TREES and SHRUBS of the PENOBSCOT EXPERIMENTAL FOREST Penobscot County, Maine

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U. S. D. A. FOREST SERVICE RESEARCH PAPER NE-128
1969

NORTHEASTERN FOREST EXPERIMENT STATION, UPPER DARBY, PA.
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
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COVER PHOTO: Chemo Pond as seen from the boat landing on the Penobscot Experimental Forest.

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CONTENTS

A spruce-fir forest of Maine, typical of the Penobscot Experimental Forest.

ACKNOWLEDGMENTS

The authors thank Dr. Fay Hyland, Emeritus Professor of Botany, and Dr. Charles D. Richards, Professor of Botany, both at the University of Maine, for their advice and assistance in the preparation of this list. Assistance in the identification of some specimens of *Salix, Rubus,* and *Rosa* by R. C. Bean, R. J. Eaton, and A. R. Hodgdon is also gratefully acknowledged.

THE PENOBSCOT EXPERIMENTAL FOREST

THE PENOBSCOT Experimental Forest, a research unit of the Northeastern Forest Experiment Station, is located in southern Penobscot County, Maine. This record of the Penobscot Forest and its vegetation has been prepared as a reference aid for the forest researcher, the student, and the visitor to the Forest.

In this booklet you will find a brief description of the Forest, its history and physical features, and a list of the trees and shrubs found on the Forest. A list of publications about research on the Forest is appended.

We have found and identified 103 species of woody plants and shrubs on the Penobscot Forest, of which 5 are exotic introductions. The list includes 41 trees, 60 shrubs, and 2 woody vines.

HISTORY AND MANAGEMENT

The Penobscot Experimental Forest consists of 4,000 acres (6¼ square miles) of woodland located about 8 miles northeast of Bangor, in the towns of Bradley and Eddington. This land was purchased in 1950 by nine large land-owning companies, and was leased to the Northeastern Forest Experiment Station of the Forest Service, U. S. Department of Agriculture, for 99 years.

This was the first time in the history of American forestry that private wood-using industries cooperatively purchased land to be leased to the Federal Government for research purposes. The companies that took part in this unique project are Dead River Company, Eastern Corporation (now a Division of Standard Packaging Corporation), Great Northern Paper Company, Hollingsworth and Whitney Company (now Scott Paper Company), International Paper Company, Oxford Paper Company (now Ethel Corporation), Penobscot Development Company (now a part of Diamond International Corporation), S. D. Warren Paper Company (now Scott Paper Company), and St. Regis Paper Company.

On this Forest the Northeastern Forest Experiment Station conducts research in spruce-fir silviculture. The Station's research unit here, headquartered at Orono, is responsible for planning,

establishing, and maintaining research studies on the area as well as administering logging operations and maintenance of roads and boundaries.

A three-man operating committee represents the landowners in the administration of the area. This operating committee receives stumpage fees from the sale of timber cut during the silvicultural experiments and fees from the leasing of several camp lots. These fees are deposited into a fund that is used primarily for paying property taxes on the land. The fund has also been used to acquire additional land, to help finance a research project, and to carry out timber-stand-improvement work.

Each of the landowners is also represented on the Orono unit's Forestry Research Advisory Committee. This committee meets annually and helps keep open lines of communication between the landowners and the research scientists. Progress and results of studies are quickly passed on to the landowners, and the need for new research work is conveyed to the scientists.

The Penobscot Forest is also used by others on a cooperative basis. The Maine Department of Inland Fisheries and Game is conducting several studies on the Forest, including a large-scale study of the quantity and quality of food and cover provided by different cutting methods. Forest pathologists from the Station's laboratory at Hamden, Connecticut, are studying the rate of spread of decay-causing fungi in the principal softwood and hardwood species. The Station's geneticists have installed one replication of their regional white pine provenance study on the Forest and have outplanted specimens of a number of exotic species and hybrid pine and spruce, a list of which is included as an appendix. And students from the University of Maine also conduct research projects on the Forest.

Only a very small portion of land within the Forest was ever cleared for agriculture or grazing. Most of the area was cut lightly in the recent past (30 to 50 years) for pine, hemlock, and spruce sawlogs. Earlier cutting may have been heavier. Presence of charcoal and old burned stumps in many areas indicates that fires followed the cutting of pine stands.

The present stands are 75 to 110 years old. In some areas two-storied stands are developing — an understory of fir and some spruce beneath old stands of other species. Approximately 1,000 acres (25 percent of the total forest area) have been subjected to silvicultural cutting, ranging from clearcut harvesting to intensive selection cutting.

A 39-acre area on the eastern side of Blackman Stream has been designated as a natural area where no cutting will be done. This area is divided approximately in half into an upland type consisting of a dense stand of balsam fir, white pine, red spruce, and eastern hemlock on glacial till soils, and a swamp type consisting of an open stand of red and black spruce, white pine, and tamarack on organic soils. The remainder of the forest is available for new research studies.

A spruce-hemlock stand on the Penobscot Forest. This stand is being managed to favor red spruce over hemlock and balsam fir.

PHYSIOGRAPHY

Topography

Located east of the Penobscot River, the Penobscot Experimental Forest lies in an area of transition between the Central Uplands and the Coastal Lowlands *(Toppan 1935)*. The relief is slight, ranging in elevation from 80 to 250 feet above sea level. The land is imperfectly drained by intermittent brooks and streams. Most of the eastern boundary of the forest is formed by 1, 200-acre Chemo Pond and its outlet, Blackman Stream.

Climate

The climate of the area is cool and humid. Thirty-year records of the weather station at the Old Town Airport, 8 miles northwest of the Experimental Forest, show an average annual temperature of 44.3° F. and average annual precipitation of 40.6 inches. Growing degree-days, cumulative to the base 40° F., total 4,000 for the entire year and 3,000 for the period 1 March to 26 September *(Deither and Vittum 1963)*. Average length of the freeze-free period is 144 days at the Old Town weather station *(Havens and McGuire 1961)*. The Forest is near the line between Plant Hardiness Zones 4 and 5, which has average annual minimum temperatures of −20° F. *(U. S. Natl. Arboretum 1965)*.

Soils

Soils of the Experimental Forest have been strongly influenced by the glacial history of the region. Wisconsin glacial till derived from fine-grained, dark-colored sedimentary rock (slates and shales) forms the principal parent material. Major soil types occurring on the glacial till ridges are well-drained Plaisted loams and stony loams, and moderately well-drained Howland loams and sandy loams. Flat till areas between the ridges are occupied by the poorly and very poorly drained Monarda and Burnham loams and silt loams. Outcroppings of vertically bedded shale covered by a thin mantle of till represent the Thorndike stony and very stony loams.

Some of the lowest areas along the present watercourses and in depressions are occupied by deposits of lacustrine and marine fine sediments. Common soil types on these parent materials include moderately well drained Buxton silt loam, poorly drained Scantic silt loam and very poorly drained Biddeford silt loam and silty clay loam.

A treeless flood plain consisting of recent alluvium, which is subject to annual floods, occurs along Blackman Stream. Soil types here are the very poorly drained Saco silt loams and fine sandy loams.

Glacio-fluvial sands and gravels are limited to a small esker system along Blackman Stream at the northeastern edge of the Forest. Soils on these materials are the excessively drained Stetson gravelly sandy loam, well-drained Stetson fine sandy loam, and well-drained Machias fine sandy loam.

A few organic deposits of muck and peat occur, but all are forested. There are no treeless heaths or muskegs.

Forest Types

The Penobscot Experimental Forest is located in an area of transition between the transition hardwoods-white pine-hemlock and the spruce-fir-northern hardwoods forest types as described by Westveld et al. *(1955)*. Softwood stands composed primarily of balsam fir, red spruce, and white spruce occupy the low-lying imperfectly drained areas. In areas of better drainage, softwood stands have a high proportion of eastern hemlock, with some white pine. White pine and red spruce, along with occasional red pine, predominate in softwood stands on the shallow well-drained soils. Paper birch and red maple are present in small numbers in nearly all the softwood stands.

Hardwood stands composed of sugar maple, beech, and yellow birch occupy the highest elevations of well-drained glacial till soils. Hardwood stands on areas of very poor drainage and organic soils are composed of red maple, American elm, and black ash. Many of these stands are associated with softwood stands composed of black spruce or northern white-cedar and occasional tamarack.

Mixed softwood-hardwood stands occur on all the intermediate soil drainage sites. Red maple and paper birch are the principal hardwood associates of spruce, fir, hemlock, and pine. Big-tooth and quaking aspens occur in some areas, and so does red oak.

THE TREES AND SHRUBS

The collection of herbarium specimens from which the list of trees and shrubs was compiled was made by the Penobscot Experimental Forest staff and Elbert L. Little, Jr., in 1967 and 1968. The identifications have been checked by Dr. Little. Several specimens were further determined by Richard J. Eaton, Curator of Vascular Plants, New England Botanical Club.

Duplicate sets of about 150 numbers of specimens have been deposited in the Forest Service Herbarium at Washington, D. C.; the Forest Service spruce-fir silviculture project at Orono, Maine; and the Herbarium of the University of Maine, Orono, Maine. An incomplete set has been deposited in the Herbarium of the University of New Hampshire, Durham, New Hampshire.

Woody plants growing naturally on the Penobscot Experimental Forest, as listed here, total 103 species in 60 genera and 26 plant families. However, these figures include five introduced species (four genera and three families): *Berberis thunbergii, Malus pumila, Rhamnus frangula, Solanum dulcamara,* and *Lonicera xylosteum.* Also mentioned but not counted in the totals are two species of herbs in woody plant genera: *Aralia racemosa* and *Cornus canadensis.*

The four largest plant families together contain more than one-half the genera (30) and species (54), as follows: Rosaceae, 9 genera and 20 species (including 1 genus and 2 introduced species); Ericaceae, 9 genera and 13 species; Caprifoliaceae, 5 genera and 11 species (1 introduced); and Pinaceae, 7 genera and 10 species. The largest genera are *Rubus* with 6 species, *Acer* and *Salix* with 5 each, and *Cornus, Vaccinium,* and *Viburnum* with 4 each.

The list of woody plants is thought to be nearly complete for the Penobscot Experimental Forest. However, a few rare species

may remain to be collected later. Some others were recorded for southern Penobscot County by Hyland and Steinmetz *(1944)* and in the check list by Ogden, Steinmetz, and Hyland *(1948).*

No unusual records or range extensions were found, nor were any expected. All but one of the woody plant species found on the Experimental Forest were recorded in Penobscot County (or reported under another name) in the check list by Ogden, Steinmetz, and Hyland *(1948).* The addition is an introduced cultivated ornamental, apparently an escape, *Lonicera xylosteum.*

In growth form, 41 species are trees (small, medium, or large), and 60 are shrubs (large and small and subshrubs). Only 2 species are woody vines: *Parthenocissus quinquefolia* and *Solanum dulcamara,* the latter introduced. Classed with the shrubs is one minute parasitic epiphyte: dwarf-mistletoe, *Arceuthobium pusillum.* A few species of creeping plants are barely woody; for example, *Gaultheria hispidula, Michella repens,* and *Linnaea borealis.*

Of the 41 tree species, most are small (including large shrubs attaining tree size) or of medium size. Only 13 species are classed as becoming large trees on the Penobscot Experimental Forest, as follows: *Picea glauca, Picea rubens, Pinus resinosa, Pinus strobus, Tsuga canadensis, Betula alleghaniensis, Betula papyrifera, Fagus grandifolia, Quercus rubra, Ulmus americana, Acer saccharum, Tilia americana, Fraxinus americana.*

The relatively large number of small shrub species and the small number of large trees are to be expected in Maine. Northward into cooler climates, the growth forms of native woody species become smaller.

Certain families of woody plants in the eastern United States are absent on the Forest, though they may be found in southern or coastal parts of Maine or may be represented in cultivation. Examples are Juglandaceae, walnut family; Magnoliaceae, magnolia family; Lauraceae, laurel family; and Leguminosae, legume family (native species all herbaceous). Certain tree genera are absent; for example, *Celtis, Morus, Liquidambar, Platanus,* and *Nyssa.* On the Experimental Forest three tree genera have only one native species: *Quercus, Ulmus,* and *Crataegus.*

KEY TO THE LIST

In the following list of the trees and shrubs growing naturally on the Penobscot Experimental Forest, scientific names and common names of trees are those accepted in the U. S. Forest Service check list *(Little 1953)*. The trees are further described and illustrated in publications on Maine trees by Stark, LaBonte, and Nash *(1968)* and Hyland *(1964)*. Scientific names of shrubs are from Gleason *(1952)*, except the blackberries *(Rubus subg. Eubatus)*, which are from Hodgdon and Steele *(1966)*. Varieties have not been distinguished. However, commonly used varietal names and synonyms have been inserted in parenthesis. Additional locally used common names are included for some species.

Each species in the list is accompanied by a description containing the following information.

Size and Character

- Large tree: taller than 70 feet and 24 inches d.b.h. or larger.
- Medium tree: 30 to 70 feet tall and 12 to 24 inches d.b.h.
- Small tree: less than 30 feet tall and less than 12 inches d.b.h.
- Large shrub: taller than 5 feet but not qualifying as a tree.
- Small shrub: shorter than 5 feet, often only 1 to 2 feet tall or less.
- Subshrub: creeping or trailing species, often barely woody.
- Woody vine: twining or climbing woody plant.

Occurrence

- Where the species is found on the Penobscot Experimental Forest: forest type—softwood, mixedwood, hardwood—roadsides, openings, or general.

General Habitat

- Soil and site conditions where the species is found, after Hyland and Steinmetz *(1944)*.

Abundance

- Frequency of occurrence on the Penobscot Experimental Forest: abundant, common, uncommon, or rare.

THE ANNOTATED LIST

TAXACEAE : YEW FAMILY

Taxus canadensis Marsh. **Canada yew**
Small shrub; softwood type; moist soils in shade of conifers; uncommon. Local common name: ground hemlock.

PINACEAE : PINE FAMILY

Abies balsamea (L.) Mill. **balsam fir**
Medium tree; general; abundant. Common forest tree, forms large part of stand on low-lying wet soils and is associated with spruce and hardwood species on upland soils.

Juniperus communis L. (var. *depressa* Pursh) **common juniper**
Small shrub; open places; dry, shallow, or sandy soils; rare. Common and locally a problem in pastures in some areas of the State.

Larix laricina (Du Roi) K. Koch **tamarack**
Medium tree; softwood type; swamps and boggy places, sometimes in wet abandoned pastures; common. Other common names: hackmatack, eastern larch, juniper.

Picea glauca (Moench) Voss **white spruce**
Medium to large tree; general; often in moist habitats with red spruce; common. Colonizes abandoned fields and pastures. Local common name: cat spruce.

Picea mariana (Mill.) B.S.P. **black spruce**
Medium tree; softwood types; chiefly in bogs or organic soils, also on adjacent uplands; common.

Picea rubens Sarg. **red spruce**
Medium to large tree; general; mostly on uplaid soils and shallow rocky soils; abundant.

Pinus resinosa Ait. **red pine**

Medium to large tree; softwood type; on dry sites of sandy or gravelly soils and very shallow soils; uncommon. Local common name: Norway pine.

Pinus strobus L. **eastern white pine**

Large tree; general; mostly on fertile well-drained soils or shallow soils, also occasionally found in wet areas; abundant. Other common names: northern white pine, pumpkin pine, soft pine. Colonizes abandoned agricultural land.

Thuja occidentalis L. **northern white-cedar**

Medium tree; softwood stands; swamps and other moist habitats; abundant. Other common names: eastern arborvitae, eastern white-cedar.

Tsuga canadensis (L.) Carr. **eastern hemlock**

Large tree; softwood and mixedwood types; uplands and well-drained soils; abundant.

SALICACEAE : WILLOW FAMILY

Populus balsamifera L. **balsam poplar**

Medium tree; hardwood type; open areas; uncommon. Locally called balm-of-Gilead poplar.

Populus grandidentata Michx. **bigtooth aspen**

Medium tree; hardwood or mixedwood type; pioneer species of rich soils; common. Locally called popple.

Populus tremuloides Michx. **quaking aspen**

Medium tree; hardwood or mixedwood type; pioneer species, often on slightly drier and sandier soils than above *Populus* species; common. Locally called popple or trembling aspen.

Salix bebbiana Sarg. **Bebb willow**

Large shrub or small tree; open areas and roadsides, moist or dry soil; common.

Salix discolor Mühl. **pussy willow**
Large shrub; open areas, wet meadows, and boggy stream margins or dry sandy areas; uncommon.

Salix lucida Mühl. **shining willow**
Large shrub; open areas, banks of streams and ponds, often growing in water; common.

Salix pedicellaris Pursh (var. *hypoglauca* Fern.) **bog willow**
Small shrub, open areas, wet meadows and boggy stream margins; uncommon.

Salix sericea Marsh. **silky willow**
Large shrub; open areas; wet places and swamps along streams and flood plains; common.

MYRICACEAE : WAXMYRTLE FAMILY

Comptonia peregrina (L.) Coult. ***sweetfern***
Small shrub; large openings; dry soils; abundant.

Myrica gale L. ***sweetgale***
Small shrub; open areas; wet areas, bogs, and swamps; common.

BETULACEAE : BIRCH FAMILY

Alnus rugosa (Du Roi) Spreng. (*A. incana* auth.) **speckled alder**
Large shrub to small tree; open areas and roadsides; wet places along streams and moist soils; abundant.

Betula alleghaniensis Britton (*B. lutea* Michx. f.) **yellow birch**
Medium to large tree; hardwood type; rich moist soil; common.

Betula papyrifera Marsh. **paper birch**
Medium to large tree; hardwood and mixedwood types; general; abundant. Locally called white birch or canoe birch.

Betula populifolia Marsh. **gray birch**
Small tree; open areas; poor sandy or rocky soil; abundant. Pioneer species often invades old fields and pastures especially where soil is wet. Locally called poverty birch or Getchell birch.

Corylus cornuta Marsh. **beaked hazel**
Large shrub; small openings; generally on the poorer soils; common.

Ostrya virginiana (Mill.) K. Koch **eastern hophornbeam**
Small tree; hardwood types; rich woods; common. Locally called ironwood, leverwood, or hornbeam.

FAGACEAE : BEECH FAMILY

Fagus grandifolia Ehrh. **American beech**
Medium to large tree; hardwood types; rich moist soils; common.

Quercus rubra L. (*Q. borealis* Michx. f.) **northern red oak**
Medium to large tree; hardwood or mixedwood types; dry or moist soil, often in rocky places; common.

ULMACEAE : ELM FAMILY

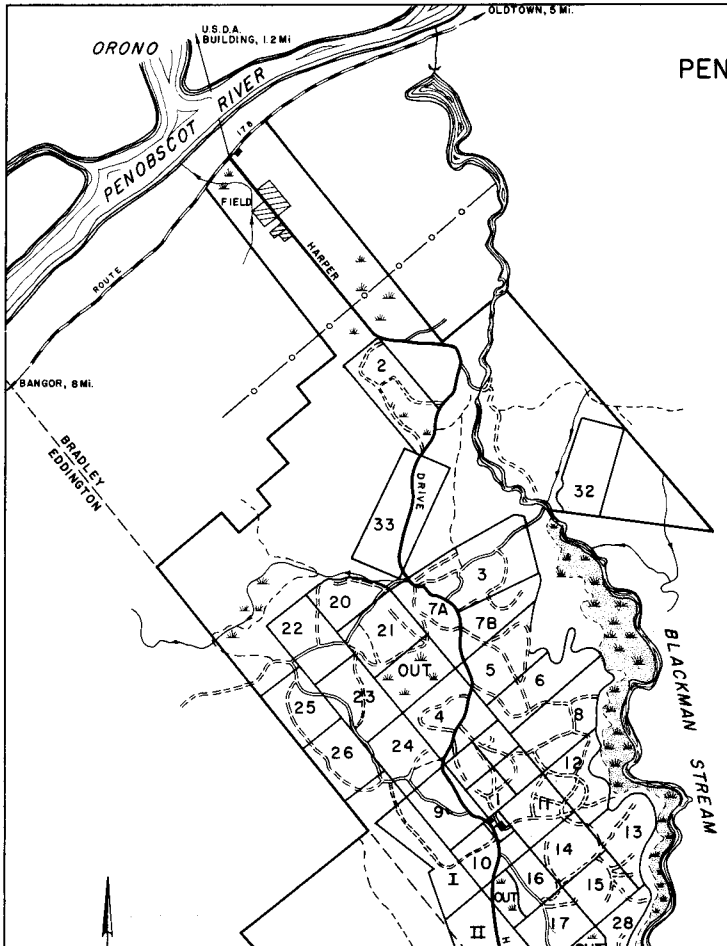
Ulmus americana L. **American elm**
Large tree; hardwood type; rich moist soils along water courses; common.

LORANTHACEAE : MISTLETOE FAMILY

Arceuthobium pusillum Peck **dwarf-mistletoe**
Subshrub; softwood type; occurs as parasite on crowns of black spruce; uncommon.

BERBERIDACEAE : BARBERRY FAMILY

Berberis thunbergii DC. **Japanese barberry**
Small shrub; open areas; rare; introduced, escaped from cultivation.



PENOBSCOT EXPERIMENTAL FOREST

IN THE TOWNS OF

BRADLEY AND EDDINGTON

PENOBSCOT COUNTY, MAINE

1968

SCALE - CHAINS

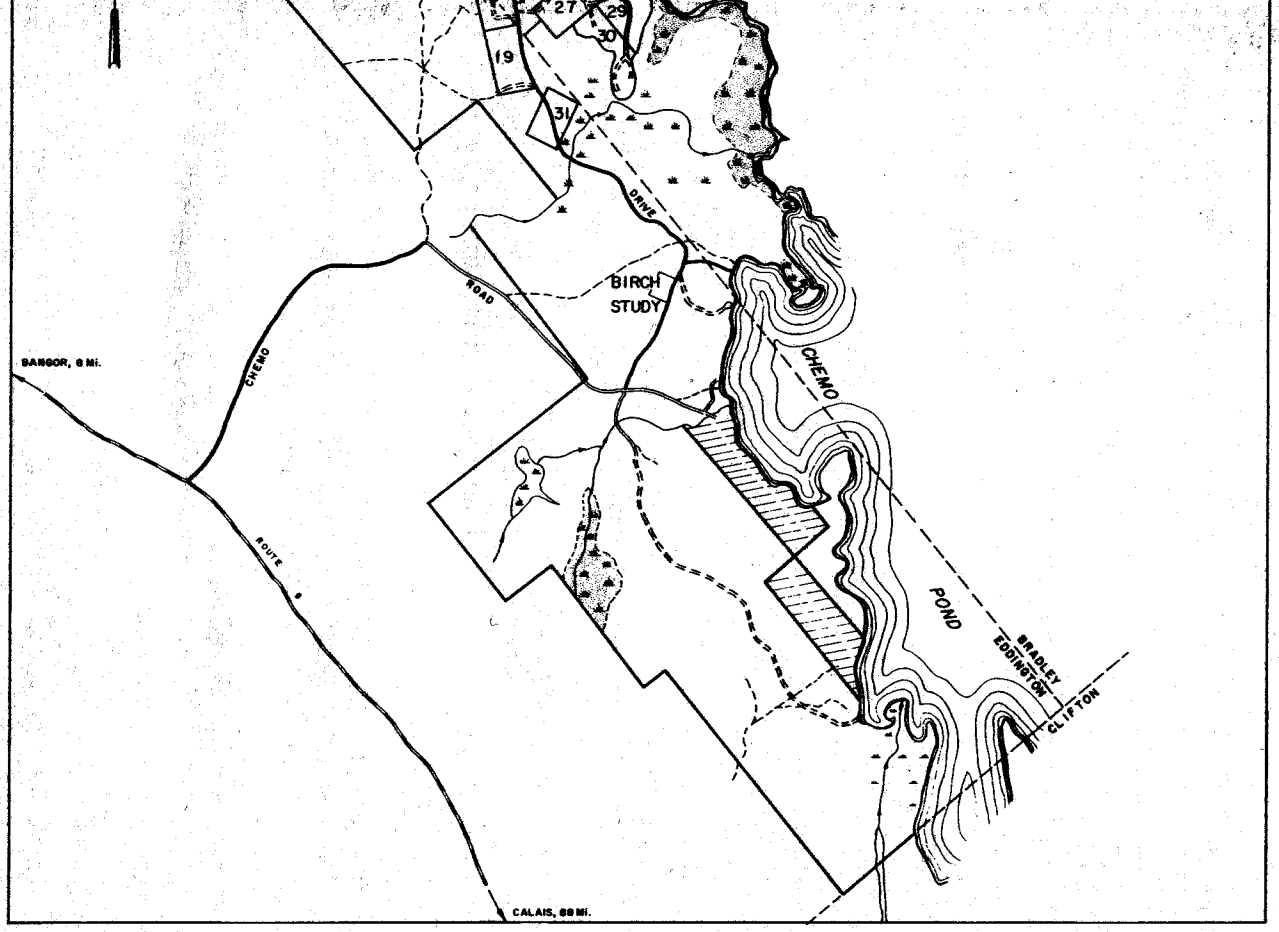
20 10 0 20 40 60 80

LEGEND

- HARD SURFACED ROAD
- LOOSE SURFACED GRADED ROAD
- SURFACED WOOD ROAD
- UNSURFACED WOOD ROAD
- TRAILS
- TOWN BOUNDARY
- POWER LINE
- BUILDING
- FORESTED SWAMP
- NON-FOREST MARSH
- STREAM
- EXPERIMENTAL PLANTINGS
- PRIVATE LAND

COMPARTMENTS

MANAGEMENT INTENSITY DEMONSTRATION	1
SPRUCE-FIR MANAGEMENT STUDY	3, 4, 5, 6, AND 8-31 INCLUSIVE
NATURAL AREA	32
STRIP STUDY	33
MANAGEMENT UNITS	I, II


27
29
30
19
31
DRIVE
ROAD
BIRCH
STUDY
CHEMO
BANGOR, 6 Mi.
CHEMO
ROUTE
POND
BRADLEY
EDDINGTON
CLIFTON
CALAIS, 88 Mi.

SAXIFRAGACEAE : SAXIFRAGE FAMILY

Ribes hirtellum Michx. **wild gooseberry**

Small shrub; small open areas; swamps and grassy swales; uncommon.

HAMAMELIDACEAE : WITCH-HAZEL FAMILY

Hamamelis virginiana L. **witch-hazel**

Large shrub to small tree; small openings; moist or dry often rocky woods; common.

ROSACEAE : ROSE FAMILY

Amelanchier arborea (Michx. f.) Fern. **downy serviceberry**

Large shrub; roadside, near Rt. 178; uncommon.

Amelanchier laevis Wieg. **Allegheny serviceberry**

Small tree; openings and roadsides; acid soils damp or dry; common. Locally called shadbush.

Aronia melanocarpa (Michx.) Ell. (*Pyrus melanocarpa* (Michx.) Willd.) **black chokeberry**

Large shrub; open areas; moist soils or rocky barrens; uncommon.

Crataegus macrosperma Ashe (?) **hawthorn**

Large shrub or small tree; openings; dry rocky soil; common. Specimens sterile, and identification uncertain.

Malus pumila Mill. (*Pyrus malus* L.) **apple**

Small tree; openings, old pasture; common; introduced, escaped from cultivation.

Prunus pensylvanica L. f. **pin cherry**

Small tree; open areas; recent openings following fire; common. Also called fire cherry, wild red, or bird cherry.

Prunus serotina Ehrh. **black cherry**

Medium tree; hardwood type; rich moist soils; uncommon.

Prunus virginiana L. **common chokecherry**
Large shrub or small tree; openings, edges of clearings; rich soil; uncommon.

Rosa johannensis Fern. **rose**
Small shrub; roadside and open areas; uncommon.

Rosa palustris Marsh. **swamp rose**
Small shrub; opening along Blackman Stream; wet swampy soil; uncommon.

Rosa virginiana Mill. **Virginia rose**
Small shrub; roadside and openings; uncommon.

Rubus allegheniensis Porter **common blackberry**
Small to large shrub; roadside and openings; dry soils; common.

Rubus hispidus L. **swamp dewberry**
Small shrub; forming dense tangle along ground; common.

Rubus pensilvanicus Poir. (*R. ostryifolius* Rydb.) **blackberry**
Small shrub; open areas and fields; uncommon.

Rubus pubescens Raf. **dwarf red blackberry**
Small shrub; fields and open areas; moist soils; common.

Rubus strigosus Michx. (*R. idaeus* L. var. *strigosus* (Michx.) Maxim.) **red raspberry**
Small shrub; open areas and roadsides; dry or moist soils; common.

Rubus vermontanus Blanch. (?) **blackberry**
Small shrub; open areas and roadsides; dry or moist soils; common.

Sorbus americana Marsh. (*Pyrus americana* (Marsh.) DC.) **American mountain-ash**
Small tree; open areas and roadsides; moist or dry soil; uncommon.

Spiraea latifolia (Ait.) Borkh. **meadowsweet**

Small shrub; fields and open places; rocky poor soil, moist or dry; abundant.

Spiraea tomentosa L. **hardhack**

Small shrub; fields and open places; rocky poor soil, moist or dry; common. Locally called steeplebush.

ANACARDIACEAE : CASHEW FAMILY

Rhus radicans L. (var. *rydbergii* (Small) Rehd.; *Toxicondendron radicans* (L.) Kuntze) ***poison-ivy***

Small shrub; hardwood type; along stream banks and roadsides, wet to dry soils; common. A few varieties and forms have been recognized.

Rhus typhina L. **staghorn sumac**

Large shrub or small tree; open areas; usually dry soils and rocky places; common.

AQUIFOLIACEAE : HOLLY FAMILY

Ilex verticillata (L.) Gray **winterberry**

Small to large shrub; hardwood type; open wet places, wet soils of hardwood swamps; common. A few varieties have been distinguished.

Nemopanthus mucronata (L.) Trel. **mountain-holly**

Large shrub or small tree; swamps, bogs, or wet places; uncommon.

ACERACEAE : MAPLE FAMILY

Acer pensylvanicum L. **striped maple**

Small tree (often shrubby); hardwood type; rich moist soil; common. Locally called moosewood.

Acer rubrum L. **red maple**

Medium tree; hardwood, mixedwood or softwood types; moist to wet soils and swamps; abundant. Locally called soft or white maple.

Acer saccharinum L. **silver maple**

Medium tree; hardwood type; banks of streams and lake shores; rare, along bank of Blackman Stream. Locally called white maple.

Acer saccharum Marsh. **sugar maple**

Large tree; hardwood type; deep, rich, well-drained soils; common. Other common names: hard or rock maple.

Acer spicatum Lam. **mountain maple**

Large shrub or small tree; hardwood or mixedwood types; cool moist soils; common.

RHAMNACEAE : BUCKTHORN FAMILY

Rhamnus frangula L. **glossy buckthorn**

Large shrub or small tree; one specimen found along Blackman Stream near old dam site; rare, introduced.

VITACEAE : GRAPE FAMILY

Parthenocissus quinquefolia (L.) Planch. **Virginia creeper**

Woody vine; hardwood type; moist soils, especially along streams and roads; rare.

TILIACEAE : LINDEN FAMILY

Tilia americana L. **American basswood**

Large tree; hardwood type; moist rich soils; uncommon.

THYMELAEACEAE : MEZEREUM FAMILY

Dirca palustris L. **leatherwood**

Large shrub; hardwod type; moist often calcareous soils; rare. Also called wicopy.

ARALIACEAE : GINSENG FAMILY

Aralia hispida Vent. **prickly sarsaparilla**

Subshrub; recent openings and burned areas; dry soils, rocky places; common.

Aralia nudicaulis L. **wild sarsaparilla**
Subshrub; under softwoods or hardwoods; moist or dry soil; abundant.

Aralia racemosa L. **spikenard**
Herb; rich moist woods; common.

CORNACEAE : DOGWOOD FAMILY

Cornus alternifolia L. f. **alternate-leaf dogwood**
Large shrub to small tree; hardwood and mixedwood type; dry rocky soils; common.

Cornus amomum Mill. **silky dogwood**
Large shrub; open places along water courses; uncommon.

Cornus canadensis L. **bunchberry**
Herb; general; abundant.

Cornus rugosa Lam. **roundleaf dogwood**
Large shrub; hardwood and mixedwood type; rich moist soil; common.

Cornus stolonifera Michx. **red osier dogwood**
Large shrub; openings; along water courses and wet places; common.

ERICACEAE : HEATH FAMILY

Andromeda glaucophylla Link **bog-rosemary**
Small shrub; bogs and swales; common.

Chamaedaphne calyculata (L.) Moench **leatherleaf**
Small shrub; open areas; bogs, swamps, and other wet places; common.

Epigaea repens L. (var. *glabrifolia* Fern.) **trailing-arbutus**
Subshrub; general; sandy rocky soils, moist or dry; common. Locally called mayflower.

Gaultheria hispidula (L.) Mühl. (*Chiogenes hispidula* (L.) Torr. & Gray) **creeping snowberry**
Subshrub; softwood or mixedwood type; peat bogs and mossy soils; common.

Gaultheria procumbens L. **wintergreen**
Subshrub; general; dry soils or humus-covered rocks; common. Also called checkerberry or teaberry.

Gaylussacia baccata (Wang.) K. Koch **black huckleberry**
Small shrub; softwood type; rocky woods; rare.

Kalmia angustifolia L. **lambkill**
Small shrub; openings; moist to wet soils; common.

Ledum groenlandicum Oeder **Labrador-tea**
Small shrub; bogs and wet places; uncommon.

Rhododendron canadense (L.) B.S.P. **rhodora**
Small shrub; open areas in swamps, bogs, or wet places; common.

Vaccinium angustifolium Ait. **blueberry**
Small shrub; open areas; dry soils; common. Locally called lowbush or low-sweet blueberry.

Vaccinium corymbosum L. **highbush blueberry**
Large shrub, open areas; swamps, bogs, and wet places; uncommon.

Vaccinium macrocarpon Ait. **large cranberry**
Subshrub; open bogs, and wet places; often in sphagnum moss; common.

Vaccinium myrtilloides Michx. (*V. canadense* Kalm) **blueberry**
Small shrub; open places; dry or moist soils; common.

OLEACEAE : OLIVE FAMILY

Fraxinus americana L. **white ash**

Medium to large tree; hardwood type; rich moist soils; common.

Fraxinus nigra Marsh. **black ash**

Small tree; hardwood type; swamps and wet places; common. Also called brown or basket ash.

Fraxinus pennsylvanica Marsh. **green ash**

Small tree; a single plant 10 feet high beside Harper Drive near Rt. 178, the only record; rare. Also found along banks of Penobscot River 1/4 mile away. Also called red ash.

SOLANACEAE : NIGHTSHADE FAMILY

Solanum dulcamara L. **bitter nightshade**

Climbing woody vine; a single plant beside Harper Drive near Rt. 178, the only record; rare, introduced.

RUBIACEAE : MADDER FAMILY

Cephalanthus occidentalis L. **common buttonbush**

Small to large shrub; open areas; along water courses, often in water; uncommon.

Mitchella repens L. **partridge-berry**

Subshrub; softwood type; dry soils; common.

CAPRIFOLIACEAE : HONEYSUCKLE FAMILY

Diervilla lonicera Mill. **bush-honeysuckle**

Small shrub; open areas; roadsides; dry rocky soil; common.

Linnaea borealis L. (var. *americana* (Forbes) Rehd.) **twinflower**

Subshrub; general; moist mossy soils; common.

Lonicera canadensis Marsh. **American fly honeysuckle**

Small shrub; general; moist soils; common.

Lonicera villosa (Michx.) R. & S. **mountain fly honeysuckle**
Small shrub; open areas; wet rocky soils; common.

Lonicera xylosteum L. **European fly honeysuckle**
Large shrub; open areas; rare, introduced.

Sambucus canadensis L. **American elder**
Small to large shrub; openings and roadsides; rich soils; common. Also called common or black-berried elder.

Sambucus pubens Michx. **scarlet elder**
Small to large shrub; openings and roadsides; rocky soils; common.

Viburnum acerifolium L. **mapleleaf viburnum**
Small to large shrub; softwood type; dry to moist soils; common.

Viburnum alnifolium Marsh. **hobble-bush**
Small to large shrub; hardwood type; moist rich soils; uncommon. Also called witch hobble.

Viburnum cassinoides L. **withe-rod**
Large shrub; open places; wet or dry soils; common. Often called wild raisin.

Viburnum recognitum Fern. (*V. dentatum* L. var. *lucidum* Ait.) **arrowwood**
Small to large shrub; general; in small openings and along water courses; wet or dry soils; common.

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APPENDIX

Species Planted

Small numbers of specimens of the following exotic species and interspecific hybrids of spruce and pine have been planted in the Penobscot Experimental Forest. Data on location, numbers planted, and survival and growth are on file at the Orono office of the Northeastern Forest Experiment Station.

Picea abies (L.) Karst.
P. abies X *asperata*
P. abies X *koyamai*
P. abies X *montigena*
P. abies X *wilsonii*
P. asperata X *abies*
P. asperata X *montigena*
P. engelmannii Parry
P. engelmannii X *glauca*
P. glauca X *engelmannii*
P. glauca X *jezoensis*
P. glauca X *koyamai*
P. glauca X *pungens*
P. montigena X *abies*
P. montigena X *asperata*
P. omorika (Panic) Parkyne
P. omorika X *koyamai*
P. omorika X *orientalis*
P. orientalis (L.) Link
P. orientalis X *montigena*
P. orientalis X *omorika*
P. pungens Engelm.
Pinus ayacahuite X *strobus*
P. griffithii McClelland
P. griffithii X *strobus*
P. peuce X *strobus*
P. sylvestris X *densiflora*

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