the attack of the fungus, Nectria sp. and scale insects. Several of the shagbark hickory trees measure 2 feet at d.b.h. Found in lesser amounts are red maple (Acer rubrum), white birch (Betula papyrifera), hophornbeam (Ostrya virginiana), and pitch pine, which is located only on the eastern bluffs along with black huckleberry (Gaylussacia baccata).

Groundplants and shrubs in the stand include:

wild sarsaparilla  Aralia nudicaulis  
winterberry holly  Ilex verticillata  
beaked hazelnut  Corylus cornuta  
northern wild raisin  Viburnum cassinoides  
mapleleaf viburnum  Viburnum acerifolium  
Canada mayflower  Maianthemum canadense  
starflower  Trientalis borealis  
false Solomon's Seal  Smilacina racemosa  
serviceberry  Amelanchier sp.  
arboretum  Viburnum sp.  
cinnamon fern  Osmunda cinnamomea  
bracken fern  Pteridium aquilinum

Data collected on diameters and from increment corings appears below:

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<tr>
<th>d.b.h.</th>
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<th>d.b.h.</th>
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</table>

-167-
2. LITTLE DIAMOND ISLAND - RED OAK STAND (continued)

Increment cores for red oak taken at d.b.h.

<table>
<thead>
<tr>
<th>d.b.h.</th>
<th>Ages</th>
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</thead>
<tbody>
<tr>
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<td>72</td>
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<tr>
<td>--</td>
<td>86</td>
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<td>--</td>
<td>89</td>
</tr>
<tr>
<td>19</td>
<td>96</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED status

Although the stand does not meet the criteria of naturalness nor minimum age for natural old-growth stands, it is recommended that the area be registered as an exemplary stand for two reasons: 1) the hardwood composition is unusual for coastal islands, and 2) the excellent form and diversity of species that the stand contains.

3. YORK WHITE OAK STAND

Forest type: White oak
Town: York
County: York
Quad: York 15' (1956)
Age: 70 years (est.)
Elevation: 40'
Date Field Checked: April 22, 1980 by John Grena & James Trask
Status: Not Recommended.

Description

These oaks are located in the northeastern corner of the town of York, near the Ogunquit town line, and 1/2 mile west of the coastline. The area did not meet the naturalness and stand identity criteria.

The trees on this site consist of: ten large white oak, three of which measured 25, 27, and 28 inches at d.b.h.; a young stand of white pine, 60 to 70 years old; and seedling regeneration, 3 to 4 feet tall, of red and white oak.

The area was once pastureland, a condition which altered the understory component and the natural succession sufficiently to eliminate the naturalness and stand identity of the site. As a result of the open growing conditions,
3. YORK WHITE OAK STAND (continued)

The white oak exhibit poor form, with crowns that branch from the main trunk 10 feet up from the ground. In addition, the pine component was thinned 5 to 10 years ago.

Criteria met and reasons for NOT RECOMMENDED status

This area does not meet the criteria for naturalness nor stand identity because it was pastureland less than 100 years ago. As a result, the composition and its natural development have been altered, similarly as have thousands of acres in Maine that were once pastureland. Thus, the area is not recommended for critical area status.

4. BAXTER PARK

Forest type: Mixed woods

Town: Portland

County: Cumberland

Quad: Portland 15' (1957)

Age: Not determined

Elevation: 40'

Date Field Checked: May 28, 1982, Charles Cogbill

Status: Recommended.

Description

A small city park between Route 9 and Route 302 is the home of several species of trees of extremely large size. Although not a natural forest stand, the unusually large (and therefore old) specimens occurring here warrant special recognition. The tree species occurring here and their d.b.h.'s are Sugar maple (Acer saccharum) up to 22 inches, Oaks (Quercus spp.) up to 45 inches, Hemlock (Tsuga canadensis) to 35 inches, Red Pine (Pinus resinosa) to 24 inches, beech (Fagus grandifolia) to 18 inches and White Pine (Pinus strobus) to 18.3 inches. Several characteristic groundplants, herbs and ferns are present also.

Criteria met and reasons for RECOMMENDED status

Although the naturalness criteria is not totally met, the age and identity of this stand have been preserved. This park is therefore recommended for evaluation as an old-growth forest stand.

1417P
HARDWOOD FORESTS IN MAINE

Introduction

Stands dominated by a mixture of deciduous angiosperm trees are found throughout the temperate regions of eastern North America. A consistent group of northern hardwoods occurs in the transition zone between the diverse deciduous species to the south and coniferous evergreen species to the north. The northern species represented include American beech (Fagus grandifolia), yellow birch (Betula lutea), and sugar maple (Acer saccharum). The overlapping ranges of these species also includes the center of the range of white pine and eastern hemlock. Together these five species, with minor representation of a limited number of other usually southern hardwoods range from the Maritimes to the upper midwest and central Quebec to the southern Appalachians. The species composition of the types show almost no consistency, except that the three northern hardwoods are usually all present in the forest. Stands can be dominated by either beech, birch, or maple or any combination of the three with several other hardwood or coniferous species. This type, called "northern hardwoods", is best represented in the northern tier of the states and immediate vicinity of the Great Lakes drainage and the St. Lawrence River. In Maine this type is found in better moisture conditions and on deeper soils both on ridges in the north and on most flat or rolling sites in the south.

Inventory Results

Twenty-three old-growth hardwood forests were identified for field checking from 1979-1982 (Table 9 and Figure 9). Eleven of these areas are recommended for critical area status, and three are currently registered or immediately adjacent to a registered area that will be expanded to include the old-growth component.

The majority of the stands inventoried were primarily composed of the northern hardwood species described, especially sugar maple and beech, with yellow birch. Varying amounts of associate species including red oak (Quercus rubra), White Ash (Fraxinus americana), red spruce (Picea rubens) and balsam fir (Abies balsamea) occurred in these sites.

The oldest hardwood trees located were beech and sugar maple in northern Aroostook County, which ranged in age up to about 275 years old. Many of the hardwood stands averaged about 130-200 years as the maximum age class. Most of the old-growth stands identified appeared to be in good health, with occasional occurrences of Beech-scale-Nectria reported as affecting the vigor of some Beech trees in certain stands. However Beech still retains a dominant position in many of these stands.

The sizes of the stands inventoried ranged from only a few acres to over 200 acres. The larger sites were much less frequently occurring, however, they were usually quite exemplary stands. The remainder of the sites fell under 50 acres. All of the identified old-growth areas occurred at elevations above 450 feet, with most of these at elevations greater than 1000 feet.

The old-growth hardwood stands identified and recommended are located in the northern and mid-southern portions of the State (Figure 8). Good sites have not yet been found in the broad band of Central Maine extending from the Canadian border eastward to Washington County in the extreme southern portion of Maine. These latter areas should be inventoried for potential old-growth sites.
## TABLE 9
OLD-GROWTH HARDWOOD STANDS INVENTORIED

<table>
<thead>
<tr>
<th>Rec.</th>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
<th>Status</th>
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<td>Yankeetuladi</td>
<td>Aroo.</td>
<td>T19 R11</td>
<td>180-233 (med.-max)</td>
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<td>Rec.</td>
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<td>Hafey</td>
<td>Aroo.</td>
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<td>275 (max.)</td>
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<td>Aroo.</td>
<td>T14 R13</td>
<td>175-200 (range)</td>
<td>125</td>
<td>Rec.</td>
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<tr>
<td>4</td>
<td>Big Reed Pond</td>
<td>Pisc.</td>
<td>T8 R10</td>
<td>Not determined</td>
<td>10</td>
<td>Rec.</td>
</tr>
<tr>
<td>5</td>
<td>Telos Dam</td>
<td>Pisc.</td>
<td>T6 R11</td>
<td>Not determined (res. st.* )</td>
<td>-</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>6</td>
<td>Pump Handle</td>
<td>Pisc.</td>
<td>T8 R13</td>
<td>113 (avg.)</td>
<td>3</td>
<td>Rec.</td>
</tr>
<tr>
<td>7</td>
<td>Barren Mountain</td>
<td>Pisc. Elliotsville</td>
<td>T8 R13</td>
<td>75 (avg.)</td>
<td>50</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>8</td>
<td>Lunksoos</td>
<td>Peno.</td>
<td>T4 R7</td>
<td>250+ (max), 150-238 (range)</td>
<td>10</td>
<td>Rec.</td>
</tr>
<tr>
<td>9</td>
<td>Newburgh</td>
<td>Peno.</td>
<td>Newburg</td>
<td>110 (second growth)</td>
<td>-</td>
<td>Not Loc./FC</td>
</tr>
<tr>
<td>10</td>
<td>Little Bigelow</td>
<td>Some.</td>
<td>T3 R3</td>
<td>Not determined (res. st.)</td>
<td>-</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>11</td>
<td>IP Sugarbush</td>
<td>Some.</td>
<td>T6 R19</td>
<td>85+ (max.)</td>
<td>50</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>12</td>
<td>Tumbledown</td>
<td>Oxfo.</td>
<td>Roxbury</td>
<td>Not determined (est. 100 yr)</td>
<td>50</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>13</td>
<td>Day Mountain</td>
<td>Fran.</td>
<td>Strong</td>
<td>130-150 (max.)</td>
<td>20</td>
<td>Rec.</td>
</tr>
<tr>
<td>14</td>
<td>Beech Hill</td>
<td>Kenn.</td>
<td>Pittston</td>
<td>130 (max.)</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>15</td>
<td>Mt. Philip</td>
<td>Kenn.</td>
<td>Rome</td>
<td>70-150 (range)</td>
<td>1</td>
<td>Rec.</td>
</tr>
<tr>
<td>16</td>
<td>Cobbosseecontee</td>
<td>Kenn. Monmouth</td>
<td></td>
<td>200 (hdwd. max.)</td>
<td>11</td>
<td>Reg.</td>
</tr>
<tr>
<td>17</td>
<td>Moose Hill</td>
<td>Andr.</td>
<td>Livermore Falls</td>
<td>75-93</td>
<td>2</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>18</td>
<td>Rockport</td>
<td>Knox</td>
<td>Rockport</td>
<td>104-173 (range, beech)</td>
<td>10</td>
<td>Rec.</td>
</tr>
<tr>
<td>19</td>
<td>Haystack Mountain</td>
<td>Oxfo.</td>
<td>Mason</td>
<td>Not determined</td>
<td>7</td>
<td>Reg.</td>
</tr>
<tr>
<td>20</td>
<td>Trout Pond</td>
<td>Oxfo.</td>
<td>Mason</td>
<td>Not determined</td>
<td>3</td>
<td>Rec./F.C.</td>
</tr>
<tr>
<td>21</td>
<td>Mahoosuc Notch</td>
<td>Oxfo.</td>
<td>Grafton</td>
<td>Not determined</td>
<td>5</td>
<td>Rec.</td>
</tr>
<tr>
<td>22</td>
<td>Eliot</td>
<td>York</td>
<td>Eliot</td>
<td>Not determined</td>
<td>5</td>
<td>Not Rec.</td>
</tr>
<tr>
<td>23</td>
<td>York</td>
<td>York</td>
<td>York</td>
<td>59-158 (range)</td>
<td>3</td>
<td>Not Rec.</td>
</tr>
</tbody>
</table>

*residual stand
FIGURE 9
OLD-GROWTH HARDWOOD STANDS INVENTORIED

- Registered as a critical area
- Recommended for evaluation as a critical area
- Recommended for further study and evaluation
- Not Recommended
Plate 8
Old-growth hardwood stand,
DESCRIPTION OF HARDWOOD FOREST STANDS INVENTORIED

1. YANKEETULADI HARDWOODS

Forest type: Beech-maple

Town: T19 R11 WELS

County: Aroostook

Quad: Beau Lake 15' (1955)

Age: 180 - 233 (median-max)

Elevation: 1200'

Stand size: 240 acres

Date Field Checked: November 5, 1981; Charles Cogbill and Tylor Kelly

Status: Recommended

Description

This hardwood ridge is slightly north of and between Yankeetuladi Pond and Mud Pond. It is on a rolling ridge dipping north-northeast at less than 10°. Access is by a skid trail which leaves the east side of a woods road just north of Yankeetuladi Pond. About 1 mile from the road the skid trail traverses the southern portion of the stand. No trees have been removed (or will be since the trail was abandoned) except along the trail itself. The lower slope to the west of the flat ridge crest was burned some time ago and now supports white birch (Betula papyrifera) and red maple (Acer rubrum). Other sections of the slope nearer the stand contain yellow birch (Betula lutea), balsam fir (Abies balsamea), white pine (Pinus strobus, to 3 1/2 feet diameter), and white spruce (Picea glauca).

On the ridge there is a mixture of sugar maple (Acer saccharum) and beech (Fagus grandifolia), with scattered, mostly dying, yellow birch (Betula lutea). Mean diameter at breast height (dbh) of the trees (more than 4 inches diameter) is 11 inches for sugar maple and 7 inches for beech. Sugar maple trees commonly reach 18 inches to 26 inches dbh while large beech were found from 10 inches to 16 inches dbh. Dead yellow birch affected by dieback measured 17 inches to 22 inches dbh. Several large (14 inches dbh, 70 feet tall) white spruce and smaller red spruce (Picea rubens - 9 inches dbh) are scattered through the stand. The canopy averages 55 feet tall and has 90% coverage. The stand interior is rather open with beech saplings common and shrubs such as hobblebush (Viburnum alnifolium) are scattered. The forest floor is covered with prolific seedlings of beech, sugar maple and yellow birch along with shining club moss (Lycopodium lucidulum) and evergreen wood fern (Dryopteris intermedia) as common undergrowth. The deep loamy sand soils have a 0.5 inches mull layer and a trace of grey leached (A2) horizon. The mineral soil is yellowish brown with a pH of 5.2 and filled with small shale
fragments. There is about 1 foot of micro-topography with pits and mounds not pronounced, but occasional large (3 foot dbh) logs are rotting in the forest floor.

A 388 yd$^2$ plot to the north of the skid trail contains an average 610 trees (more than 4 inches dbh) and 629 saplings (1-3 inches dbh) per hectare giving a basal area of 21 m$^2$/ha. Sugar maple accounts for 59% of the trees and 83% of the basal area. Some 38% of the trees and 16% of the basal area is beech. However, 91% of all saplings (1-3 inches dbh) are beech. Only 3% of the stems are yellow birch. Most trees have rotten centers, but 7 bored trees give minimum ages. All trees were more than 100 years old with a median age of at least 180 years. The oldest, a maple, is much more than 233 years old. The stand appears to be uneven-aged and started more than 250 years ago. Scattered sugar maple and beech trees both reach 16 inches to 18 inches dbh and exhibit good form, having straight boles of at least 24 feet.

Across the border in Kamouraska County, Quebec maple forests grow only on till along ridges (Hamel 1955). These "chaines d'erablières" are composed of sugar maple and yellow birch. They occur only on the most favorable sites, often rich in calcium derived from the crumbling bedrock. Along the eastern edge of Kamouraska, 20 miles to the west of Yankeetuladi, these rich maple forests appear to have the westernmost influence of the Acadian forest zone (Hamel 1955). Beech is not a notable regional associate of the maple forest, except right along the St. Lawrence shore. Inland yellow birch and fir are the normal associates in mixed forest. Maple woods are relict outliers in Kamouraska and are very rare north of Riviere du Loup. These forests do not replace themselves after cutting, and due to the restricted distribution, their perpetuation is precarious (Hamel 1955). Beech is more restricted in this area; its northeastern range limit is at Riviere du Loup. It has only recently migrated this far north and a local intensive study is under way to look at fluctuations of the beech range limit over the past several thousand years (C. Lenk, personal communication).

In an initial survey of the area in 1794, Park Holland recorded 30 witness trees from the immediate region. He passed within 2 miles of the stand. Significantly, he states that a hill 3 miles due east was "beech land"; a birch was marked on a matching knoll 2 miles due south; and a hill 20 miles east was "covered with birch and maple". Holland describes the uplands as good hardwood or mixed timber and some good pine. He recorded 40% birch, 20% beech, 27% fir, 3% maple, and 3% spruce among witness trees on the hills in the vicinity. Some 187 years ago, there were no noteworthy burns or other disturbances and the site appeared both outwardly and in composition much as it does today.

The complete dominance of hardwoods with a prominence of beech is unusual, as in this region forests usually contain more yellow birch and fir. A study 50 miles to the northeast in New Brunswick show 8% of the land as hilltop hardwoods, dominated by sugar maple. Hardwood stands sampled in Green River, New Brunswick are 82% maple, 8% fir, 7% birch, 2% beech and 1% spruce (Hughes 1964). Nearby, most slopes support a mixed softwood forest, and beech is rare (Grandtner 1966). Mature stands are all-aged, reproducing well to
1. YANKEETULAPI HARDWOODS (continued)

hardwood, and maintain about 28 yd²/ha basal area. Except for beech and red spruce decreasing to the north, all the Quebec and New Brunswick mature stand characteristics are comparable to the Yankeetuladi site.

Criteria met and reasons for RECOMMENDED status

This stand appears to be uncut and entirely natural. It is old-growth with trees over 230 years old. The extensive ridge has the same general composition over an extent of at least a mile. It is the only undisturbed hardwood stand known to Tylor Kelly, a knowledgeable woodsman, in the region north of Allagash. The stand is representative of those which covered adjacent ridges, but have been selectively cut. The trees are relatively large, considering the altitude. In fact, beech is within 50 miles of the northern limit of its range here and well represented at this altitude. Additionally, the upland white spruce is more characteristic of areas north of the range of red spruce. The well-developed hardwood composition, (even if not a unique remaining example), the prominence of beech so far north, and the extensive homogenous ridge, all contribute to the stand as an exceptional example of hardwood ridges in northern Maine.

2. HAFEY HARDWOODS

Forest Type: Beech
Town: T18 R11
County: Aroostook
Quad: Allagash 15' (1930)
Age: 275 (max)
Stand Size: 100 acres
Elevation: 1300'
Date Field Checked: July 2, 1982, Cogbill
Status: Recommended.

Description

This ridge is essentially a continuation of the Yankeetuladi Stand to the north. It occupies a virtually identical portion and contains predominately small beech 1 to 6 inches in diameter and large (16-21 inch) sugar maples. It is very open with no sign of any cutting. This is an old-growth ridge with trees over 275 years old and reproducing. An area to the north on Hafey Mountain property contains several large red spruce trees on ledges.
Criteria met and reasons for RECOMMENDED Status

This area is old, undisturbed and forms a coherent stand. This meets the criteria and therefore, this stand is recommended for evaluation.

3. MUSQUACOOK HARDWOODS

Forest Type: Beech-Maple
Town: T14 R13 WELS
County: Aroostook
Quad: Round Pond, Maine 15' (1955)
Age: 175 - 200 years (range of sugar maple and yellow birch)
Elevation: 1500'
Stand Size: 125 acres
Date Field Checked: November 5, 1981; Charles Cobgill, Tylor Kelly
Status: Recommended.

Description

This hardwood stand extends west 0.2 mi. beyond where the Michaud Tote road south of the Allagash Checkpoint crosses the township line between T14 R12 and T14 R13. The road turns at the crest of the west end of Musquacook Mountain just beyond the stand. The flat topped, gently rolling ridge dips to the east at about 10'. To the west, the stand continues on the top of several small rises on the ridge. The lower portions of the ridge contain much more spruce (Picea rubens, and P. glauca) and balsam fir (Abies balsamea) which have been cut in the past. There are several other similar ridges in the vicinity. This hardwood ridge is dominated by sugar maple (Acer saccharum) and beech (Fagus grandifolia). Throughout the stand there are common yellow birch (Betula lutea) and fir, and scattered red spruce and red maple (Acer rubrum). Mean diameter for both beech and maple is 9 inches dbh. Beech diameter range from 4 to 15 inches dbh and maples are from 4 to 24 inches. The yellow birch moderately large (9 inches to 15 inches dbh) and appears to be affected by dieback. The stand canopy is flat topped at 60' and has 90% coverage. The ground has about 30% coverage of hobblebush (Viburnum alnifolium) with abundant shining clubmoss (Lycopodium lucidulum) and evergreen wood fern (Dyopteris intermedia). Other common vascular plants include wood sorrel (Oxalis montana), asters (Aster sp.) and wood reed (Cinna latifolia). The soil is a deep sandy loam covered with a 1 inches mull of leaf litter. A gray 1/2 inch to 1 inch leached A2 horizon lies over a deposited reddish brown 2 1/2 inches B1. There is a trace of charcoal in the A1 horizon. The soil has a pH of 4.8. It gets lighter with depth and contains only few pebbles to over 12 inches. The ground is 40% covered with
21. Pit and mounds, there are few logs presently on the ground but windthrown trees are common.

A 50 x 15 m sample quadrat on the top of the ridge indicates 490 trees (more than 4 inches dbh) per hectare, but only 100 saplings (1-3 inches dbh) per hectare. Both beech and sugar maple contribute 41% of the trees, while yellow birch is 11% and fir is 8% of the stand. Basal area is 27.3 m²/hectare, with maple 40%, beech 39%, birch 15% and fir 5%. The medium age of 6 trees cored is approximately 175 years and the oldest is a sugar maple more than 190 years old. Most of the maple and birch-appear to be about 175 to 200 years old.

The beech are younger being 105 to 115 years old. The stand appears to have two even-aged components one about 200 years old and another about 115 years old. These two age groups show no distinction in size classes as the old large sugar maples and old medium sized yellow birch are mixed in with the larger, but younger beech.

Criteria met and reasons for RECOMMENDED status

This ridge stand appears to be uncut and entirely natural in origin. There was probably a disturbance about 115 years ago and experienced replacement of much of the stand. The pit and mound topography lack of stumps and number of holdovers indicate a natural blowdown of some sort. The older part of the stand is about 200 years old and might have started after a fire. The stand demonstrates well the dynamics of hardwood forests with blowdowns and periodic replacement of older trees. The basal area is sizeable for its northern location and is now the maximum sustained by hardwood stands in this region. The prominence of beech and few dead yellow birch, indicate a composition similar to the original forest. It is old-growth with trees over 200 years old and is maintaining its composition. Although only one of several hardwood ridges in the vicinity, it is a representative well-developed example. Beech forests are relatively uncommon this far north and the sugar maple is the major component in forests across the border in Quebec. With 40% beech composition, and documented old trees, this is an unusual stand. It is not as old as the Yankeetuladi stand, but sizeable forest trees and homogenous composition make this stand a valuable example of hardwood ridges.

4. BIG REED HARDWOODS

Forest Type: Mixed Northern Hardwoods

town: T8 R10 WELS

County: Piscataquis

Quad: Spider Lake '5' (1961)

Age: Not determined
4. BIG REED HARDWOODS (continued)

Elevation: 1060'-1200'

Stand Size: 10 acres


Status: Recommended.

Description

This is a small, but typical stand of slope forest on the Big Reed Pond Preserve. It is located along a loosely blazed trail from the haul road crossing of Reed Brook to Big Reed Pond. The path goes west across the slash of a relatively recent cut and enters the uncut area just northeast of Reed Deadwater. The trail goes along the 1100 foot contour then continues down to the east end of Big Reed Pond. The area contains a mixed composition, but tends toward a rich hardwood site. The dominants are beech (Fagus grandifolia), sugar maple (Acer saccharum) and yellow birch (Betula lutea). There is a component of red spruce (Picea rubens), and balsam fir (Abies balsamea), from the lower or rocky slopes. Also represented are cedar (Thuja occidentalis), hemlock (Tsuga canadensis) and ash (Fraxinus americana). The stand is relatively rich compared to the regional vegetation and contains several seeps along a gentle southwest slope.

The stand contains no cut stumps and consists of a variety of sizes of trees of the dominant species. Beech grow to 26 inches, birch to 30 inches, maple to 27 inches and all average about 15 inches in diameter. Occasional large spruce to 65 feet tall grow to 30 inches. The understory is dominated by wood fern, wood sorrel with a rich assortment of other herbs. The soil is rocky, but thick and bears no evidence of charcoal. There are several downed trees, and there is moderate evidence of remains in the forest floor. The age of the spruce trees in this stand is 90-150 years.

This tract has been owned by the Pingree-Wheatland heirs for over 100 years and managed by the Seven Islands Land company who supports the use of the Reed Pond Study Area for ecological investigations (Young, 1982). The entire study area comprises a 5,100 acre tract of land including natural old-growth forest, relatively undisturbed by cutting. There are no records of cutting, however Young notes the past harvesting of cedar in 1924 near the southern line of the study area. There are currently no plans for timber operations on this entire tract.

Since the field visit to this area consisted of a half-day visit to a 10 acre portion of the study area, more extensive field work here may uncover other significant old-growth sites as well as valuable information regarding old-growth forest dynamics in Maine.
Criteria met and reasons for RECOMMENDED status:

1) The stand is uncut and undisturbed by man; and presently used as a preserve study area.

2) Although not dense or tall, the stand has windthrow, snags, and an appearance of dynamic replacement.

3) The stand contains trees of old age and is of classic old-growth structure.

4) The mixed stand, rich damp understory, and extent over several patches, all make it a characteristic example of old-growth hardwood forest.

5) This area should be more extensively inventoried to find other such significant sites.

5. **TELOS DAM MIXEDWOOD**

Forest Type: Mixed woods

Town: T6 R11 WELS

County: Piscataquis

Quad: Telos Lake 15' (1957)

Age: Not determined

Stand Size: Not determined

Elevation: 900'

Date Field Checked: September 23, 1980 by John Grena & Richard Davis

Status: Not Recommended.

Description

This is an area below the "Telos Cut" on a ridge north of Telos Lake. It does not meet the criteria for naturalness nor stand identity. The stand has been completely disturbed by a 1976 selection harvest. The area surveyed is laced with skidder trails and two winter haul roads. The residual stand does contain a few scattered sugar maple, hemlock, and red spruce, 13 inches or more in diameter, of good form and health.

Criteria met and reasons for NOT RECOMMENDED Status

This area does not meet the criteria for naturalness nor stand identity because it is an area of intensive management and has been cut in 1976.
6. **PUMP HANDLE SUGAR MAPLE - BEECH STAND**

Forest Type: Sugar Maple - Beech

Town: T8 R13 WELS - Eagle Lake Twp.

County: Piscataquis

Quad: Churchill Lake 15' (1962)

Age: 113 years (average)

Stand Size: 3 acres

Elevation: 1100'

Date Field Checked: September 25, 1980 by John Grena and Brady Scott

Status: Recommended

**Description**

A small stand of sugar maple and beech containing large-diameter maple grows on Second Ridge, centrally located on the Pump Handle peninsula. The Pump Handle extends into the northern portion of Eagle Lake.

The sugar maple (*Acer saccharum*) and beech (*Fagus grandifolia*) comprise the canopy in this even-aged stand. The only vegetation beneath them is regeneration of two-foot beech and maple seedlings, and groundplants, trillium (*Trillium sp.*) and wood fern (*Dryopteris sp.*). A few red oaks are found at this site. No signs of any past cutting are present in the stand.

Although the area contains old-growth specimens, the area is too small to be considered significant unless future work does not uncover a stand of similar composition.

The beech and maple average 113 years in age. Maple, the species in majority, averages 19.7 inches d.b.h.; the largest specimen being 30 inches. The maples rise 55 to 65 feet in height and have straight, single trunks until the crown begins 25 to 35 feet up on the bole. All trees exhibit healthy crowns; however, the beech show advanced signs of the Beech-scale *Nectria* disease on their trunks.

Surface soils are of the mull type: a loose brown colored layer resulting from a mixing of the organic and mineral soils at ground level. The surface texture is a stoney clay loam on this 15% slope.

**Criteria met and reasons for RECOMMENDED Status**

This area meets the criteria for age, stand identity and naturalness, and thus is recommended for critical area status.
7. **BARREN MOUNTAIN BEECH-MAPLE-BIRCH STAND**

Forest Type: Beech-Maple-Birch

Town: Elliottsville

County: Piscataquis

Quad: Sebec Lake 15' (1950)

Age: 75 years

Standard Size: 50 acres (approximately)

Elevation: 900-1200'

7. **BARREN MOUNTAIN (continued)**

Date Field Checked: September 8, 1980 by John Grena and Kenneth Allen

Status: Not Recommended. Area inventoried merits consideration as exemplary stand, but was not the site originally intended for field checking. The correct site should be located and inventoried.

**Description**

On the south and lower slopes of Barren Mountain is an uncut beech-maple-birch stand. Barren Mountain is north of Lake Onawa and eleven miles southeast of Greenville. The stand does not meet the 100 years minimum age requirement: trees of average stand diameter that had increment cores extracted were 75 years old. Moreover, this was not the area on the mountain indicated as old growth, but was 3/4 mile east of the area that should have been inventoried.

Vegetation consists of overstory, understory and groundcover strata. The overstory contains sugar maple (Acer saccharum) and beech (Fagus grandifolia), with a few scattered yellow birch (Betula lutea). The height of this stratum is between 70 and 75 feet. Beneath these, sugar maple, beech and hophornbeam (Ostrya virginiana), 1/2 to 4 inches at d.b.h. comprise the understory. These species are between 15 and 25 feet tall. Lastly, the following groundplant and shrub species are present: christmas fern (Polystichum acrostichoides), Jack-in-the-pulpit (Arisaema sp.), whorled aster (Aster acuminatus), wild sarsaparilla (Aralia nudicaulis), hobblebush (Viburnum alnifolium), white baneberry (Actaea pachypoda), early meadowrue (Thalictrum dioicum), and zigzag goldenrod (Solidago flexicaulis).

The sugar maple in the stand are of good form, with straight, clear trunks for 35 feet until the trunk spreads into the crown. The trees average 16 inches d.b.h., with 19 being the largest diameter class. The tallest tree is 75 feet tall. Most of the maple under 18 inches d.b.h. display good health, however, larger trees were found to be rotten in the center.
7. BARREN MOUNTAIN (continued)

The beech component average 11 inches d.b.h. Most have blistered bark, a symptom of the Beech-scale *Nectria* disease.

The stand is large enough to retain its identity even though a portion could be altered by mortality or blowdown. The site does not appear to be a habitat supporting any rare or unusual species. The trees grow at an elevation between 900-1200 feet on a 42% slope: features that protect the stand from harvest operations.

Data collected in the stand appears in the following charts:

Increment Cores Taken at d.b.h.

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<thead>
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<th>Species</th>
<th>D.b.h. (inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
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<td>beech</td>
<td>12</td>
<td>74</td>
</tr>
<tr>
<td>sugar maple</td>
<td>13</td>
<td>70</td>
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No. of Trees by Species and D.b.h. class from a random sample of trees

<table>
<thead>
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<th>D.b.h.</th>
<th>Sugar maple</th>
<th>Beech</th>
<th>Yellow birch</th>
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<tbody>
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<td>1</td>
<td>1</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Criteria met and reasons for NOT RECOMMENDED Status:

This stand does not meet the criteria for a natural old-growth stand, and it was not the area intended to be inventoried. It is recommended that the correct stand be field checked. This stand does merit considerations in the exemplary stand category, but not as old-growth.
8. **LUNKSOOS MOUNTAIN HARDWOODS**

Forest type: Beech-maple

Town: T4 R7 WELS

County: Penobscot

Quad: Stacyville 15' (1953)

Age: 250+ (maximum), 150-238 (range)

Stand Size: 10 acres

Elevation: 1140'

Date Field Checked: July 27, 1980 Hank Tyler, Sally Rooney; October 30, 1981 Charles Cogbill

Status: Recommended.

Description

This stand is on a steep rocky slope on the east face of Lunksoos Mountain. It is located between a very steep (50°) talus slope above and a gentle (15°) lower slope below. The talus is at the base of cliffs comprising the east face of Lunksoos. The specific site is below a small gully, filled with white birch (Betula papyrifera), southeast of the prominent rounded northern cliff face. The area below the stand is traversed by a small stream forming at the abrupt change in slope. This lower area was selectively cut in its upper reaches and covered with scrubby second growth beech lower down. The lower slope is traversed by many old logging roads from at least two different periods of cutting. The slope is covered with a moderately sized sugar maple (Acer saccharum) and beech (Fagus grandifolia) stand with a rich mixture of yellow birch (Betula lutea), white ash (Fraxinus americana) scattered red spruce (Picea rubens) and basswood (Tilia americana). Mean diameter of the maples is 12 inches at breast height (dbh) and beech average 8 inches dbh. Larger sugar maples range from 13 inches to 33 inches dbh and beech are smaller reaching a maximum of 18 inches dbh. Many of the yellow birch are dying, but they reach 29 inches dbh. The lower part of the stand is slightly richer with larger and taller (60 feet) trees, supporting basswood up to 24 inches dbh, red spruce up to 22 inches dbh, and ash up to 22 inches. The section of the stand just below the talus is somewhat stunted with less than 45 feet to 50 feet average canopy height. The stand is open underneath with canopy coverage about 85%. The interior of the study area contains abundant hornbeam (Ostrya virginiana) up to 7 inches dbh. Tall shrubs (Acer pensylvanicum and Viburnum alnifolium), cover 20 to 80% of the ground. Sugar maple seedlings are ubiquitous and with beech sprouts, cover the forest floor. Common herbs are evergreen wood fern (Dryopteris intermedia), Christmas fern (Polystichum acrostichoides), Shining clubmoss (Lycopodium lucidulum), and marginal shield fern (Dyropteris marginalis). The soil is deep but filled with stones. A 1/2 - 2 1/2 inch mordor humus layer covers a
trace to 1/2 inch well developed grey leached layer (A2). The B horizon is
dark brown, loamy sand with a 4.7 pH. Boulders up to 8 feet cover 10-20% of
the slope. There is no charcoal noticeable in the soil, a few old stumps and
pit and mound topography. Bedrock is volcanic greenstone.

A 718 yd² quadrat in the upper portion of the stand contains 470 trees
(more than 4 inches dbh) and 200 saplings (1-3 inches dbh). Beech comprise
53% of the trees, and indicate 100% of the saplings. Maple has 43% density,
while yellow birch forms the remaining 4% of the sample. Basal area totals
27.7 m²/ha, and divides into 64% maple, 35% beech, and 2% birch. The maple
are larger trees while beech are smaller with abundant sprout saplings. The
medium age of 11 trees cored is 149 years. There are a few sugar maples 190 to 238+
years old and all large trees are more than 150 years old. The trees are not
affected by heart rot and show good form, despite the steep slope.

Criteria met and reasons for RECOMMENDED status

This stand appears to be uncut and entirely natural. It is moderately
old-growth with trees over 250 years old. An extensive area to the north was
burned in 1825 (156 years ago) and to the south in 1805 (178 years ago). Much
of the stand began at about the time of the second fire. However, the lack of
charcoal, age of the oldest trees and hardwood composition all indicate that
the stand is not a direct result of that fire. It is probable that the
sheltered location under the cliffs and between the two fires saved this area
from destruction. Regardless of origin, the area is unique in the immediate
vicinity by supporting a hardwood forest, at least partially predating the
extensive fires. Due to the steep slope, a fairly sizable piece of the
original forest has escaped cutting. The stand contains an assortment of
species, including basswood at the very northern limit of its range. The
dominance of maple and beech is representative of pure hardwood ridges, but
not slopes. Thus this site stands out as a prime example of rich hardwood
forest in original condition in the Baxter Park region.

9. NEWBURGH HARDWOOD

Forest Type: White Ash

Town: Newburg

County: Penobscot

Quad.: Brooks 15' (1955)

Age: 110 (second-growth)

Stand Size: Not determined
Date Field Checked: December 11, 1981, Cogbill

Status: Further field work to locate this stand is recommended.

Description

An area of rich hardwoods especially white ash, was searched for, but never located. The area near the Waldo Co. line contains moderately well-developed second-growth forests about 110 years old. No especially notable forest stands were found. Ken Hendren of the Maine Forest Service reported this area.

This area does not support an as yet identified old-growth stand.

10. **LITTLE BIGELOW MOUNTAIN SUGAR MAPLE**

Forest Type: Sugar Maple

Town: Dead River T3 R3 BKP WKR

County: Somerset County

Quad: Little Bigelow Mountain 15' (1956)

Age: Not determined

Elevation: 1440'

Date Field Checked: August 9, 1980 by John Grena and Terry McGovern

Status: Not Recommended.

Description

The stand contains a few old sugar maple of poor form, left after a high-grade selection cut. The younger understory is composed of pole and sapling-sized beech.

Criteria met and reason for NOT RECOMMENDED Status:

The stand did not meet the naturalness criteria for natural old-growth forest stands because the trees were residuals left after a high-grade harvest.

11. **INTERNATIONAL PAPER COMPANY SUGARBUSH AREAS**

Forest Type: Sugar maple

Town: T6 R19 WELS, T8 R19 WELS
11. IP SUGARBUSH (continued)

County: Somerset

Quads: Hardwood Mountain 15' (1957); Norris Brook 15' (1957)

Age: 85+ (maximum)

Stand Size: 50 acres

Date Field Checked: September 29 and 30, 1980 by John Grena, Hank Tyler, Alec Giffen, Thomas Eubanks, Peter Provencher

Status: Not Recommended.

Description

The six sugarbush stands inventoried during these two days represent sugar maple-beech stands where low-grade cutting has been performed for over 50 years. Low-grade harvesting results when the cull and smaller trees in a stand are removed to favor the larger and/or healthier trees. The trees removed in sugarbush stands are used for firewood, and to open up the stand for sugar maple regeneration. The sugar maple trees in the residual stand are the healthiest and largest specimens, and perhaps genetically superior to the other trees that were removed.

On September 29, 1980, four sites were inventoried in T6 R19. All have been intensively low-grade harvested and sugared for many decades. The average diameter of the dominant sugar maple in these stands is 31 inches at breast height. Diameters of the dominant sugar maple range from 20 to 35 inches.

Shrubs and groundplants include: an understory tree and shrub layer of sugar maple (Acer saccharum), striped maple (Acer pensylvanicum), beech (Fagus grandifolia), mountain maple (Acer spicatum), and hobblebush (Viburnum alnifolium); and a ground layer of honeysuckle (Lonicera sp.), shield fern (Dryopteris sp.), raspberry (Rubus idaeus), bluebead lily (Clintonia borealis), and wild sarsaparilla (Aralia nudicaulis).

An increment coring at breast height of a 22 inch sugar maple indicated that the tree is at least 84 years old. The annual rings were not clearly distinguishable and 2-1/4 inches of the core was rotten.

On September 30, 1980, two stands were inventoried in T8 R18: camp No. 198 and No. 190.

Camp No. 198 is a sugar maple stand that has been intensively low-graded and sugared for many decades. Regeneration in the stand consists of sugar maple (Acer saccharum) and beech (Fagus grandifolia) seedlings that are 1/2 to 4 feet tall. Dominant overstory sugar maple in the stand average 20.5 inches in diameter at breast height and 75 feet in height.
11. IP SUGARBUSH (continued)

Groundplants in the stand include: wood sorrel (Oxalis montana), shield fern (Dryopteris sp.), wild sarsaparilla (Aralia nudicaulis), and hobblebush (Viburnum alnifolium).

The forest floor is covered with 1/4 inch of leaf litter. Beneath the litter is a 1/4 inches organic layer and a silt loam textured soil. Elevation on the site is 1500 feet.

An increment coring taken at breast height of a 14 inch diameter beech indicated that the tree is at least 76 years old. Increment cores of sugar maple trees were not readable.

Camp No. 190 is under the same management as No. 198. Both have been intensively managed for sugar maple production. Average diameter of the dominant sugar maple is 24 inches.

Groundplants and shrubs in the stand include: shield fern, striped maple (Acer pennsylvanicum), false Solomon's- Seal (Smilacina racemosa), Canada mayflower (Maianthemum canadense), and maidenhair fern (Adiantum pedatum).

No increment cores were readable.

Criteria met and reasons for NOT RECOMMENDED Status

The sugarbush areas do not meet the criteria for naturalness because they have been intensively managed for many decades. Speculating on the age of the trees, it is felt that the stands meet the 100 year age minimum criteria. Lastly, the areas do meet the criteria for stand identity.

It is recommended that the sugarbush areas not be registered as natural old-growth forest stands because they do not meet the naturalness criteria. Although the stands contain large-sized trees, the stands lose their value as natural areas because of management practices that have altered the structure and composition.

12. TUMBLEDOWN MOUNTAIN

Forest Type: White Birch

Town: T6 (North of Weld)

County: Franklin

Quad: Roxbury, 7.5 (1969)

Elevation: 2500'

Stand Size: 50 acres
12. TUMBLEDOWN MOUNTAIN (continued)

Age: Not determined (est. 100 yrs.)

Date Field Checked: June 3, 1982, C. Cogbill

Status: Not Recommended.

Description

The area at the headwaters of Tumbledown Brook just south of Tumbledown Pond is dominated by second growth white birch following a fire about 100 years ago. The area contains some sugar maple, and striped maple of small pole size and a few red spruce are 10 to 14 inches in diameter. The area is not a northern hardwood forest and is disturbed in the recent past.

Criteria met and reasons for NOT RECOMMENDED Status

This area does not meet the criteria for age or stand identity, and thus is not recommended.

13. DAY MOUNTAIN HARDWOODS

Forest Type: Hardwood

Town: Strong

County: Franklin

Quad: Kingfield, ME 15' (1930)

Age: 130-150 (maximum age class)

Stand Size: 20 acres

Elevation: 800' (approximately)

Date Field Checked: December 9, 1981, Cogbill, Brackley

Status: Recommended to expand critical area to include the old-growth forest.

Description

The middle upper east slope of Day Mountain supports a mixed hardwood forest dominated by sugar maple with some white ash, red oak, and hornbean. The slope is very steep (40') and rocky with wet seeps common. The area has been selectively cut on the lower slope and trees are 10 to 24 inches in diameter and 45 feet tall. Most of the large trees are between 130 and 150 years old. The stand is relatively rich and moderately old, but not undisturbed. Further, this site is adjacent to a registered critical area for rare plants.
14. BEECH HILL (continued)

Criteria met and reasons for RECOMMENDED Status

This small area which is uncut meets the criteria of age, stand identity, and naturalness. Although, the area is small and adjacent to a disturbed wooded slope, it is significant because of its proximity to an existing rare plant area. It is recommended that the existing rare plant area be expanded to include the old-growth hardwoods.

14. BEECH HILL BEECH-MAPLE-BIRCH STAND

Forest Type: Beech-Maple-Birch

Town: Pittston

County: Kennebec

Quad: East Pittston 7.5' (1970)

Age: 130 years (maximum)

Stand Size: 5 acres

Elevation: 450'

Date Field Checked: February 5, 1981 by John Grena, Alec Giffen, Joe Chaisson

Status: Recommended.

Description

On the southeast slopes of Beech Hill is an uncut beech-sugar maple-yellow birch stand containing large-sized beech (Fagus grandifolia), northern red oak (Quercus rubra), and sugar maple (Acer saccharum). Beech Hill is one mile southwest of Joys Pond. This uneven aged stand contains overstory trees aging 130 years.

In addition to the old-growth overstory, the stand also contains saplings (2 inch d.b.h.) and pole-sized (2-10 inches) trees. The understory sapling component consists primarily of beech. The pole sized trees, found in both the overstory and understory, consist of yellow birch (Betula lutea), beech and hophornbeam (Ostrya virginiana). Average stand diameter is 12 inches d.b.h., while 60 feet is the mean height. The largest diameter class is 24 inches, while the tallest tree is 70 feet.

The size makes it marginal as to whether it would maintain its character should a portion fall to mortality or windthrow. The area itself does not appear to be the habitat for any rare or unusual species. The trees, however, are of fair-good form, especially the maple and oak. Overstory beech exhibit broken tops.
14. BEECH HILL (continued)

Data collected on the stand is listed below.

D.b.h. (inches) of Representative Overstory Trees

<table>
<thead>
<tr>
<th>Beech</th>
<th>Sugar Maple</th>
<th>Red Oak</th>
<th>Basswood</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>12.4</td>
<td>12.3</td>
<td>14.1</td>
</tr>
<tr>
<td>13.2</td>
<td>13.3</td>
<td>12.8</td>
<td>14.3</td>
</tr>
<tr>
<td>13.3</td>
<td>14.5</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>14.3</td>
<td>19.0</td>
<td>28.2 (2)</td>
<td></td>
</tr>
<tr>
<td>15.7</td>
<td>22.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.2</td>
<td>24.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.4</td>
<td>30.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Increment Corings taken at D.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (Inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>red oak</td>
<td>24</td>
<td>158 (partial age)</td>
</tr>
<tr>
<td>red oak</td>
<td>28.2</td>
<td>132 (partial age)</td>
</tr>
<tr>
<td>beech</td>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>beech</td>
<td>16.2</td>
<td>121</td>
</tr>
<tr>
<td>beech</td>
<td>16.4</td>
<td>134</td>
</tr>
<tr>
<td>sugar maple</td>
<td>30.8</td>
<td>96 (partial age, estimated total age of 160 years)</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED Status:

This area meets the criteria of age, stand identity and naturalness, and hence is recommended for critical area status.

15. MT. PHILIP HARDWOOD

Forest Type: Hardwood

Town: Rome

County: Kennebec

-192-
15. MT. PHILIP HARDWOOD (continued)

Quad: Norridgewock 15’ (1956)

Age: 70-150’ (range)

Stand Size: 1 acre

Date Field Checked: December 10, 1981, Sue Gawler, Charles Cogbill

Status: Recommended.

Description

The south facing ledges at the summit of Mt. Philip contain stunted red oak (Quercus rubra) with some white ash (Fraxinus americana) and hornbean (Ostrya virginiana). The oaks are up to 16 inches in diameter and 70 to 150 years old. The rocky ledges cover a small area (1 acre) and the surrounding area is formerly cut over. This area supports a small, but interesting stand of moderate age.

Increment Corings taken at D.b.h.

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (Inches)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>red oak</td>
<td>15.2</td>
<td>69</td>
</tr>
<tr>
<td>red oak</td>
<td>19.9</td>
<td>116</td>
</tr>
<tr>
<td>beech</td>
<td>15.1</td>
<td>151</td>
</tr>
</tbody>
</table>

Criteria met and reasons for RECOMMENDED Status

This small stand meets the criteria for age, stand identity and naturalness, and thus is recommended for evaluation as a critical area.

16. COBBOSSEECONTEE OLD-GROWTH HARDWOOD STAND

Forest Type: Northern Hardwoods

Town: Monmouth

County: Kennebec

Quad: Gardiner 15’ (1957)

Age: 200 (hdwd max.)

Stand Size: approximately 4.5 hectares (11 acres)

Elevation: 200'
16. COBBOSSECONTEE (continued)

Date Field Checked: October 20, 1981 by Charles Cogbill, Hank Tyler

Status: Registered as old-growth white pine

Description

The Cobbosseecontee old-growth hardwood stand is a small but significant remnant with white pine (Pinus strobus) immersed (average 1 tree per acre) in northern hardwoods. Twelve huge pines, widely scattered, overtop the forest of beech (Fagus grandifolia), sugar maple (Acer saccharum), and red oak (Quercus rubra). Located on well drained soil and relatively even terrain, this area is an excellent illustration of mixed white pine area which has naturally given way to hardwoods.

The 30° southwest slope to the lake contains a gentle 20 foot swale. The parent material is a deep till with rocky obstructions (ca. 9 inches deep) common. The soils are yellowish brown and have a pH of 5.9. The ground surface is covered with 2 inches to 3 inches of mull humus. The forest floor is relatively free from large decaying boles, but about 10% of the rolling hillside is covered by pits and mounts from old blowdowns.

The pines themselves are approximately 215 years old and of excellent form. They are tall, protruding high above the surrounding canopy and are visible from some distance. The bole is straight, clear and has little taper. The smallest of the old-growth trees measures 24 inches d.b.h. (diameter at breast height); the largest is an impressive 40 feet d.b.h. The average d.b.h. is 35 inches. The trees appear healthy, and can be expected to persist for many years.

The remainder of the stand reaches 90 feet under the 110 feet emergent white pine canopy. Large sugar maples (Acer saccharum) and beech (Fagus grandifolia) dominate the hardwoods, reaching 29 inches and 23 inches diameters at breast height (dbh), respectively. Common white ash (Fraxinus americana - to 26 inches dbh) and occasionally large red oaks (Quercus rubra - to 34 inches dbh) or hemlock (Tsuga canadensis - to 33 inches dbh) are mixed among the dominant maple-beech forest. Maple is slightly dominant at larger sizes (18 inches to 22 inches dbh). The larger hemlock, oak, and sugar maple are all 189 to 200 years old. Thus, the hardwoods are only slightly younger than the overstory pines. The red oaks are heavily branched and indicate a more open-grown stage when hardwoods become established among young pines. Significantly there is no evidence of any past fire. After an early disturbance about 1765, the present stand character was fixed at about the time of settlement in Monmouth (1790's).

According to the landowner, the pines have been a local landmark for at least 60 years. Formerly more numerous, several of the pines have blown down over the years. They have also been important as raptor habitat: an eagle's nest 15 feet deep and estimated to be 150 years old stood out at the top of one of the pines until the tree blew down a few years ago. As the tallest trees in the area, the remaining trees are potential eagle nesting sites.
The understory of the stand is relatively open, and features several patches of *Hepatica americana*, a beautiful spring wildflower.

High quality old-growth white pine stands in Maine are outstanding natural features in that they represent the remnants of the extensive pine forests which shaped Maine's early history, forests which had developed over the centuries and which, since colonization, have been almost entirely eradicated. They are, furthermore, scientifically significant, illustrating important points of forest ecology, such as mechanisms of forest establishment and development, the effects of site factors on stand growth, and forest successional patterns. For more information, see the planning report on old-growth white pine by Philip Conkling (1978).

The Cobbosseecontee old-growth white pine stand is included on the Register of Critical Areas because it is one of the few significant old-growth stands of this important species. In particular, it illustrates the pine-northern hardwoods succession, and is of scientific and historical value.

Criteria met and reasons for RECOMMENDED Status

This outstanding area meets all the criteria for age, stand identity, and naturalness, and thus it is recommended that the existing boundaries of the critical area be expanded to include the hardwoods.

17. MOOSE HILL HARDWOOD STAND

Forest Type: Hardwood

Town: Livermore Falls

County: Androscoggin

Quad: Livermore Falls 7.5' (1967)

Elevation: 930'

Age: 75-93 (range)

Stand Size: 2 acres

Date Field Checked: August 13, 1980 by John Grena and Alec Giffen

Status: Not Recommended.

Description

A mixed hardwood stand containing large-diametered red oak (*Quercus rubra*) that display straight, cylindrical trunks grows on the southeastern slopes of Moose Hill. Moose Hill is 2 1/2 miles east of Livermore Falls, near the Androscoggin-Kennebec County line.
17. MOOSE HILL HARDWOOD STAND (continued)

Although the area may have been pasture at one time, the stand has been disturbed for at least 100 years. Increment corings taken at breast height indicate that the overstory trees in this uneven-aged stand average a minimum of 86 years in age. Within this stand, sugar maple (Acer saccharum), white ash (Fraxinus americana) and understory beech (Fagus grandifolia) along with red oak comprise the majority of the stocking. Scattered throughout the stand on this 20% are a few hophornbeam (Ostrya virginiana), white birch (Betula papyrifera) and yellow birch (Betula lutea) all of which are 6 inches d.b.h. or less. All trees in the stand exhibit good health.

The single-trunked red oak are branch free for 27 to 32 feet of their total height of 75 to 80 feet. Thirty feet up, the trunk branches to form a crown that extends 25 feet out in all directions. Red oak average 19.5 inches at d.b.h. and 75 feet tall, with the largest specimen measuring 24 inches d.b.h. and 80 feet in height.

Growing above a 3 to 4 inch litter layer in shallow rocky soils are the following groundplants and shrubs: Wild sarsaparilla (Aralia nudicaulis), Canada mayflower (Maianthemum canadense), Christmas fern (Polystichum acrostichoides), and striped maple (Acer pensylvanicum).

Criteria Met and reasons for NOT RECOMMENDED Status:

This stand does not meet the naturalness nor the age criteria for natural old-growth stands because it was once pasture land. As one of the smallest sites inventoried, the stand's identity is more likely to be altered than a similar stand covering a larger acreage. However, the stand is a good example of succession on abandoned land.

18. ROCKPORT HARDWOOD STAND

Forest Type: Beech
Town: Rockport
County: Knox
Quad: Camden 7.5' (1955)
Age: 104-173 (range of beech)
Stand Size: Approximately 10 acres
Elevation: 40 - 80'
Date Field Checked: February 15, 1980 by John Grena and Hank Tyler
Status: Recommended.
18. **ROCKPORT HARDWOOD STAND**

**Description**

This mixed hardwood stand in Rockport contains large-sized sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), and northern red oak (*Quercus rubra*) in the overstory. This uneven-aged stand grows on the slopes of a small hill at an elevation between 140 and 160 feet. No evidence of cutting is present anywhere in the stand. Fallen trees were left on the ground to decay.

The cores from seven trees yielded ages from 101 to 173 years for beech (*Fagus grandifolia*), yellow birch (*Betula lutea*) and sugar maple, with beech having the widest range and the oldest trees. Beech is the predominant tree in the understory. All are less than ten inches at d.b.h., and most are sapling-sized (2 inches or less). The beech are severely damaged by the beech-scale *Nectria*, evidenced by the blistered and punctured bark surface.

The overstory component of red oak and white ash contrasts the beech in size and health. Oak and ash average 29.2 inches d.b.h. and are of excellent form and health, with straight cylindrical trunks that rise some 30 feet before the crowns begins.

Similarly, the sugar maples are impressive specimens, averaging 23.5 inches at d.b.h. They are of lesser quality though, exhibiting sweep, and blistered barks as a result of the many years that they have been tapped.

Diameters of overstory trees in the stand appear in the following chart:

<table>
<thead>
<tr>
<th>Sugar Maple</th>
<th>White Ash</th>
<th>Beech</th>
<th>Red Oak</th>
<th>Ironwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>19</td>
<td>17</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>19(2)</td>
<td>24</td>
<td>19(2)</td>
<td>23</td>
<td>27</td>
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<tr>
<td>20(2)</td>
<td>26</td>
<td></td>
<td>26</td>
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<tr>
<td>22(3)</td>
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<td>23</td>
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<td>41(2)</td>
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<td>24</td>
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<td>25</td>
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<td>26</td>
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<tr>
<td>28(2)</td>
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<td>29</td>
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<tr>
<td>32</td>
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</tbody>
</table>

**Criteria met and reasons for RECOMMENDED Status**

This area meets all the criteria for age, stand identity and naturalness, and hence is recommended for evaluation as a critical area.
19. **HAYSTACK MOUNTAIN SUGAR MAPLE - BEECH STAND**

*Forest Type:* Sugar Maple-Beech  
*Town:* Mason  
*County:* Oxford  
*Quad:* Speckled Mountain 7.5' (1970)  
*Age:* Not determined  
*Stand Size:* 7 acres  
*Date Field Checked:* July 18, 1980 by John Grena and L. M. Eastman  
*Status:* Registered critical area for rare plants.

**Description**

An uncut stand of sugar maple (*Acer saccharum*) and beech (*Fagus grandifolia*) grows in a saddle (elevation 1800 feet) along the Haystack Notch Trail. The saddle is found between Haystack Mountain and Haystack Notch near route 113. The stand contains three features that make it a significant natural area: 1) the scenic beauty of the large-sized, overstory sugar maple, 2) the absence of cutting in the area, and 3) an abundance of ground plants and rare plants in this rich woods that have been designated critical area No. 51 on the Register.

This uneven-aged stand exhibits fair health. Associated species growing on this well-drained site include: white ash (*Fraxinus americana*) and yellow birch (*Betula lutea*). The stand's regeneration stratum is well stocked with sugar maple and beech seedlings between six inches to 3 1/2 feet tall.

Sugar maple is the predominant overstory and understory species. The maple exhibit good form, having a single trunk that extends for 25 to 30 feet before separating into the crown. Total height of the maple is 65 feet while the beech, smaller in average size, rise 45 to 55 feet in height. The average diameter of each species is less than the stand diameter; sugar maple averages 15.3 inches and beech averages 9.7 inches.

Some of the more common species found in the stand but not included in the register entry are: hobblebush (*Viburnum alnifolium*), whorled aster (*Aster acuminatus*), common wood sorrel (*Oxalis montana*), white baneberry (*Actaea pachypoda*) and evergreen wood fern (*Dryopteris intermedia, var. intermedia*).

Measurements taken from 3 prism plots appear below.
19. HAYSTACK MOUNTAIN (continued)

Number of Trees by Species and d.b.h. Classes

<table>
<thead>
<tr>
<th>d.b.h. (inches)</th>
<th>Sugar maple</th>
<th>SPECIES</th>
<th>Beech</th>
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<th>Yellow birch</th>
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Criteria Met and reasons for RECOMMENDED Status

This area meets all the criteria for age, stand identity and naturalness. It is recommended that the existing register of critical area note the old-growth significance of this area.

20. TROUT POND HARDWOOD STAND

Forest Type: Hardwood

Town: Mason

County: Oxford

Quad: Speckled Mountain 7.5' (1970)

Age: Not determined

Stand Size: 3 acres

Elevation: 980'
20. TROUT POND (continued)

Date Field Checked: July 18, 1980 by John Grena and Les Eastman

Status: Recommended

Description

A small-sized, apparently uncut stand of mixed hardwoods grows on a ridge on the west shore of Trout Pond. Trout Pond is 1/2 mile east of the White Mountain National Forest.

Protected from harvesting by a 40% slope and rocky terrain, the stand is composed primarily of beech (Fagus grandifolia) and sugar maple (Acer saccharum). Associated species include: white birch (Betula papyrifera), white ash (Fraxinus americana), quaking aspen (Populus tremuloides), and a few yellow birch (Betula lutea).

Trees on this well-drained, rocky-soiled site average 12.8 inches d.b.h., but the majority of the beech component is below ten inches d.b.h. The trees become smaller near the top of the ridge, where the slope becomes steeper. The largest trees in the stand are a 31 inches d.b.h. yellow birch and a 23 inches d.b.h. white birch. Except for these two specimens, most trees are of good form and health, especially the beech which are free of Beech-scale Nectria.

Although the area contains old-growth specimens, the area is too small to be considered significant unless future work does not discover a stand of similar composition.

Groundplants and shrubs in the stand are: round-leaved violet (Viola rotundifolia), hobblebush (Viburnum alnifolium), striped maple (Acer pensylvanicum), marginal wood fern (Dryopteris morghialis), whorled aster (Aster acuminatus), red trillium (Trillium erectum), wild sarsparilla (Aralia nudicaulis), and blue-bead lily (Clintonia borealis).

Criteria Met and reasons for RECOMMENDED Status

This area meets the criteria for stand identity and naturalness. It is recommended that the area be revisited to collect age data, before evaluation as a critical area proceeds.

21. MAHOOSUC NOTCH

Forest Type: Red Spruce - Yellow Birch

Town: Grafton

County: Oxford
21. MAHOOSUC NOTCH (continued)

Quad: Old Speck 15' (1943)

Age: Not determined

Stand Size: 5 acres

Elevation: 2200'

Date Field Checked: 14 June 1982, Charles Cogbill

Status: Recommended.

Description

A very small stand of almost pure yellow birch (Betula lutea) is found on the rich slope just east of the east end of Mahoosuc Notch. The area just above the stream is right along the Appalachian Trail just as it turns north after it exits from the Notch. This is about 3 miles east along the Mahoosuc Notch Trail from the Success Pond Round trailhead in New Hampshire. The stand is loosely defined as the rich slope approximately 50 feet on either side of the trail. The surrounding land is dominated by red spruce (Picea rubens), balsam fir (Abies balsamea), and yellow birch, on steep rocky land. The stand contains yellow birch up to 26 inches in diameter, red spruce to 16 inches in diameter and at least two sugar maples (Acer saccharum) of 7 inches and 18 inches in diameter. There are scattered white birch (Betula papyrifera) and balsam Fir (Abies balsamea) at the average 12 inches in diameter. There is a prominent shrub layer dominated by mountain ash (Pyrus decora) with mountain maple (Acer spicatum) and hobblebush (Viburnum alnifolium).

The continuous understory is rich and mesic with a prominent vernal flora. In addition to a standard boreal flora including Oxalis montana and Clintonia borealis there are Trillium erectum and Dicentra cucullaria. The soil is thin and gravelly with boulders and talus obstructions at about 8". There is a weakly developed salt and pepper A2 horizon over a well-developed depositional dark red B. The stand is on a gentle 15' slope at the base of a steep talus, bedrock slope of Mahoosuc Mountain. There is a stream directly below the area and at least two seeps cross the trail in the area.

The Notch is 3/4 miles long boulder/talus filled defile with steep slopes or cliffs on both sides. The notch floor slopes slightly to the east and alternates between glades and ice-cave boulder fields. A small, mostly underground stream, follows the gorge as does a rugged portion of the Appalachian trail. The base of the notch is at 2500 feet and descends to 2100 feet while Fulling Mill and Mahoosuc Mountain both extend over 3400 feet within 0.5 mile of the Notch.

There are 500 feet north facing cliffs on Fulling Mill Mountain forming the south wall of the Notch. The Notch is totally undisturbed and isolated from much trail traffic. There is little well-developed forest and most of the trees are stunted, twisted red (black?) spruce or paper birch on
21. MAHOOSUC NOTCH (continued)

thin soil over boulders. There is abundant development of exposed heath (e.g. Vaccinium vitis idaea, Ledum groenlandicum and Kalmia angustifolium mixed with feathermosses and Lichens (Cladina rangiferina and Cetraria islandica). The notch is a scenic and geologic site of unique character.

The mesic stand at the lower end of the notch is natural and undisturbed. As with most of the region there is drastic topographic heterogeneity so no area has a uniform cover over much extent. The small pocket of mesic yellow birch forest is old and should continue to exist although there is little evidence of replacement. Despite the small size this area should persist as an isolated occurrence of rich mesic woods and vernal flora.

Criteria met and reasons for RECOMMENDED status

1) This area is typical of many small areas scattered in the mountains, but the location near Mahoosuc Notch adds to the overall value of that unique area.

2) The stand is very small, but harbors a diversity of rich boreal and temperate forest flora.

3) The stand is yellow birch dominated and one of the few found in an undisturbed, old condition.

4) The Notch itself contains no well defined forest stand, but is an unparalleled natural area.

22. ELIOT MIXEDWOOD STAND

Forest Type: mixed woods

Town: Eliot

County: York

Quad: Dover East, Maine - N.H. 7.5' (1956)

Age: Not Determined

Stand Size: 5 acres

Elevation: 150'

Date Field Checked: April 22, 1980 by John Grena and James Trask

Status: Not Recommended. It is suggested that the area be revisited and accurate ages determined for the stand.
22. ELLIOT MIXEDWOOD STAND (continued)

Description

This five acre mixed wood stand near Third Hill in Eliot did not fit the stand identity criteria. Only six potential old-growth trees were found within this area (elevation 150 feet): thus, the trees are scattered, single specimens, rather than an association within the stand as defined in the criteria. The stand was selectively cut 40 years ago. Data collected from these trees appears below:

<table>
<thead>
<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
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<tbody>
<tr>
<td>white oak</td>
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<tr>
<td>beech</td>
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<tr>
<td>hemlock</td>
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<td>black birch</td>
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<tr>
<td>red spruce</td>
<td>18, 24</td>
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</table>

Criteria met and reasons for NOT RECOMMENDED Status

This stand does not meet the stand identity criteria because the trees are single scattered specimens rather than an association within a stand. However, the area should be revisited to take increment cores and accurately determine the age of the stand.

23. YORK MIXED HARDWOOD STAND

Forest Type: Mixed Hardwood

Town: York

County: York

Quad: York Harbor 7.5' (1956)

Age: 59-158 years (range)

Elevation: 120'

Stand Size: 3 acres

Dates Field Checked: April 22, 1980 by John Grena & James Trask; August 29, 1980 by John Grena

Status: Not Recommended.

Description

A mixed hardwood stand near Chases Pond Road in York contains twelve different species of trees. Surrounded on two sides by stonewalls, the
stand contains some trees over 100 years old. Growing on gently sloping former pastureland, it illustrates recent succession to forest growth: the stand is young and the forest floor is devoid of fallen branches or dead trees, and lacks a developed shrub and groundplant stratum.

Four species, deploying excellent form and averaging 13.1 inches d.b.h., comprise 70% of the composition. Arranged in order of abundance, they are: northern red oak (Quercus rubra), beech (Fagus grandifolia), sugar maple (Acer saccharum), and shagbark hickory (Carya ovata). Other species found in the stand include: basswood (Tilia americana), white ash (Fraxinus americana), red maple (Acer rubrum), hophornbeam (Ostrya virginiana), black birch (Betula lenta), white birch (Betula papyrifera), yellow birch (Betula lutea), and hemlock (Tsuga canadensis).

Beneath this overstory, beech and sugar maple saplings (2 inches d.b.h.), 6 to 25 feet tall and scattered white pine (Pinus strabus) and beech seedlings, 3 to 4 feet tall comprise the understory and regeneration strato. The pine seedlings have seeded from adjacent stands.

The regeneration indicates that succession will be toward a beech-maple type with a few associated white pine near the stand's border. A remaining, but well-rotted, three-foot pine stump in the stand reveals that pine were present on this site before the hardwoods, and with the present stacking of pine seedlings, pine may contribute to the composition in the future.

Data from a 100% sampling appears in the following charts.

**Increment corings taken at d.b.h.**

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<tr>
<th>Species</th>
<th>D.b.h. (inches)</th>
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<tr>
<td>hemlock</td>
<td>32</td>
<td>60</td>
<td>135</td>
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### Number of Trees by Species and d.b.h. Classes for the five most abundant species

#### SPECIES

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<tr>
<th>d.b.h. (inches)</th>
<th>r. oak</th>
<th>beech</th>
<th>w. ash</th>
<th>sugar maple</th>
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#### Criteria met and reasons for NOT RECOMMENDED Status

The stand does not represent a natural old-growth forest stand. However, because of the diversity of tree species and their excellent health, it is recommended that the stand be evaluated as an exemplary stand on the Critical Areas Register.
SUMMARY OF RESULTS

This most recent phase of the natural old-growth forest inventory aims to incorporate the data collected during 3 previous field seasons by John Grena and Charles Cogbill from January 1980 to December 1982. Of the numerous leads assembled by Grena, many were selected for field visits and many new leads have since been identified both from field trips and through valuable assistance from numerous townspeople and loggers, as well as an ongoing literature search.

To date, 104 forest sites have been field checked. Of these 68 have been identified as natural stands of old-growth forest, according to the criteria described herein, and are therefore recommended for evaluation as critical areas (see Table 10). Other sites still require more data collection, including information on tree ages to aid in the characterization of these sites. The remaining sites visited, which did not qualify as old-growth, exhibited an assortment of forest types in various successional stages, resulting from significant disturbance by man, either through logging or farming and subsequent land abandonment. Unchecked leads for old-growth forests in Maine are listed in Table 11.

Pure hemlock (Tsuga canadensis) stands are uncommon, primarily for two reasons: the restriction of the type to a narrow band extending across central Maine and the exploitation of the trees in the 1930's and 40's for the tannins in the bark. The stands found worthy of recommendation for critical area status are dense stands in ravines and along riversides and lakeshores, where they tend to exhibit their best development in this region. Pollen records show that hemlock played a much more important role from 8,000 to 5,000 years ago. This maximum was followed by a decline probably resulting from a disease or other natural factors. Since then, it began to increase in abundance and peaked again about 1,000 years ago, although it never reached its former prominence. Since its "peak," it has been declining in abundance and range in the northeast. (R. Davis, personal communication.) Hemlock is considered to be in greatest abundance in western Maine, although very little is in old-growth stands.

The hemlock stands observed often occur in association with other tree species and other forest types such as white pine (Pinus strobus), balsam fir (Abies balsamea), northern white cedar (Thuja occidentalis), northern hardwoods association, red spruce (Picea rubens) and others. Pure stands and those with a characteristic dense canopy, allow less light to penetrate to the forest floor for undergrowth development. In addition, the extreme shade tolerance of hemlock allows it to withstand periods of suppression for 25-200 or more years. In a forest stand, this competitive ability of hemlock is better than that of any associated tree species (Fowells, 1965). The undergrowth is sparse, but does contain seedlings, clubmosses, ferns and herbs such as Pyrola secunda, partridge berry (Mitchella repens), wintergreen (Gaultheria procumbens), Canada mayflower (Maianthemum canadense), painted trillium (Trillium undulatum) and others.

The limited number of available leads for white spruce (Picea glauca) forests were field checked, but did not result in locating any old-growth. The white spruce stands observed are in the northern tier of the state and occur in what was once farmland and has since been abandoned. White spruce is
a pioneering species on these sites, eventually being replaced by better competitors. It is however often a component of the northern hardwoods climax type, as well as some other climax and sub-climax types.

White spruce is often an important component of the spruce-fir forests along sections of the Maine coast. Its intermediate tolerance between white pine and red spruce, allows it to withstand some shade, and subsequently be released into the canopy. This species can occur on exposed sites with gravelly soils and become severely wind-trained and stunted. However, the white spruce can form open woodland areas, and is capable of reaching a significantly old age. No such stands were found in this inventory.

Fine examples of old-growth red spruce forests are stands which occur at high elevations and mountain sides. Three such sites are in the Mt. Katahdin region: Traveler and North Traveler Mountains and at Basin Ponds. The elevations among these areas ranged from 2,400 to 2,800 feet.

Common associates in this and other alpine regions are balsam fir, white birch (Betula papyrifera), yellow birch (Betula lutea) and other northern hardwood species on the better microsites, and occasionally white pine, hemlock and red maple (Acer rubrum). Shrubs and ground plants include hobblebush (Viburnum alnifolium), striped maple (Acer pensylvanicum), mountain maple (Acer spicatum), mountain ash (Sorbus americana), wild sarsaparilla (Aralia nudicaulis), regeneration of spruce and fir, and often a dense mat of mosses with ferns and clubmosses present. More mature stands are characteristically multi-aged. The shorter life span of balsam fir creates openings in the stand, allowing the release of understory components into the stand, generally spruce and fir.

The spruce-fir forest along the coast, especially along the immediate shoreline, experiences extreme harshness of climate. Natural disturbances are commonplace, including the effects of blowdown, fire and exposure. In these exposed coastal sites, where soils are shallow, coarse and overlying bedrock, the forests may suffer blowdown by the time they reach 100 years old. The trees themselves are capable of living longer, as is evidenced slightly inland from the coast, where the more sheltered conditions are likely to allow the old-growth character to develop. However, these areas are not completely protected from natural disaster. Only very small pockets of old-growth forests here can escape the domino affect of a major blowdown. These vestiges do exist and are able to maintain themselves. In this instance the arbitrary 100 year old criteria may need some flexibility, to recognize the character of the extreme conditions affecting these coastal spruce-fir forests (R. Davis, personal communication).

Old-growth white pine in Maine is given a detailed description of its type and occurrence in the Critical Areas Program planning report on the subject (Conkling, 1978). Several new areas were field checked in conjunction with this inventory since Conkling's work, and supports his findings about old-growth white pine forests.

White pine exhibits its best development and highest productivity in very well-drained sites, such as those formed in stratified glacial deposits, sandy outwash, and rocky ridgetops. These pure white pine stands do exist in Maine
and form an edaphic (soil related) climax, and are therefore free from hardwood competition. White pine also forms pure stands where it has invaded old fields, and is not considered old-growth. The associated understory in the old-growth stands depends upon the particular site and geographic region (Conkling, 1978).

The old-growth white pine stands identified in this study were found in association with either hemlock or northern red oak (Quercus rubra), along lakes and watercourses, or as scattered specimens towering over second growth forests of many types. Two outstanding sites are the Hollis White Pine-Hemlock stand in York County and the Newcastle White Pine-Northern Red Oak Stand and Bald Eagle site in Lincoln County.

As described earlier, the Red Pine (Pinus resinosa) stands inventoried occur either in pure stands or in association with jack pine (Pinus banksiana) or white pine. Other common tree associates are red spruce, hemlock, northern white cedar, white birch and red maple. Shrubs and groundplants include serviceberry (Amelanchier sp.), striped maple, blueberry (Vaccinium sp.), Wild sarsaparilla, starflower (Trientalis borealis) and other common herbs, fern and mosses.

A most significant pure red pine stand inventoried is the 220 acre Cathedral Woods in Eustis, Franklin County. This stand predates a fire in the area as indicated by fire scars on many of the older trees. Red pine becomes increasingly fire tolerant with age (Fowells, 1965). As expected, the red pine stands observed occur on cliffs and clffy soils, steep slopes, or associated with remote lakeshores and islands.

Old-growth northern white cedar stands thus far observed in Maine occur in pure stands or in association with a variety of forest types, most notably red spruce. Other species may include balsam fir, black spruce (Picea mariana), tamarack (Larix laricina), black ash (Fraxinus nigra) and red maple on wetter sites. On drier sites one may find red spruce, quaking aspen (Populus tremuloides), bigtooth aspen (Populus grandidentata), white pine, hemlock, yellow birch, paper birch, sugar maple (Acer saccharum), northern red oak, as well as other northern hardwoods (Fowell, 1965). The small number of sites inventoried and the lack of superlative sites (except the one already registered) may not reflect scarcity of these forests, but rather our inability to locate them at the present time. A continued effort should be made to find old-growth cedar sites, as they certainly must exist.

Worthwhile old-growth oak (Quercus spp.) stands seen were those with northern red oak and American beech (Fagus grandifolia) as well as sugar maple, white birch, and white ash (Fraxinus americana). Many hardwood species are known to occur in association with red oak and this diversity was evident in stands in the southern portion of the state. A significant old-growth forest was located on Mt. Megunticook in Camden, Knox County. The other areas visited were quite small and most have had interference from man in one form or another, including that of protection. The understory is generally quite diverse in these forests, with common ground plants, numerous shrubs and sapling-sized trees characteristic of the site.
The extensive history of logging and settlement in New England widens the gap of difference between the original and present day forests. Most of these forest lands are now second growth, thus compounding the difficulty in describing the forest types of this region. The hardwood forests of New England may be classified as either Beech-Maple or Hemlock-White Pine-Northern Hardwoods (Braun, 1950).

The region of Beech-Maple forests is entirely within the area covered by the last or Wisconsin ice sheet, and there is increasing dominance of conifers (notably red spruce) further northward. In all cases, however, original forests are scarce. Most of the significant old-growth hardwood stands identified in this study, approximate original conditions of this forest type. Superlative stands include Yankeetuladi, Musquacook, Hafey in Aroostook County and Big Reed Pond Hardwoods in Piscataquis Co. The latter is currently a preserve study area (Young, 1982).

Associated tree species include white ash, cedar, red oak, balsam fir, red maple, red spruce and white spruce. Common ground plants and shrubs are hobblebush and hop hornbeam (Ostrya virginiana), shining clubmoss (Lycopodium lucidulum), evergreen wood fern (Dryopteris intermedia), wood sorrel (Oxalis montana), wood reed (Cinna latifolia), hardwood seedlings and round-lobed hepatica (Hepatica americana).
### Areas Recommended for Evaluation as Old-Growth Forests

#### OLD-GROWTH HEMLOCK STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mattawamkeag</td>
<td>Penobscot</td>
<td>Winn</td>
<td>112-236</td>
<td>5</td>
</tr>
<tr>
<td>No. 3 Pond</td>
<td>Penobscot</td>
<td>T3 R1</td>
<td>300</td>
<td>26</td>
</tr>
<tr>
<td>Prentiss Woods</td>
<td>Penobscot</td>
<td>Bangor</td>
<td>130</td>
<td>30</td>
</tr>
<tr>
<td>Pleasant Lake</td>
<td>Washington</td>
<td>T6 R1</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>Farm Cove Mountain</td>
<td>Washington</td>
<td>T6 ND</td>
<td>300</td>
<td>5</td>
</tr>
<tr>
<td>Sabao Lake</td>
<td>Hancock</td>
<td>T41 MD</td>
<td>150-250</td>
<td>50</td>
</tr>
<tr>
<td>Waldoboro</td>
<td>Lincoln</td>
<td>Westport</td>
<td>170-240</td>
<td>5</td>
</tr>
<tr>
<td>Thomas Point</td>
<td>Lincoln</td>
<td>Westport</td>
<td>150 (est.)</td>
<td>5</td>
</tr>
<tr>
<td>Mt. Christopher</td>
<td>Oxford</td>
<td>Greenwood</td>
<td>170</td>
<td>3</td>
</tr>
<tr>
<td>Adams Pond</td>
<td>Cumberland</td>
<td>Bridgton</td>
<td>128-260</td>
<td>5</td>
</tr>
<tr>
<td>Ocean Park</td>
<td>York</td>
<td>Old Orchard Beach</td>
<td>120-140</td>
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</table>

#### OLD-GROWTH RED SPRUCE STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Town (registered)</td>
<td>Aroostook</td>
<td>T13 R11</td>
<td>170</td>
<td>92</td>
</tr>
<tr>
<td>Chandler Mountain</td>
<td>Aroostook</td>
<td>T9 R8</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>No. 9 Mountain</td>
<td>Aroostook</td>
<td>T13 R11</td>
<td>120-140</td>
<td>60</td>
</tr>
<tr>
<td>Wassataquoik Lake</td>
<td>Piscataquis</td>
<td>T4 R10</td>
<td>200-250</td>
<td>20</td>
</tr>
<tr>
<td>Traveler Mountain</td>
<td>Piscataquis</td>
<td>T5 R9</td>
<td>250-300</td>
<td>6</td>
</tr>
<tr>
<td>North Traveler</td>
<td>Piscataquis</td>
<td>T5 R9</td>
<td>230-300</td>
<td>25</td>
</tr>
<tr>
<td>Basin Ponds</td>
<td>Piscataquis</td>
<td>T3 R9</td>
<td>190-320</td>
<td>4</td>
</tr>
<tr>
<td>Priestly Mountain</td>
<td>Piscataquis</td>
<td>T10 R13</td>
<td>120-230</td>
<td>6</td>
</tr>
<tr>
<td>Mooseleuk Mountain</td>
<td>Piscataquis</td>
<td>T9 R9</td>
<td>Not det.</td>
<td>40</td>
</tr>
<tr>
<td>Nestuntabunt Mountain</td>
<td>Piscataquis</td>
<td>T1 R11</td>
<td>140-170</td>
<td>10</td>
</tr>
<tr>
<td>Hurd Mountain</td>
<td>Piscataquis</td>
<td>T6 R15</td>
<td>150-200</td>
<td>15</td>
</tr>
<tr>
<td>Elephant Mountain</td>
<td>Franklin</td>
<td>Twp. D</td>
<td>300+</td>
<td>30</td>
</tr>
<tr>
<td>Sugarloaf Mountain</td>
<td>Franklin</td>
<td>T4 R2</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>Bernard Mountain</td>
<td>Hancock</td>
<td>SW Harbor</td>
<td>135-200</td>
<td>20</td>
</tr>
<tr>
<td>Buckle Island</td>
<td>Hancock</td>
<td>Swans Island</td>
<td>125 (est.)</td>
<td>-</td>
</tr>
<tr>
<td>Jonesborough</td>
<td>Washington</td>
<td>Jonesborough</td>
<td>150-200</td>
<td>30</td>
</tr>
<tr>
<td>Roque Island</td>
<td>Washington</td>
<td>Jonesport</td>
<td>215</td>
<td>30</td>
</tr>
<tr>
<td>Cathedral Woods</td>
<td>Lincoln</td>
<td>Monhegan</td>
<td>143-165</td>
<td>10</td>
</tr>
</tbody>
</table>

#### OLD-GROWTH WHITE PINE STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Stream Flowage</td>
<td>Piscataquis</td>
<td>T4 R13</td>
<td>200-250</td>
<td>50</td>
</tr>
<tr>
<td>Gero Island</td>
<td>Piscataquis</td>
<td>T5 R13</td>
<td>150-200</td>
<td>70</td>
</tr>
<tr>
<td>Chesuncook Lake</td>
<td>Piscataquis</td>
<td>T5 R13</td>
<td>250</td>
<td>45</td>
</tr>
<tr>
<td>Moosehorn Stream</td>
<td>Piscataquis</td>
<td>T4 R14</td>
<td>120-150</td>
<td>25</td>
</tr>
<tr>
<td>Soper Brook (W)</td>
<td>Piscataquis</td>
<td></td>
<td>320</td>
<td>3</td>
</tr>
<tr>
<td>Wassataquoik Stream</td>
<td>Penobscot</td>
<td>T3 R7</td>
<td>150</td>
<td>15</td>
</tr>
</tbody>
</table>
### OLD-GROWTH WHITE PINE STANDS (continued)

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spencer Lake</td>
<td>Somerset</td>
<td>T4 R6</td>
<td>160</td>
<td>40</td>
</tr>
<tr>
<td>Cold Brook</td>
<td>Somerset</td>
<td>T3 R3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Huston Brook</td>
<td>Franklin</td>
<td>T3 R2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Narrows No. 2</td>
<td>Oxford</td>
<td>T4 R1</td>
<td>150-200</td>
<td>23</td>
</tr>
<tr>
<td>Big Lake</td>
<td>Washington</td>
<td>Grand Lake Stream</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Bald Mountain</td>
<td>Washington</td>
<td>Baring</td>
<td>120-140</td>
<td>1</td>
</tr>
<tr>
<td>Newcastle</td>
<td>Lincoln</td>
<td>Newcastle</td>
<td>120-140</td>
<td>5</td>
</tr>
<tr>
<td>Hollis</td>
<td>York</td>
<td>Hollis</td>
<td>160</td>
<td>12</td>
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### OLD-GROWTH RED PINE STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cliff Ridge</td>
<td>Piscataquis</td>
<td>T9 R12</td>
<td>100-150</td>
<td>20</td>
</tr>
<tr>
<td>Debsconeag Lake</td>
<td>Piscataquis</td>
<td>T2 R10</td>
<td>190-215</td>
<td>5</td>
</tr>
<tr>
<td>Lobster Lake-Big Is.</td>
<td>Piscataquis</td>
<td>T3 R14</td>
<td>172</td>
<td>20</td>
</tr>
<tr>
<td>No. 5 Bog</td>
<td>Somerset</td>
<td>T4 R7</td>
<td>95-220</td>
<td>25</td>
</tr>
<tr>
<td>Baker Pond</td>
<td>Somerset</td>
<td>Caratunk</td>
<td>120</td>
<td>4</td>
</tr>
<tr>
<td>Cathedral Pines</td>
<td>Franklin</td>
<td>Eustis</td>
<td>180-200</td>
<td>220</td>
</tr>
<tr>
<td>The Pines</td>
<td>Washington</td>
<td>T5 ND</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

### OLD-GROWTH CEDAR STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky Brook (registered)</td>
<td>Aroostook</td>
<td>T13 R10</td>
<td>300</td>
<td>9</td>
</tr>
</tbody>
</table>

### OAK STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxter Park</td>
<td>Cumberland</td>
<td>Portland</td>
<td>Not det.</td>
<td>Not det.</td>
</tr>
<tr>
<td>Little Diamond Is.</td>
<td>Cumberland</td>
<td>Portland</td>
<td>86-96</td>
<td>33</td>
</tr>
<tr>
<td>Mt. Megunticook</td>
<td>Knox</td>
<td>Camden</td>
<td>106</td>
<td>9</td>
</tr>
</tbody>
</table>

### OLD-GROWTH HARDWOOD STANDS

<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yankeetuladi</td>
<td>Aroostook</td>
<td>T19 R11</td>
<td>180-233</td>
<td>240</td>
</tr>
<tr>
<td>Hafey</td>
<td>Aroostook</td>
<td>T18 R11</td>
<td>275</td>
<td>100</td>
</tr>
<tr>
<td>Musquacook</td>
<td>Aroostook</td>
<td>T14 R13</td>
<td>175-200</td>
<td>125</td>
</tr>
</tbody>
</table>

-212-
<table>
<thead>
<tr>
<th>Area</th>
<th>County</th>
<th>Town</th>
<th>Age</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Reed Pond</td>
<td>Piscataquis</td>
<td>T8 R10</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Pump Handle</td>
<td>Piscataquis</td>
<td>T8 R13</td>
<td>113</td>
<td>3</td>
</tr>
<tr>
<td>Lunksoos</td>
<td>Penobscot</td>
<td>T4 R7</td>
<td>250+ (max.)</td>
<td>10</td>
</tr>
<tr>
<td>Day Mountain (registered)</td>
<td>Franklin</td>
<td>Strong</td>
<td>130-150</td>
<td>20</td>
</tr>
<tr>
<td>Beech Hill</td>
<td>Kennebec</td>
<td>Pittston</td>
<td>130</td>
<td>5</td>
</tr>
<tr>
<td>Mt. Philip</td>
<td>Kennebec</td>
<td>Belgrade</td>
<td>70-150</td>
<td>1</td>
</tr>
<tr>
<td>Cobbosseecomtee (reg.)</td>
<td>Kennebec</td>
<td>Monmouth</td>
<td>200</td>
<td>11</td>
</tr>
<tr>
<td>Rockport</td>
<td>Knox</td>
<td>Rockport</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Haystack Mountain (reg.)</td>
<td>Oxford</td>
<td>Mason</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Trout Pond</td>
<td>Oxford</td>
<td>Mason</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Mahoosuc Notch</td>
<td>Oxford</td>
<td>Grafton</td>
<td>-</td>
<td>5</td>
</tr>
</tbody>
</table>
# TABLE 11
## UNCHECKED LEADS FOR OLD-GROWTH FORESTS IN MAINE

<table>
<thead>
<tr>
<th>York and Cumberland Counties</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shapleigh-Walnut Hill</td>
<td>Dick Arsenault, LaValley Lubec, Sanford</td>
</tr>
<tr>
<td>* Upper Goose Island</td>
<td>Registered, Heronry, TNC</td>
</tr>
<tr>
<td>The Gulf</td>
<td>Registered Area for rare plants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lincoln, Knox and Sagadahoc Counties</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Allen Island</td>
<td>Phil Conkling</td>
</tr>
<tr>
<td>* Mark Island</td>
<td>Registered, Heronry, TNC</td>
</tr>
<tr>
<td>* Squirrel Island</td>
<td>Jim Connors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hancock County</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunk Mountain</td>
<td>Jim Connors</td>
</tr>
<tr>
<td>Schoodic Mt.</td>
<td>Nat. Areas Inventory</td>
</tr>
<tr>
<td>Deer Island</td>
<td>Nat. Areas Inventory</td>
</tr>
<tr>
<td>Indian Camp Brook</td>
<td>Brian Athrop/St. Regis</td>
</tr>
<tr>
<td>Orono Island</td>
<td>Phil Conkling</td>
</tr>
<tr>
<td>Swan's Island</td>
<td>Phil Conkling</td>
</tr>
<tr>
<td>Round Island</td>
<td>Phil Conkling</td>
</tr>
<tr>
<td>Turtle Island</td>
<td>TNC, P. Conkling</td>
</tr>
<tr>
<td>Preble Island</td>
<td>Phil Conkling</td>
</tr>
<tr>
<td>Penobscot Mountain</td>
<td>Diamond International</td>
</tr>
<tr>
<td>Grass Island</td>
<td>TNC</td>
</tr>
<tr>
<td>* Ironbound Island</td>
<td>TNC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Washington County</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanceboro</td>
<td>Georgia Pacific, Oscar Selin</td>
</tr>
<tr>
<td>* Vanceboro</td>
<td>Georgia Pacific/Ken &amp; Tom Brewer</td>
</tr>
<tr>
<td>Trafton Island</td>
<td>Chris Davis-Phil Conkling</td>
</tr>
<tr>
<td>Lakeman's Island</td>
<td>Chris Davis/Phil Conkling</td>
</tr>
<tr>
<td>* Mud Lake</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Rainey Brook</td>
<td>Georgia Pacific, Oscar Selin</td>
</tr>
<tr>
<td>Monroe Lake</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Great Spruce Island</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Shipstern Island</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Round Lake</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Pork Barrel Lake</td>
<td>Georgia Pacific</td>
</tr>
<tr>
<td>Danforth</td>
<td>Georgia Pacific</td>
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</table>

* indicates priority for follow-up.
<table>
<thead>
<tr>
<th>Location</th>
<th>Species</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elliottsville T5 R15</td>
<td>hardwood</td>
<td>Ken Allen</td>
</tr>
<tr>
<td>Allagash Mountain</td>
<td>hardwood/spruce</td>
<td>Diamond International</td>
</tr>
<tr>
<td>Polliwog Brook</td>
<td>spruce</td>
<td>Baxter Park- Barry MacArthur</td>
</tr>
<tr>
<td>Russell Mountain</td>
<td>spruce</td>
<td>Bill Orcutt-Greenville</td>
</tr>
<tr>
<td>Jo-Mary Mountain</td>
<td>spruce</td>
<td>Bill Orcutt-Greenville</td>
</tr>
<tr>
<td>Cooper Mountain</td>
<td>spruce</td>
<td></td>
</tr>
<tr>
<td>L. Boardman Mountain</td>
<td>spruce</td>
<td></td>
</tr>
<tr>
<td>B. Boardman Mountain</td>
<td>spruce</td>
<td></td>
</tr>
<tr>
<td>Farrar Mountain</td>
<td>spruce</td>
<td>Great Northern</td>
</tr>
<tr>
<td>Rum Mountain</td>
<td>spruce/hardwood</td>
<td>Bill Reed-Greenville</td>
</tr>
<tr>
<td>Bowerbank</td>
<td>pine</td>
<td>USNFS-good map</td>
</tr>
<tr>
<td>T4 R9</td>
<td>pine</td>
<td>USNFS-good map</td>
</tr>
<tr>
<td>T9 R14-Snake Brook</td>
<td>cedar</td>
<td>USNFS-map</td>
</tr>
<tr>
<td>Churchill Lake 9-12</td>
<td>pine</td>
<td>Lee Turner</td>
</tr>
<tr>
<td>Big Spencer Mountain</td>
<td>spruce</td>
<td>Bill Orcott-Greenville</td>
</tr>
<tr>
<td>Shirley West Brook</td>
<td>spruce</td>
<td></td>
</tr>
<tr>
<td>Barren Mountain</td>
<td>mixed</td>
<td>Internation Paper</td>
</tr>
<tr>
<td>Nahmakanta Lake</td>
<td>maple</td>
<td>USNFS</td>
</tr>
<tr>
<td>Wadleigh Valley</td>
<td>maple</td>
<td></td>
</tr>
<tr>
<td>Elm Stream Township 4-16</td>
<td>mixed</td>
<td></td>
</tr>
<tr>
<td>Chesuncook Lake</td>
<td>w pine</td>
<td></td>
</tr>
<tr>
<td>Cold Stream Pond-Island</td>
<td>mixed</td>
<td>Bill Turner-IP</td>
</tr>
<tr>
<td>Passadumkeag Mountain</td>
<td>spruce</td>
<td>St. Regis</td>
</tr>
<tr>
<td>Mt. Chase</td>
<td>spruce</td>
<td>Joseph Lupsha</td>
</tr>
<tr>
<td>Sandy Stream</td>
<td>hemlock</td>
<td></td>
</tr>
<tr>
<td>East Branch</td>
<td>spruce</td>
<td>IP</td>
</tr>
<tr>
<td>Dover</td>
<td>cedar</td>
<td></td>
</tr>
<tr>
<td>Horseshoe Mountain</td>
<td>spruce</td>
<td>IP/GN</td>
</tr>
<tr>
<td>Mattawamkeag Lake</td>
<td>mixed</td>
<td>Diamond International</td>
</tr>
<tr>
<td>T15 R8 NE</td>
<td>cedar</td>
<td>Edward Grant</td>
</tr>
<tr>
<td>T12 R11</td>
<td>spruce</td>
<td></td>
</tr>
<tr>
<td>Harding Brook Ridge</td>
<td>hardwood</td>
<td>Alec Giffen</td>
</tr>
<tr>
<td>T6 R3</td>
<td>hardwood</td>
<td></td>
</tr>
<tr>
<td>Clayton Stream</td>
<td>cedar</td>
<td>J. Grena</td>
</tr>
<tr>
<td>Round Pond</td>
<td>spruce</td>
<td>Irving</td>
</tr>
<tr>
<td>Caribou T19 R12</td>
<td>hardwood</td>
<td>IP</td>
</tr>
<tr>
<td>Big Black- T14 R14</td>
<td>spruce</td>
<td>Alec Giffen</td>
</tr>
<tr>
<td>T16 R13 NW</td>
<td>cedar</td>
<td></td>
</tr>
<tr>
<td>T12 R13</td>
<td>hardwood</td>
<td></td>
</tr>
<tr>
<td>T13 R12</td>
<td>spruce</td>
<td></td>
</tr>
</tbody>
</table>
Kennebec, Androscoggin, and Waldo Counties

Gardiner Estate mixed

Oxford County

* Royce Mountain spruce Nat. Area Inv., Cogbill
Peabody Mountain pine Nat. Area Inv.
Pond in the River pine Marshall Buske/Alec Giffen
* Old Speck spruce/hardwoods
* Baldpate Mountain hardwoods/spruce
* Bachelor's Grant spruce/mixed Mark Bache - USNFS
* Stow mixed Mark Bache - USNFS
* Mason mixed Mark Bache - USNFS

Franklin County

* Sugarloaf Mountain spruce Terry McGovern
* Crockertown spruce Terry McGovern
Township D bog US Nat. Forest Service
* Day Mountain ash

Somerset County

Cranberry Peak pine Caren Caljouw
East Nubble hemlock Caren Caljouw
Huston Pond pine Terry McGovern
Kennebec Gorge spruce Scott Paper Co.
No. 5 Mountain spruce Jim Connor
* Attean Mountain spruce U.S. Forest Service
* Baker Lake cedar

1358P
DISCUSSION

The forest types covered in the old-growth inventory reflect those types which characterize the natural undisturbed vegetation of Maine. These forest types, or formations have become established in this region since the last ice age. The Wisconsin ice sheet covered most of Maine up until about 15,300 years ago (Borns, Davis et al, 1975). The gradual recession of the glacier from this area was followed by a period in which tundra vegetation predominated in the early post-glacial environment. As the ice sheet receded further northward, the tundra and taiga vegetation followed, with the eventual establishment of our coniferous and hardwood forests.

The forest ecosystem, resulting from thousands of years of evolution and response to changing climatic conditions is now represented only by small remnants of old-growth forest. The native Americans living in this area before the European settlers arrived, did sustain themselves and their villages through some forest clearing and land cultivation (Day, 1953). But the effects of their presence over thousands of years was not nearly as profound as those of the immigrants. The European occupation of the area and subsequent utilization of the forests has lessened this ecosystem's ability to respond to further disturbances as a coherent entity, whether these be natural or man-induced.

Some forests stands have healed their wounds inflicted by man's interference as well as natural disturbances, through sufficient time and protection, and have become prime examples of our native forests once again. These recovered sites, although not untouched in the truest sense, have followed their particular course of succession and achieved a self-sustaining nature in their environment once more. There have been instances in which slight development of a site, either by inhabitation or thoughtful ownership, has afforded a significant layer of protection upon an old-growth site, which may have otherwise been logged. Such examples found in this inventory are: Prentiss Woods in Bangor (Hemlock), Cathedral Woods in Eustis (Red Pine), Sysladobsis Lake (Red Pine) Stand in T5ND and Big Reed Pond Preserve Study Area (hardwoods) in T8R10. The latter site is especially noteworthy due to its use as a research area for ecological investigations. The site is protected in its undisturbed state while it is used to secure valuable information regarding old-growth forests and for comparison with forest management operations. Seven Islands Land Company administers this land owned by the Pingree-Wheatland heirs (Young, 1982). Such cooperation of research and economic ideals ought to be recognized and enhanced where possible.

The old-growth forests identified by this study encompass many different types as already indicated. However, the significant sites located, often reflect the intensity of sampling of certain forest types within a given area, as well as the geographic limitations of certain forest species and types.

Geographic gaps occur in each of the forest types, leaving us with incomplete distribution of each forest type throughout its range, as well as areas in which old-growth stands were not found at all. (These areas are outlined in the action plan.)
Several maps of the natural forest vegetation zones of New England and Maine have been drawn, each differing slightly. These differences are subject to interpretation but essentially illustrate the intergradation of several forest types across the legion. The spruce-fir boreal forest is more common to the north, the temperate aridwood forest to the south and transition forests of white pine-hemlock-hardwoods are the basic components of the major forest zones in Maine, some of these maps exhibit variations in composition and distribution (see figures 10, 11, 12 and 13).

The 350 year infiltration into Maine's forest by the Europeans and their descendants, leaves us with very few as yet identified natural old-growth forest areas. The most significant areas identified in this study are much smaller in acreage than expected or hoped for, often less in area than that which would ordinarily be considered a discrete forest stand. Most old-growth forest stands found in this study are greater than 5 acres and less than 50 acres. Significant exceptions to these are: Dry Town (Aroo. Co.) - Red spruce stand, 92 acres (already registered); Cathedral Pines Red Pine Stand in Eustis (Franklin Co.) - 220 acres; and 3 hardwood stands in Aroostook County - Yankeetuladi, Hafey and Musquacook: 240, 100 and 125 acres, respectively.

As the search for these relic natural sites continues, more is learned about the effect that disturbances, both natural and man-induced, has had and will continue to have on our forest ecosystem. It is difficult to elucidate the "best" or the "typical" old-growth stand in Maine, since so few sites are known to exist. We can only judge by what our eyes have seen thus far seen. It is quite probable that the deeper we explore the more remote and inaccessible areas, the more apt we are to locate superlative sites.

Of particular interest are the higher elevation, sub-alpine forests, which although may not contain large, aesthetically beautiful trees, due to the harsh environment, may still qualify as natural old-growth forest worthy of protection. These sub-alpine forests of Maine are poorly studied.

As a result of our best judgment and limited capabilities in a study of this kind, due recognition can be paid to the sites here identified as old-growth. In this process, new leads are ever surfacing, and the need to follow them surely exists. Continued field research will provide us with a broader base upon which we can develop forest and land management practices to ensure protection and wise use of these forests whose greatest value is inherent in their existence. There is great potential for continued cooperation between foresters, managers, researchers and local and state governments to recognize the significance of these islands of forest history and assure their survival. There is much we can learn from the aged.
FIGURE 10
Potential Natural Vegetation from Kuchler (1964).
FIGURE 11
Major Forest Regions, from Lull (1968).
FIGURE 12
Natural Forest Vegetation Zones, from Society of American Foresters (1955) and Westveld et al. (1956).

Spruce-Fir-Northern Hdwds
Transition Hdwds-White Pine-Hemlock
Central Hdwds-Hemlock-White Pine
Northern Hdwds-Hemlock-White Pine
Figure 3. Natural Forest Vegetation Zones of New England. Courtesy of Committee on Silviculture, Society of American Foresters, New England Section, 1955.
After a majority of the field season had been completed, the ranking system was devised to help evaluate the areas.

The initial set of attributes and points were written by John Grena. These were reviewed and revised twice by Hank Tyler, Alec Giffen, Joseph Chaisson and John DelVecchio of the State Planning Office, and then presented to the Advisory Board in January, 1981. At the Board meeting, two new categories: 8. Maximum Height Class, and 10. Maximum Diameter Class were added; and the maximum value for 3. Persistence was changed from 5 to 10 points to reflect the importance of this attribute.

These changes were implemented into the system, it underwent another review and revision, and was finally written into its present form. As a result of this process, the data contained in all the descriptions was revised into a new format that would highlight the attributes in the ranking system. The ranking scoresheet for 42 areas that met the main criteria is found on pages 227 and 228.

In the ranking system, points are awarded for the existence and quality of certain attributes in the stand. The points given in each category are totalled and used to rank a stand against the others.

In determining which among the ranked areas should be evaluated for registration, the Critical Areas Advisory Board should consider:

1. the desirability of having at least one or two representatives of each major forest type. A forest type, as defined by the Society of American Foresters, is a "descriptive term used to group stands of similar character as regards composition and development due to given ecological factors, by which they may be differentiated from other groups of stands";

2. the geographic distribution of the stands within each type;

3. the desirability of including stands or different site conditions within each type, ie. high elevation spruce-fir stands versus lowland spruce-fir stands; and

4. the need to adequately research an area or forest type before a stand in this area, or of this type is registered.

**RANKING SYSTEM CATEGORIES**

1. Preference will be given to the stand containing the oldest age class. Age was considered the most important attribute because of the scarcity of old trees in Maine and the historical and scientific value they possess as remnants from past centuries.

Each age class is a 50 year interval: 100-150, 150-200, and so on. The oldest age class found in a stand is used in the ranking process. This age class is determined from the age of the oldest overstory trees whose diameters are well represented in the stand.
Two examples will illustrate how the oldest age class is determined:

1) The oldest growth trees dominate a stand - the majority of trees have diameters between 14 and 23 inches. The stand also contains a few trees that are 30 inches in d.b.h. The oldest age class would be determined from corings taken from trees between 14 and 23 inches and not from a 30 inch specimen that is not representiative of the stand.

2) The old growth component is growing in association within the stand - often, this condition is found in a two-aged, two-storied stand such as a spruce-fir stand with old growth white pine. The oldest age class here would be determined from the age of the oldest pine tree(s) whose diameter is well represented in the overstory trees.

<table>
<thead>
<tr>
<th>Oldest Age Class</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 150</td>
<td>1</td>
</tr>
<tr>
<td>150 - 200</td>
<td>3</td>
</tr>
<tr>
<td>200 - 250</td>
<td>5</td>
</tr>
<tr>
<td>250 - 300</td>
<td>9</td>
</tr>
<tr>
<td>300 - 400</td>
<td>14</td>
</tr>
<tr>
<td>400+</td>
<td>20</td>
</tr>
</tbody>
</table>

2. Preference will be given to those stands which show no disturbance or the least disturbance by human activity. Lack of disturbance was considered the next important feature because such areas are rare, and would be of the highest value in scientific research. They also represent stands where decades or centuries of natural processes could be compared with stands of similar composition that have been influenced by man.

<table>
<thead>
<tr>
<th>Disturbance</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>undisturbed</td>
<td>7</td>
</tr>
<tr>
<td>minor disturbance</td>
<td>3</td>
</tr>
<tr>
<td>(more than 50 years ago)</td>
<td>0</td>
</tr>
<tr>
<td>minor disturbance (recently)</td>
<td>0</td>
</tr>
</tbody>
</table>

3. Preference will be given to stands whose unique character is expected to persist because the area is 1) large enough, 2) sheltered from the wind, or 3) in good condition in regard to insect and pathogen agents. These factors will reduce the risk of destruction enabling the site to be useful for scientific study and educational use.

<table>
<thead>
<tr>
<th>Persistence</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>most likely</td>
<td>10</td>
</tr>
<tr>
<td>likely</td>
<td>5</td>
</tr>
<tr>
<td>unlikely</td>
<td>0</td>
</tr>
</tbody>
</table>

4. Preference will be given to those stands which are the habitat for rare or endangered wildlife and plant species; or are the habitat for more common species such as deer wintering areas, or visually appealing species such as lady slippers.

<table>
<thead>
<tr>
<th>Plant &amp; Wildlife habitat</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>rare species</td>
<td>5</td>
</tr>
<tr>
<td>common species</td>
<td>2</td>
</tr>
</tbody>
</table>
5. Preference will be given to healthy, vigorous stands. Here, the evaluation is subjective in part, and is made on the overstory, old growth component. The signs or symptoms of the disease or injury caused by insect, fungal or mechanical agents are examined and evaluated.

<table>
<thead>
<tr>
<th>Health &amp; Vigor</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>excellent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>fair</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>poor</td>
<td>0</td>
</tr>
</tbody>
</table>

6. Preference will be given to those stands in which the trunks or boles are cylindrical, self pruned, straight, and lacking taper. Trees possessing excellent form would illustrate the form possible in undisturbed stands. Good form in old age trees would indicate phenotypic (combination of genetic and environmental factors) superiority which might be valuable as gene pools.

This evaluation is somewhat subjective, does take into account the characteristics of the species (i.e. hemlock retain dead branches longer than other species) and the site when selecting a rating.

<table>
<thead>
<tr>
<th>Form of bole &amp; self pruning</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>excellent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>fair</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>poor</td>
<td>0</td>
</tr>
</tbody>
</table>

7. Preference will be given to those stands which have the tallest average stand height. Stand height refers to the height of the overstory trees.

In the case of a two-storied stand the two heights are averaged reflecting the percentage each component occupies in the stand. Thus, the average stand height of a spruce-fir stand with a sparse stocking of old growth pine would be nearer to the average height of the spruce fir component.

<table>
<thead>
<tr>
<th>Average Height Class (feet)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-75</td>
</tr>
<tr>
<td></td>
<td>75-100</td>
</tr>
<tr>
<td></td>
<td>100+</td>
</tr>
</tbody>
</table>

8. Preference will be given to stands with the tallest maximum height class. This category recognizes trees that characterize a significant portion of the stand and are taller than average stand height.

<table>
<thead>
<tr>
<th>Maximum Height Class (feet)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-75</td>
</tr>
<tr>
<td></td>
<td>75-100</td>
</tr>
<tr>
<td></td>
<td>100+</td>
</tr>
</tbody>
</table>

9. Preference will be given to those stands which have the largest average stand diameter. Large diameter trees have aesthetic value. This guideline was included because the largest trees are not necessarily the oldest.

Again, with two-storied stands, the average diameters of each story are averaged, reflecting the percentage each story occupies in the stand.
<table>
<thead>
<tr>
<th>Average Stand Diameter (inches)</th>
<th>10 - 12</th>
<th>12 - 14</th>
<th>14 - 16</th>
<th>16 - 18</th>
<th>18 - 20</th>
<th>20 - 22</th>
<th>22 - 24</th>
<th>24 - 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

10. Preference will be given to the stands with the largest maximum diameter class. This category recognizes exceptionally large-sized trees that are represented in the stand.

<table>
<thead>
<tr>
<th>Maximum Diameter Class (inches)</th>
<th>10 - 15</th>
<th>16 - 20</th>
<th>21 - 25</th>
<th>26 - 30</th>
<th>31 - 35</th>
<th>36+</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
### Ranking System Score Sheet

**Field Checked Natural Old-Growth Forest Stands**

Revised April 1983

<table>
<thead>
<tr>
<th>AREA SPECIES/TYPE</th>
<th>Maximum Age</th>
<th>Class</th>
<th>Disturbance</th>
<th>Persistence</th>
<th>Plant &amp; Wildlife Habitat</th>
<th>Health &amp; Vigor</th>
<th>Form</th>
<th>Average Stand Height</th>
<th>Maximum Height Class</th>
<th>Average Stand Diameter</th>
<th>Maximum Diameter Class</th>
<th>TOTAL POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elephant Mountain/R. Spruce</td>
<td>14</td>
<td>7</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>49</td>
</tr>
<tr>
<td>The Pines/R. Pine</td>
<td>9</td>
<td>3</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>47</td>
</tr>
<tr>
<td>Rocky Brook T13 R10/ Cedar</td>
<td>9</td>
<td>7</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>43</td>
</tr>
<tr>
<td>Cobbosseecontee/Hardwood</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>42</td>
</tr>
<tr>
<td>Hafey Mtn./Hardwoods</td>
<td>9</td>
<td>7</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>Nestuntabunt Mt./Sp.</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Newcastle/White Pine</td>
<td>(3)</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>Lunksoos/Hardwood</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>39</td>
</tr>
<tr>
<td>Cathedral Pines/R. Pine</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Wassataquoik Lake/Sp.</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Haystack Mt./Hardwood</td>
<td>(5)</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Bald Mountain/W. Pine</td>
<td>(3)</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Farm Cove Mtn./Hemlock</td>
<td>14</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Hollis/White Pine</td>
<td>3</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td>No. 3 Pond/Hemlock</td>
<td>9</td>
<td>7</td>
<td>5</td>
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Note: The following old-growth sites have been included in the field survey, but due to incomplete data at this time, they are not ranked: Pleasant Lake (Hemlock), Thomas Point (Hemlock), Cold Brook (W. Pine) and Huston Brook (W. Pine).
PLANS FOR FUTURE WORK

Appraising the quantity of work accomplished by the inventory leaves us with a substantial base upon which to build plans for more work. Each of the numerous field visits almost invariably led to one or more new leads. These new leads are screened as necessary and visited where possible. The listing of unchecked leads for old-growth forests in Maine in Table 11 is the most recent compilation of worthwhile leads that need to be checked. Those marked with an asterisk are areas of highest priority to be checked. The rarity of significant old-growth forests behooves us to encourage the continued support of a natural old-growth forest inventory. Special attention should be paid to locating old-growth cedar stands, which seem to be extremely rare. Areas of southern Maine which have been settled and farmed for such an extended period of time, are least likely to be home to old-growth stands but these are apt to be the most significant. Other parts of the state bear voids in other particular forest types, and these should be searched for as well.
On June 10, 1983, the Critical Areas Advisory Board and the State Planning Office decided to implement the following actions:

1. The following old-growth forests that are currently on the Register of Critical Areas should remain on the Register.

   Dry Town, Aroostook Co., T13 R11
   Rocky Branch, Aroostook Co., T13 R10

   New information on these areas shall be added to the Register.

2. The following registered areas also have old-growth forest attributes.

   Dry Mountain, Franklin Co., Strong
   Cobbosseecontee, Kennebec Co., Monmouth
   Haystack Mountain, Oxford Co., Mason

   The Register entries shall be amended to note the presence of a significant old growth forest, or the area expanded to include the old-growth areas.

3. The Wassataquoik Stream Old-Growth White Pine area in Penobscot County, T3 R7 is in a proposed white water rapid area. The nomination form for this proposal area shall be amended to reflect the presence of a significant old growth forest stand.

4. The following old-growth areas will be evaluated for critical area status:

   A. Hemlock

      Mattawamkeag, Penobscot Co., Winn
      No. 3 Pond, Penobscot Co., T3 R1
      Prentiss Woods, Penobscot Co., Bangor
      Pleasant Lake, Washington Co., T6 R1
      Farm Cove Mountain, Washington Co., T6 ND
      Sabao Lake, Hancock Co., T41 MD
      Waldoboro, Lincoln Co., Waldoboro
      Thomas Point, Lincoln Co., Westport Is.
      Mt. Christopher, Oxford Co., Greenwood
      Adams Pond, Cumberland Co., Bridgeton
      Ocean Park, York Co., Old Orchard Beach

   B. Red Spruce

      Chandler Mountain, Aroostook Co., T9 R8
      No. 9 Mountain, Aroostook Co., TD R2
      Wassataquoik Lake, Piscataquis Co., T4 R10
      Traveler Mountain, Piscataquis Co., T5 R9
North Traveler, Piscataquis Co., T5 R9
Basin Ponds, Piscataquis Co., T3 R9
Priestly Mountain, Piscataquis Co., T10 R13
Mooseleuk Mountain, Piscataquis Co., T9 R9
Nestuntabunt Mountain, Piscataquis Co., T1 R11
Hurd Mountain, Piscataquis Co., T6 R15
Elephant Mountain, Franklin Co., Twp D
Sugarloaf Mountain, Franklin Co., T4 R2
Buckle Is., Hancock Co., Swans Island
Bernard Mountain, Hancock Co., Southwest Harbor
Jonesborough, Washington Co., Jonesborough
Roque Island, Washington Co., Jonesport
Cathedral Woods, Monhegan Island, Lincoln Co., Monhegan

C. White Pine

Pine Stream Flowage, Piscataquis Co., T4 R13
Gero Island, Piscataquis Co., T5 R13
Chesuncook Lake, Piscataquis Co., T5 R13
Moosehorn Stream, Piscataquis Co., T4 R14
Soper Brook-West, Piscataquis Co., T4 R11
Spencer Lake, Somerset Co., T4 R6
Cold Brook, Somerset Co., T3 R3
Huston Brook, Franklin Co., T3 R2
The Narrows, No. 2, Oxford Co., T4 R1
Big Lake, Washington Co., Grand Lake Stream
Bald Mountain, Washington Co., Baring
Newcastle, Lincoln Co., Newcastle
Hollis, York Co., Hollis
Wassataquoik Stream, Penobscot Co., T3 R7

D. Red Pine

Cliff Ridge, Piscataquis Co., T9 R12
Debsconeag Lake, Piscataquis Co., T2 R10
Big Island, Lobster Lake, Piscataquis Co.
No. 5 Bog, Somerset Co., T4 R7
Baker Pond, Somerset Co., Caratunk
Cathedral Pines, Franklin Co., Eustis
The Pines, Washington Co., T5 ND

E. Hardwood

Yankeetuladi, Aroostook Co., T19 R11
Hafey, Aroostook Co., T18 R11
Musquacook, Aroostook Co., T14 R13
Big Reed Pond, Piscataquis Co., T8 R10
Pump Handle, Piscataquis Co., T8 R13
Lunksoos, Penobscot Co., T4 R7
Mt. Philip, Kennebec Co., Belgrade
Rockport, Knox Co., Rockport
Trout Pond, Oxford Co., Mason
Mahoosuc Notch, Oxford Co., Grafton
Beech Hill, Kennebec Co, Pittston
F. Red Oak

Baxter Park, Cumberland Co., Portland
Mt. Megunticook, Knox Co., Camden
Little Diamond Is., Cumberland Co., Portland

5. The following old-growth leads shall be field checked because they occur in a county or region where no known old-growth stands occur. These leads have been screened and are believed to be good leads.

A. Hemlock

Hancock County: Scoodic Mountain, Penobscot Mountain
Washington Co.: Mud Lake, Rainey Brook, Monroe Lake
Penobscot Co.: Sandy Stream
Somerset Co.: East Nubble

B. Red Spruce

Hancock Co.: Tunk Mountain, Orono Island, Swan's Island, Round Island, Turtle Island, Preble Island, Ironbound Island
Washington Co.: Trafton Island, Lakeman's Island, Great Spruce Island
Piscataquis Co.: Allagash Mountain (also hardwood), Polliwog Brook, Russell Mountain, Jo-Mary Mountain, Cooper Mountain, L. Boardman Mountain, B. Boardman Mountain, Farrar Mountain, Rum Mountain, Big Spencer Mountain, Shirley West Brook.
Penobscot Co.: Passadumkeag Mountain, Mt. Chase
Aroostook Co.: Horseshoe Mountain, Mattawamkeag Lake, T12 R11, Round Pond, Big Black-T14 R14
Somerset Co.: Kennebec River Gorge
Oxford Co.: Royce Mountain, Old Speck (also hardwoods), Baldpate (also hardwoods), Batcheler Grant (also mixed).
Franklin Co.: Sugarloaf Mountain, Crockertown
Somerset Co.: No. 5 Mountain, Attean Mountain

C. White Pine

Hancock Co.: Deer Island
Washington Co.: Vanceboro
Piscataquis Co.: Bowerbank, T4 R9, Churchill Lake
Oxford Co.: Peabody Mountain, Pond in the River
Somerset Co.: Cranberry Park, Huston Pond
D. **Cedar**

Piscataquis Co.: T5 R15, T9 R14 - Snake Brook

Aroostook Co.: T15 R8, Clayton Stream

Somerset Co.: Baker Lake

E. **Hardwoods**

York & Cumberland Counties: Upper Goose Island

Lincoln & Knox Counties: Allen Island (yellow birch), Mark Island (hardwoods)

Washington Co.: Shipstern Island (birch)

Piscataquis Co.: Allagash Mountain (also spruce), Nahmakanta Lake (maple), Wadleigh Valley (maple)

Aroostook Co.: Harding Brook Ridge (hardwood), T9 R3 (hardwood), T19 R12

Oxford Co.: Old Speck (also spruce), Baldpate (also spruce)

F. **Mixed Forests**

Unchecked leads for old-growth mixed woods

Hancock Co.: Indian Camp Brook, Grass Island

Piscataquis Co.: Barren Mtn., Elm Stream Township

Penobscot Co.: Cold Stream Pond

Aroostook Co.: Caribou

Kennebec, Androscoggin & Waldo Counties: Gardiner Estate

Oxford Co.: Batchelder Grant (also spruce), Stow, Mason

6. The following regions of the state shall be searched for old-growth forests because the CAP's inventory has not located any forest stands in the regions or counties.

A. **Hemlock**

Androscoggin, Lincoln, Franklin, Kennebec, Sagadahoc, Knox, Waldo and southern Somerset counties. In addition, coastal Hancock and Washington counties.

B. **Red Spruce**

Oxford, Franklin, Somerset and Penobscot counties.
C. **White Pine**

Franklin, Somerset, Knox, Waldo, Hancock and Southern Piscataquis and Penobscot counties.

D. **Red Pine**

Aroostook, Penobscot, Hancock and Oxford counties.

E. **Cedar**

Cedar stands should be searched for in all areas of Maine.

F. **Hardwoods**

General Evaluation of Natural Old-Growth Forests for Inclusion on the Register of Critical Areas

Prepared by: Lissa Widoff

1. Considerations in Registration

A. Values and qualities represented by the feature (specifically including any unique or exemplary qualities of the feature).

Old-growth forests are complex ecosystems containing a diverse matrix of values. These are:

1. Habitat diversity - containing a variety of values, a complete ecosystem. The multilayered structure provides many niches available for wildlife (snags, dead trees, upper canopy, shrubs and ground vegetation, mosses and lichens.

2. Habitat naturalness - long period of time without disturbance (human induced or natural).

3. Rarity - the extensive manipulation of Maine's forests by man as well as severity of natural disturbances (eg - coastal) has left only small relic areas of natural old-growth forest.

4. Old-Growth component - the very nature of these forests is dictated by the well developed interaction between tree species (and other biological attributes), the site (and other physical attributes) and TIME. The Old-growth component is expressed once sufficient time has passed to allow the forest to develop to a mature stage in which the mature ecosystem is maintaining itself.

5. Representative Qualities - inherent in old-growth forests include the component species, size of these areas (larger areas are more rare and hence more significant), geographic distribution (significance of different types may vary with locality), and the variety of values inherent in these prime examples of plant community types.

a) A variety of functional characteristics are actively displayed including:

   o productivity (capture, storage and utilization of the sun's energy)
   o nutrient conservation and cycling
   o hydrological cycling

b) Water quality - in these unmanaged stands where nature is truly running its own course, water quality is apt to be quite high as compared with logged or managed stands where erosion and pesticide contamination are severe threats.
c) **Preservation of Gene Pools** - areas of old-growth forest are areas where evolution has proceeded without human intervention and the organisms present here are maintaining a natural gene pool.

6. **Cultural Qualities**

   a) **Science and educational values** - excellent for forestry, ecosystem and plant community research, as areas to be monitored in the event of disturbance, and for general educational purposes to general public.

   b) **Recreational values** - these areas can be aesthetically appealing, but nonetheless often harbor unique habitat in terms of complex interactions between wildlife, vegetation and the physical environment. Large old trees speak for themselves.

   c) **Historical significance** - may be inherent in past use or evolution of site in the climatic records retained in tree growth rings, or the interaction of the site with European settlers, etc.

B. **Probable Effects of uncontrolled use (specifically in relation to its intrinsic fragility).**

Logging or other intensive management would completely eliminate the old-growth forest and the associated features. Even minor cutting detracts from the value of old-growth forests. The very nature of old-growth forests is their natural, undisturbed state. Any alteration by man of these areas result in degradation of the site as old-growth.

C. **Present and probable future use (specifically present and future threats of destruction).**

Old-growth forests are partially vulnerable to human activity as regards forest management for harvesting trees. The trees are often valuable assets to loggers, paper companies and private individuals. Liquidation by harvesting has been done and will continue to occur unless the inherent values are recognized and understood by forest owners and laymen.

D. **Level of Significance**

Regional. The New England area has experienced similar levels of disturbance to the natural forest ecosystems.

E. **Probable effects of registration - positive and negative (specifically including the economic implications of inclusion of the feature on the Register).**

The expected positive effect of registration will be to give official recognition to the importance of natural old-growth forests. Also, the
landowner will be informed of the importance of these areas. Registration will help to encourage monitoring of the stands, and also will encourage the conservation of the area.

The expected negative effect of registration would be publicity generated by the registration process. Publicity could attract visitors that might result in vandalism and could hasten harvesting of significant large and old forest stands.

There should be mixed economic implications concerning the registration of natural old-growth forests, and implications would best be analyzed on a site-by-site basis.

Section 2. Representation on the Register:

Fifteen old-growth forest stands are included on the Register of Critical Areas at this time.

Section 3. Variety of Values:

All old-growth sites contain a variety of values, it is inherent in their nature. However, each site may have a different set of these values.

Section 4. Scarcity:

Very few old-growth sites are known in Maine and in the New England region. More areas probably exist but knowledge of these areas is difficult to obtain.

Section 5. Quality:

Most of the known old-growth sites are of high quality. A few have been slightly disturbed and managed for various reasons - aesthetics, hastening succession, etc.

Section 6. Persistence:

The natural old-growth forests are expected to persist, barring human influence, and natural disturbances.

Section 7. Geographic Distribution:

Most of the exceptional sites were found in remote areas of northern and western Maine, with very few in southern Maine. However, each type has distributions within or at the edge of known ranges.

Section 8. Use:

Natural old-growth forests have the potential for scientific and educational uses.

Section 9. Manageability:

Natural old-growth forests can be managed to perpetuate the old-growth character. This is most easily accomplished by allowing these sites to maintain themselves in an undisturbed area. A buffer of trees should be
left around the old-growth stands if cutting takes place adjacent to a significant stand. Also, the boundaries of the old-growth critical area should be clearly blazed and marked so they are not accidentally cut down.

Section 10. Potential Economic Effects:

Registration of natural old-growth forests should result in little economic implications for the landowner where the areas are small. However, large areas may include potentially harvestable timber and therefore be considered a direct loss to the owner.

F. Management Suggestions

1. The natural old-growth forests should be maintained in a natural state.

2. The feature should be monitored periodically to check on the condition of the Critical Area.

3. Where possible, such areas should be used for educational and/or research purposes.

4. The boundaries should be clearly marked so that the old-growth forest can be easily identified.

5. Where possible, a buffer zone should be maintained around the old-growth forest as an additional layer of protection. This can help to prevent natural disturbances to the old-growth feature, such as blowdowns.

G. Programs which directly affect or are particularly relevant to the use and management of the feature.

Coastal forests are affected by shoreland zoning laws. Forest areas above 2700 feet elevation fall into LURC high elevation zoning.

2. Conclusions and Recommendations

A. Conformance with definition contained in the Act.

The Act defines a critical area as meaning: "areas containing or potentially containing plant and animal life or geological features worthy of preservation in their natural condition, or other natural features of significant scenic, scientific, or historical values."

Natural old-growth forests are rare in Maine and high-quality sites are therefore worthy of protection.

B. Conformance with the Guidelines for the Registration of Critical Areas, adopted by the Critical Areas Advisory Board on September 11, 1975.
Section 1. Knowledge of the feature: The report Natural Old-Growth Forests in Maine was prepared for the Critical Areas Program in order to provide detailed documentation about these areas in Maine.

Section 2. Potential Effect on the Conservation of the feature: Should be positive by alerting owners and managers to the importance of these areas.
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Natural Old Growth Forest Inventory


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Day, G.M. 1953. The Indian as an Ecological Factor in the Northeastern Forest.


Ferwerda, J. 1981. Personal communication.


Leak, W.B. 1978. Relationships of Forest Vegetation to Habitat on Two Types of Glacial Drift in New Hampshire. USDAFS Res. Note NE-257, Broomall, PA.


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<th>Species and year of most recent measurement</th>
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<th>Height</th>
<th>Crown Spread</th>
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*Denotes National Champion
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The "Big Tree List" is maintained by Kathy Hale at the Maine Forest Service Nursery, RFD, Passadumkeag, ME 04475, phone number 732-3440. She can be contacted about new candidates for the list.