

# ***Forest Ecosystem Management Plan***

## **Butler Head Preserve & Whiskeag Woods**

*prepared for*

**City of Bath, Maine**



December, 2007

Prepared by:

Walter R. Armstrong, LF #376  
74 Montsweag Road  
Woolwich, ME 04579  
207-442-7450

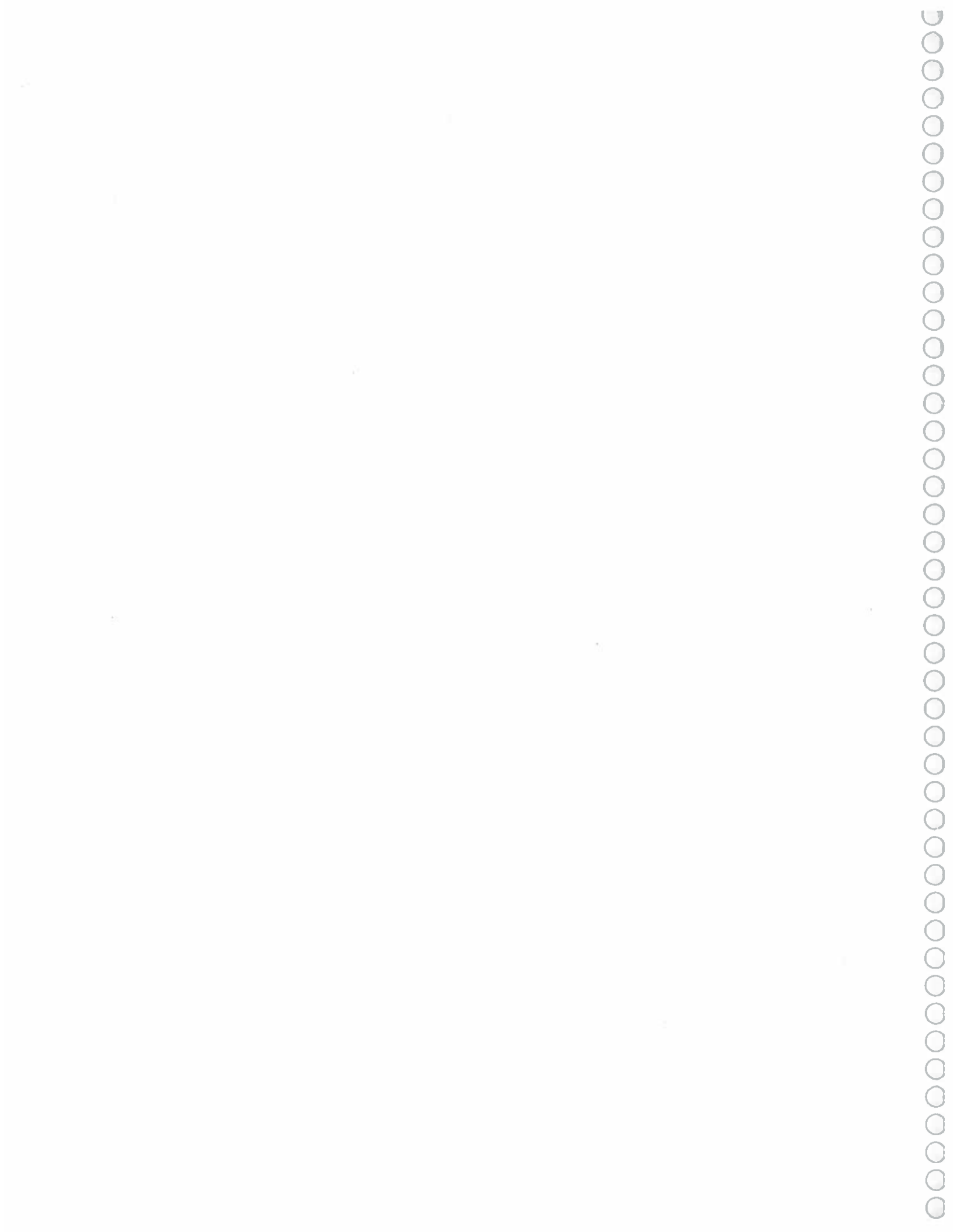
Robert Bryan, LF# 907  
Maine Audubon  
20 Gilsland Farm Road,  
Falmouth, ME 05105

MAINE   
AUDUBON



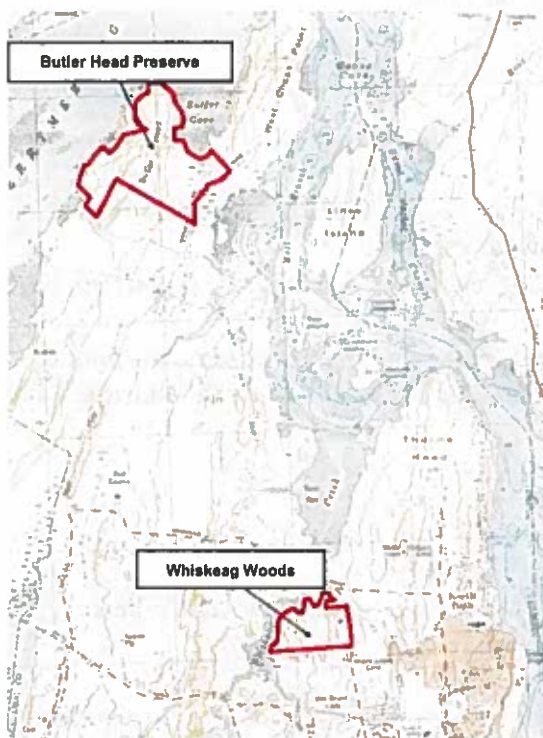
# Table of Contents

<b>I. INTRODUCTION .....</b>	<b>1</b>
<b>II. MANAGEMENT PLAN SUMMARY .....</b>	<b>2</b>
LANDOWNER GOALS AND DESIRED FUTURE CONDITION .....	2
MANAGEMENT PLAN SUMMARY .....	3
HABITAT MAPS .....	5
<b>III. FOCUS SPECIES FORESTRY .....</b>	<b>7</b>
INTRODUCTION TO FOCUS SPECIES FORESTRY .....	7
OVERVIEW OF CURRENT FOREST CONDITIONS .....	10
<i>Butler Head</i> .....	10
<i>Whiskeag Woods</i> .....	11
<i>Forest Ecosystem Summary Table</i> .....	12
<i>Landscape and Watershed Perspective</i> .....	13
<i>Wildlife Observations</i> .....	14
MANAGEMENT RECOMMENDATIONS FOR WILDLIFE AND OTHER BIODIVERSITY .....	15
<i>Focus Species</i> .....	15
<i>Focus Species Summary Table and General Habitat Recommendations – Butler Head</i> .....	16
<i>Focus Species Summary Table and General Habitat Recommendations – Whiskeag Woods</i> .....	17
<i>Management Recommendations to Reach Desired Future Conditions</i> .....	18
<i>Rare Species, Natural Communities, and Significant Wildlife Habitat</i> .....	20
<i>Wildlife Trees and Retention Patches</i> .....	21
<i>Riparian and Wetland Habitats</i> .....	23
<i>Vernal Pools</i> .....	25
<i>Invasive Plants</i> .....	25
<i>Recreational Use</i> .....	27
<i>Planning for Climate Change</i> .....	28
<i>Education Plan</i> .....	29
<b>IV. FOREST MANAGEMENT PLAN .....</b>	<b>30</b>
TIMBER STAND DESCRIPTIONS AND RECOMMENDATIONS .....	52
<i>Whiskeag Woods (Public Works Woods)</i> .....	52
<i>Butler Head</i> .....	56
<b>V. MONITORING PLAN .....</b>	<b>63</b>
<b>VI. APPENDICES .....</b>	<b>65</b>
TOPOGRAPHIC MAP .....	66
AERIAL PHOTOGRAPH – BUTLER HEAD .....	67
AERIAL PHOTOGRAPH – WHISKEAG WOODS (“PUBLIC WORKS WOODS”) .....	68
TIMBER STAND MAP – BUTLER HEAD .....	69
TIMBER STAND MAP – WHISKEAG WOODS .....	70
SOIL MAP AND DATA - BUTLER HEAD .....	71
SOIL MAP AND DATA - WHISKEAG WOODS .....	72
MAINE NATURAL AREAS PROGRAM REPORT .....	73
MDIFW WILDLIFE HABITATS OF CONCERN .....	75
MNAP/MDIFW HABITATS OF MANAGEMENT CONCERN MAP – BUTLER HEAD .....	76
MNAP/MDIFW HABITATS OF MANAGEMENT CONCERN MAP – WHISKEAG WOODS .....	77
RARE PLANT FACT SHEETS .....	78
MAINE HISTORIC PRESERVATION COMMISSION REPORT .....	89
US FISH AND WILDLIFE SERVICE NATIONAL WETLAND INVENTORY MAP .....	90
BATH SHORELAND ZONE TIMBER HARVESTING REGULATIONS .....	91
MOST PROBLEMATIC INVASIVE PLANTS IN MAINE .....	93
INVASIVE PLANT MANAGEMENT OVERVIEW .....	94



# I. Introduction

This management plan was prepared for the City of Bath as part of the Focus Species Forestry – Community Forestry Project, a cooperative venture between Maine Audubon and towns and land trusts that own managed forest land throughout Maine. The objective of the project is to involve community members and local foresters in developing ecologically based forest management plans using the *Focus Species Forestry* guidebook<sup>1</sup> as a planning tool.



This plan covers two predominantly forested parcels owned by the City of Bath (see location map). Whiskeag Woods (also referred to as “Public Works Woods” on some maps in this report) is located behind the Public Works facility on Oak Grove Avenue and includes approximately 30 acres of forest, wetland, and early-successional wildlife habitat between the Public Works facility and Whiskeag Creek. The second parcel is the 137 –acre Butler Head preserve on Merrymeeting Bay.

The plan includes two major sections:

- **Focus Species Forestry** (Section III) provides an overview of wildlife and other ecological resources of the woodlots and includes recommendations for maintaining and improving wildlife habitat and other elements of biological diversity.
- **The Forest Management Plan** (Section IV) includes a forestry report and recommended practices to improve and maintain forest growth, provide a yield of forest products, and to implement the Focus Species Recommendations.

Management goals, objectives, and recommendations are summarized in Section II.

<sup>1</sup> *Focus Species Forestry, a Guide to Integrating Timber and Biodiversity Management in Maine* is available from Maine Audubon (207-781-6180 x 222) or on-line at <http://www.maineaudubon.org/resource/documents/FocusSpeciesForestry-lowres-color.pdf>.

## II. Management Plan Summary

### ***Landowner Goals and Desired Future Condition***

#### **Primary Goal:**

Restore the natural species, age, and habitat diversity of forested areas of the properties and conserving their shoreland and watershed protection values.

#### **Supporting and Secondary Goals:**

As compatible with the Primary Goal,

- Provide wildlife habitats that are declining in the region, including large blocks of relatively mature forest and patches of young-forest habitat.
- Provide quality recreational opportunities for the citizens of Bath and the surrounding communities.
- Provide timber products used by all people of Maine and modest income to support property management, and if feasible, use materials for local vocational education and affordable housing.

#### **Desired Future Condition**

The desired future condition is a vision of what the City would like Butler Head and Whiskeag Woods to look like in the long-term, 50 years or more in the future.

*The Desired Future Condition is one of protected wetland ecosystems and well-managed, ecologically mature and developing intermediate upland forests that are comprised mainly of long-lived and late-successional species and that are interspersed with young-forest patches to provide a diversity of plant and wildlife habitat.*

Management activities on the two properties described in this report has been designed to meet the primary and secondary goals while moving the forest on a trajectory toward the desired future condition.

## Management Plan Summary

The following tables summarizes management recommendations for the two parcels.

<b>Butler Head - Summary of Management Objectives and Recommendations</b>		
<b>Stand</b> (see Timber Stand Maps and Habitat Maps)	<b>Objectives</b>	<b>Recommendations</b> (see Sections III and IV for details)  <b>To Be Reviewed and Prioritized by the Bath Forestry Committee</b>
1	Maintain as early-successional wildlife habitat, maintain shoreland habitat values	<ul style="list-style-type: none"> <li>Occasional firewood harvest to keep most of the stand in a young-forest/shrub condition.</li> <li>Apply the Riparian and Shoreland Management Guidelines.</li> </ul>
2	Improve timber quality and provide early-successional wildlife habitat	<ul style="list-style-type: none"> <li>Remove low-value white pine in 2 blocks, now and in 10 years. Consider planting some white spruce for future sawlogs and habitat diversity.</li> <li>Apply the Riparian and Shoreland Management Guidelines.</li> </ul>
3	Improve timber quality and growth; develop mature habitat values over time	<ul style="list-style-type: none"> <li>Firewood thinning in near term, another in <math>\pm 10</math> years.</li> </ul>
4	Maintain mature forest characteristics	<ul style="list-style-type: none"> <li>Preserve as is (no active management).</li> </ul>
5, 10	Improve timber quality and growth; develop mature habitat values over time	<ul style="list-style-type: none"> <li>Thin by removing low-value trees.</li> </ul>
6	Maintain mature forest values	<ul style="list-style-type: none"> <li>Limited sawlog harvest and pre-commercial Timber Stand Improvement (TSI) thinning to improve aesthetics</li> </ul>
7	Maintain natural area characteristics	<ul style="list-style-type: none"> <li>Preserve as is (no active management).</li> </ul>
8	Improve timber quality and growth; develop mature habitat values over time	<ul style="list-style-type: none"> <li>Light sawlog harvest of white pine and hemlock, thin hardwoods for firewood, maintain shagbark hickory and white oak.</li> </ul>
9	Improve timber quality and growth; maintain mature habitat and shoreland habitat values	<ul style="list-style-type: none"> <li>Light to medium thinning</li> <li>Apply the Riparian and Shoreland Management Guidelines</li> </ul>
11	Improve timber quality and growth; develop mature habitat values over time	<ul style="list-style-type: none"> <li>Medium intensity thinning of hemlock and white pine</li> </ul>
12	Maintain mature forest character and aesthetics	<ul style="list-style-type: none"> <li>Light thinning of intermediate diameter hemlock.</li> <li>Apply the Riparian and Shoreland Management Guidelines</li> </ul>
13	Maintain mature forest character and aesthetics	<ul style="list-style-type: none"> <li>Very light selective thinning of firewood.</li> <li>Apply the Riparian and Shoreland Management Guidelines</li> </ul>
All	Protect Habitats of Management Concern identified by the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program protect and other wetlands and riparian areas.	<ul style="list-style-type: none"> <li>Apply the Riparian and Shoreland Management Guidelines (see Section III) during forest management operations.</li> <li>Identify sensitive soils, intermittent streams, and forested wetlands prior to forest management operations. Use Maine's Best Management Practices for forestry to protect these sites.</li> </ul>
Road, old field, and wetland	Identify and Control Invasive Species	<ul style="list-style-type: none"> <li>Spring 2008: Identify and map the locations of invasive species.</li> <li>2008-2009: Work with a licensed herbicide applicator to control invasive shrubs. Use low-toxicity herbicides and individual stem treatments whenever possible to minimize use. (see Section III).</li> <li>Explore the use of parasitic beetles to control Purple Loosestrife.</li> </ul>
All	Increase the wildlife and biodiversity benefits of wildlife trees and downed woody material.	<ul style="list-style-type: none"> <li>Retain snags, cavity trees, and other wildlife trees during harvest operations, recruit future wildlife trees, and protect fallen logs (see Section III).</li> </ul>
All	Minimize the impacts of climate change on biological diversity.	<ul style="list-style-type: none"> <li>Maintain species diversity within stands, including those species such as red oak, white oak, shagbarks hickory, white pine and red maple that are adapted to a warmer climate.</li> </ul>
All	Recreation trails	<ul style="list-style-type: none"> <li>By Summer 2008 develop a recreation use plan that is minimizes wildlife impacts. Trail planning should use the recommended Recreation Use practices in Section III to minimize ecological impacts.</li> </ul>
All	Provide educational opportunities.	<ul style="list-style-type: none"> <li>By 2009 develop an education plan to involve local schools and community members.</li> </ul>
All	Monitor the Preserve	<ul style="list-style-type: none"> <li>Implement Monitoring Plan (Ongoing: see Section V)</li> </ul>

## Whiskeag Woods- Summary of Management Objectives and Recommendations

<b>Stand</b> (see Timber Stand Maps and Habitat Maps)	<b>Objectives</b>	<b>Recommendations</b> (see sections III and IV for details)  <b>To Be Reviewed and Prioritized by the Bath Forestry Committee</b>
1, 2, 3	Maintain shoreland habitat and recreation values	<ul style="list-style-type: none"> <li>• Very limited selection harvest of mature white pine and hemlock, encourage regeneration of trees, and maintain large, low-quality trees for wildlife</li> </ul>
4, 4a	Improve timber quality and provide some early successional wildlife habitat	<ul style="list-style-type: none"> <li>• Stand 4: removed the low-quality white pine for pulp or chips and create gaps that will regenerate as early-successional wildlife habitat.</li> <li>• Stand 4a: Limited selection harvest of mature white pine and low-quality trees</li> </ul>
5	Protect intermittent drainage, manage for old growth characteristics	<ul style="list-style-type: none"> <li>• Thin intermediate red oak and hemlock where overstocked to improve overall stand health.</li> </ul>
6	Improve timber quality and vigor; protect habitat values	<ul style="list-style-type: none"> <li>• Thin northern 2/3 of stand by removing low quality trees. Protect wet areas (potential vernal pools) in the southern 1/3, possible harvest of some mature pine and oak.</li> </ul>
7	Improve tree growth and protect shoreland values	<ul style="list-style-type: none"> <li>• Reduce density with a pre-commercial Timber Stand Improvement (TSI) thinning.</li> </ul>
8	Improve tree growth	<ul style="list-style-type: none"> <li>• Reduce density with a pre-commercial Timber Stand Improvement (TSI) thinning.</li> </ul>
9, 9a	Maintain shoreland habitat and recreation values	<ul style="list-style-type: none"> <li>• Reduce density with a pre-commercial Timber Stand Improvement (TSI) thinning.</li> </ul>
All	Protect Habitats of Management Concern identified by the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program protect and other wetlands and riparian areas.	<ul style="list-style-type: none"> <li>• Apply the Riparian and Shoreland Management Guidelines (see Section III) during forest management operations.</li> <li>• Identify sensitive soils, intermittent streams, and forested wetlands prior to forest management operations. Use Maine's Best Management Practices for forestry to protect these sites.</li> </ul>
Road, old field, and wetland	Identify and Control Invasive Species	<ul style="list-style-type: none"> <li>• Spring 2008. Identify and map the locations of invasive species.</li> <li>• 2008-2009: Work with a licensed herbicide applicator to control invasive shrubs. Use low-toxicity herbicides and individual stem treatments whenever possible to minimize use (see Section III).</li> <li>• Explore the use of parasitic beetles to control Purple Loosestrife in Whiskeag Creek.</li> </ul>
All	Increase the wildlife and biodiversity benefits of wildlife trees and downed woody material.	<ul style="list-style-type: none"> <li>• Retain snags, cavity trees, and other wildlife trees during harvest operations, recruit future wildlife trees, and protect fallen logs (see Section III).</li> </ul>
All	Minimize the impacts of climate change on biological diversity.	<ul style="list-style-type: none"> <li>• Maintain species diversity within stands, including those species such as red oak, white oak, shagbarks hickory, white pine and red maple that are adapted to a warmer climate.</li> </ul>
All	Develop and implement a recreation plan	<ul style="list-style-type: none"> <li>• By Summer 2008: develop a recreation use plan that is minimizes wildlife impacts. Trail planning should use the recommended Recreation Use practices in Section III to minimize ecological impacts.</li> <li>• Monitor and control camping and campfires</li> </ul>
All	Provide educational opportunities.	<ul style="list-style-type: none"> <li>• By 2009: develop an education plan to involve local schools and community members.</li> </ul>
All	Monitor the Preserve	<ul style="list-style-type: none"> <li>• Implement Monitoring Plan (see Section V)</li> </ul>





### III. Focus Species Forestry

#### ***Introduction to Focus Species Forestry***

Focus Species Forestry is a method to simplify the task of integrating timber management with conservation of biological diversity. It accomplishes this by identifying and managing for a few *Focus Species* whose habitat needs cover those of many other species and by ensuring that known rare species habitat or exemplary natural plant communities are conserved. Details of this approach are outlined in the forest management handbook *Focus Species Forestry, a Guide to Integrating Timber and Biodiversity Management in Maine* which was published by Maine Audubon in partnership with the Maine Forest Service, Maine Natural Areas Program, Professional Logging Contractors of Maine, and the Small Woodland Owners of Maine.

A group of focus species has been identified for Maine's major commercial forest types. This approach helps forest managers and owners develop habitat targets for specific species, like the fisher and snowshoe hare, that are associated with Maine's most common forest types. By providing adequate habitat for a suite of focus species that represent the range of habitats and forest development stages in the region, many other components of biodiversity will benefit as well. See the following sections and the appendices for more details.

<b>Overview of Habitat Types and Species Groups for Focus Species Forestry in Maine</b>	
<b>Habitat Type</b>	<b>Examples of Focus Species</b>
Early-successional Forest	Ruffed grouse, chestnut-sided warbler
Large areas of older Intermediate and Ecologically Mature Forest	Northern goshawk, wood and hermit thrush, fisher and marten
Late-successional Forest	Certain lichens
Riparian Management Areas	Beaver, brook trout, dusky salamander
Vernal Pools	Spotted salamander, wood frog
Dead and Decaying Wood and Tree Cavities	Pileated woodpecker, barred owl
Other Special-value Habitats	Important wildlife and plant habitats mapped by the Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program.

On large ownerships the goal would be to provide all of these habitat types. On small ownerships it may not be possible to provide habitat for both young and mature-forest species. The goal should be to 1) protect the values associated with unique and/or special value habitats such as late successional forest, vernal pools, riparian areas, dead and decaying wood and known special value habitats and 2) consider the character of the surrounding landscape while deciding on management for young and old forest habitat. For example, if young forest is lacking in the area, a goal might be to create some patches of young forest habitat. The character of the existing forest and other landowner objectives will also play an important role. A general approach suitable to many small ownerships is to manage primarily for mature-forest character while occasionally making small openings in the forest (1/10 to 1/2 acre or more) that will provide patches of early-successional habitat.

Focus Species Forestry classifies the Maine forest into six broad Forest Ecosystem types and two commonly found special habitats as shown in the following table. As used in Focus Species Forestry, a **Forest Ecosystem** is a broad group of related forest plant communities. A forester may assign one or more forest plant cover types to each of the broad Forest Ecosystem groups.

Maine Forest Ecosystem and Special Habitats for Focus Species Forestry			
Focus Species Habitat Classification	Description	Butler Head	Whiskeag Woods
Aspen-Birch	Aspen and/or paper birch are the dominant species. Typically develops in small to large patches (up to several hundred acres) after heavy disturbance (fire or clearcutting). Early successional, often followed by one of the other types listed below.		
Northern Hardwoods	Various mixes of sugar maple, beech and yellow birch are dominant; mixedwood stands may include up to 50% hemlock, red spruce, or balsam fir. In northern New England is typically a "matrix" forming ecosystem that covers large areas of the landscape where better soils are found.	✓	✓
Oak-Pine	Includes stands ranging from pure oak to pure white pine as well as mixes with red maple, hemlock, or northern hardwoods. This is the dominant matrix forming ecosystem in southern Maine and central/southern New England.	✓	✓
Hemlock	Stands with >50% hemlock dominance; often an inclusion within larger matrix forming forest plant communities.	✓	✓
Spruce-Fir	Stands ranging from pure red spruce to pure balsam fir, sometimes with a significant white pine, hemlock, or hardwood component. Matrix-forming ecosystem in northern New England on cool, moist, and /or lower-fertility sites.		
Northern White Cedar	Includes both northern white cedar swamps found in level basins or cedar-spruce seepage forests on gentle slopes.	✓	
Special-value Habitats			
Riparian and Wetland Forest	Forest areas bordering intermittent and perennial streams, rivers, lakes and coastal waters as well as wetland forests.	✓	✓
Vernal Pool	Fishless seasonal pools or small ponds that provide breeding habitat for wood frogs, yellow or blue-spotted salamanders, or fairy shrimp.		?

In addition to ecosystem type, the relative age or "development stage" of a forest plays a major role in the types of wildlife and other components of biodiversity that are found there. After a severe stand-replacing disturbance such as fire or heavy harvesting, forests typically undergo a somewhat predictable pattern of stand development stages that begins with small seedlings and, absent another severe disturbance, culminates in old growth after 150 or more years. A heavy harvest can set the forest back to an earlier development stage, while a light harvest can be used to maintain the current development stage, allow the most desirable trees to grow, and allow the stand to move to a more mature stage.

Different wildlife species favor different development stages. Many of the species targeted by focus species management can be grouped into those that inhabit young forests—seedling and sapling stands—or those that inhabit relatively mature, mature, or late-successional forests (see the table "*Overview of Habitat Types and Species Groups for Focus Species Forestry in Maine*", above). While most plants and animals in the northeast seem to be found in either young or mature forests, research has found that several species of lichens are associated with late-successional or old-growth forests. Stand development stages are shown in the following table.

Stand Development Stage <sup>1</sup>		Typical characteristics <sup>2</sup>
Early Successional	Regeneration and Seedlings	Trees >1 inch DBH. Typically 0-10 years.
	Saplings and Small Poles	<ul style="list-style-type: none"> <li>Trees 1-5 inches DBH occupy more of the forest than smaller or larger trees.</li> <li>Typically 10-30 years old.</li> </ul>
Intermediate		<ul style="list-style-type: none"> <li>Trees 5-12 inches DBH (5-9 inches for spruce-fir) occupy more of the forest than other sizes.</li> <li>Proportion of stocking typically in trees 30-70 years old.</li> </ul>
Ecologically Mature		<ul style="list-style-type: none"> <li>Trees &gt; 12 in DBH (&gt;9 inches for spruce-fir) occupy more of the forest than other sizes., but not meeting the definition of "late successional."</li> <li>Overstory typically 70-100+ years depending on forest type.</li> </ul>
Late-Successional		<ul style="list-style-type: none"> <li>Trees &gt; 16 inches DBH (&gt; 12 inches for spruce-fir) occupy more of the forest than other size classes.</li> <li>Large dead and downed wood accumulating.</li> <li>Transition from mature to late successional is generally in the 100-125-year age range.</li> </ul>
Old-Growth		<ul style="list-style-type: none"> <li>Generally &gt;150 years old.</li> </ul>

<sup>1</sup> Foresters and other land managers should refer to the Focus Species Forestry guidebook for technical specifications of these stages.

<sup>2</sup> DBH: diameter at breast height (4.5 ft.). Diameters and ages are general guidelines only and will vary based on site characteristics, stand history, and forest type.



**Stand Development Stages** (clockwise from above): Early successional- sapling resulting from natural canopy gap (Whiskey Creek); Intermediate Northern Hardwoods (Butler Head Stand #3); Mature Pine-Hemlock (Butler head, Stand # 12)

## Overview of Current Forest Conditions

### Butler Head

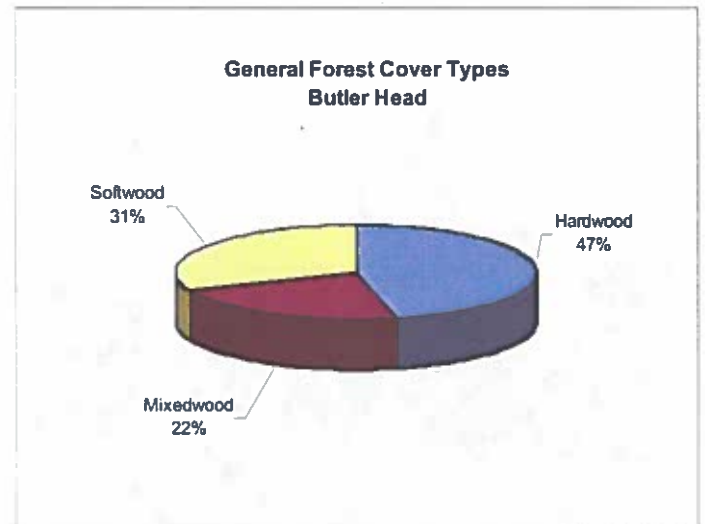
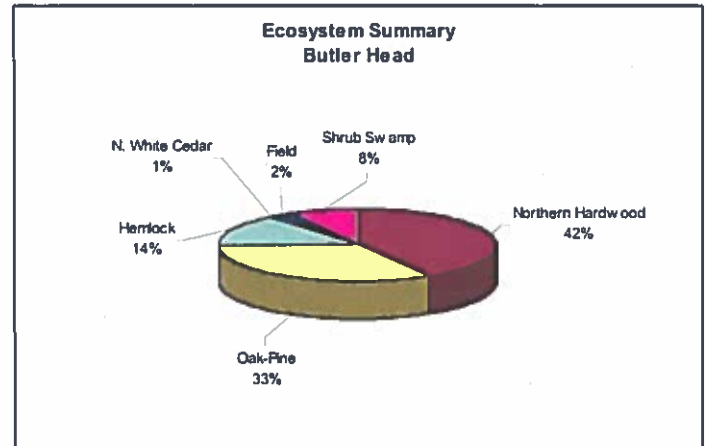
#### Ecosystem Summary

Mixed northern hardwoods including sugar maple, red maple, white birch, ash, and beech along with red oak and mixed softwoods are found on much of the Preserve.

The oak pine type includes mixtures of red oak, white pine, red maple, white birch and hemlock. Some areas are dominated by oak, while others are dominated by white pine with lesser amounts of hardwood species.

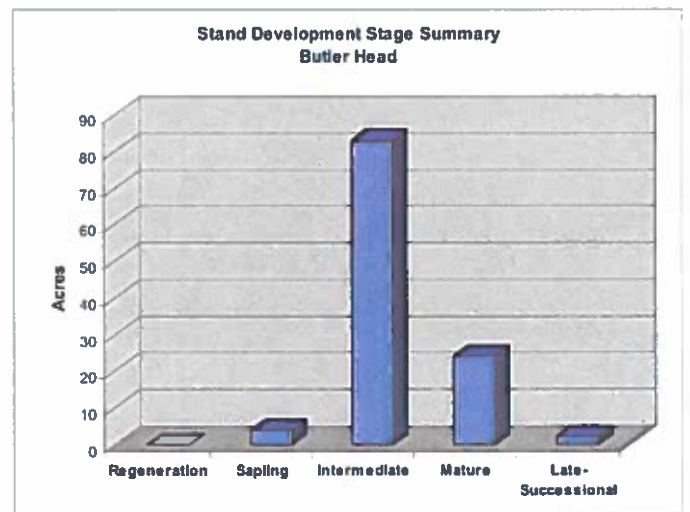
The hemlock type includes a significant white pine component and may be mixed with hardwood species.

The shrub swamp south of Butler Cove provides an important element of habitat diversity for species such as common yellowthroat and alder flycatcher.



#### Stand Development Stages

The intermediate development stage dominates the forested areas of the preserve (see figure) in approximately equal portions. The intermediate stands are maturing and therefore provide some older-forest values. The only sapling stand is located to the east of the swamp. When this stand matures there will be little or no habitat for early successional species such as ruffed grouse, snowshoe hare, or chestnut sided warbler.

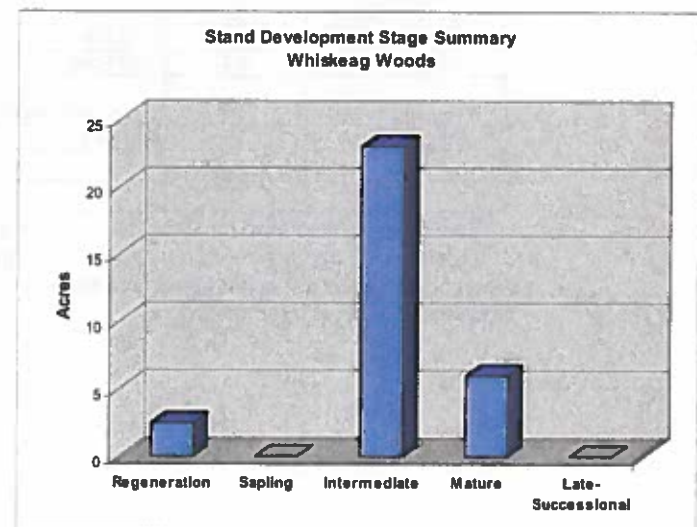
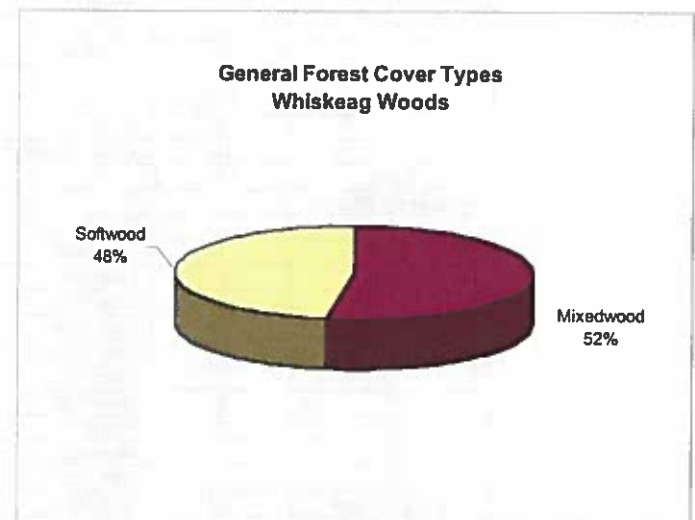
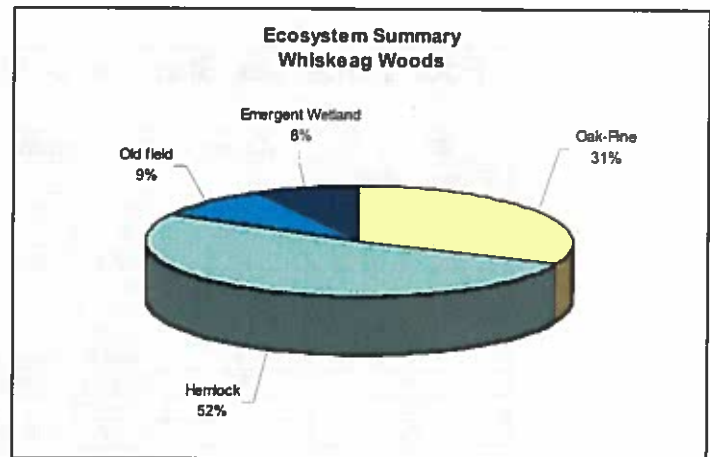


## Whiskeag Woods

Hemlock and white pine dominate the forested communities on this woodlot. Other species include red oak, beech, red maple, and white birch. In addition, there are areas of regenerating old field with goldenrods, shrubs, saplings and small trees. While small in area, these "edge" habitats provide value for migratory songbirds such as the redstart and yellow warbler. Over time these will develop into forested areas.

Conifers dominate both the softwood stands and the mixedwood stands. Hemlock is dominant in most stands, with large white pine being found in Stands 1, 5, and 4a (see Timber Stand Map, Section XX). The prevalence of hemlock suggests that much of this forest may never have been completely cleared for pasture

The stand development stage profile reflects of Whiskeag Woods is similar to that of Butler Head, reflecting a similar land use history. Stumps show evidence of a relatively recent harvest, (within 20 years), and the large area in the intermediate developments stage indicates a relatively heavy harvest approximately 40 years ago.



## Forest Ecosystem Summary Table

Focus Species Stand and Ecosystem Summary Table			
Stand <sup>1</sup>	Acres	Ecosystem <sup>2</sup>	Development Stage
<b>Butler Head</b>			
1	4	Northern Hardwoods	Sapling
2	10	Oak-Pine	Intermediate
3	20	Northern Hardwoods	Intermediate
4	2	Oak -Pine	Late successional
5	10	Northern Hardwoods	Intermediate
6	5	Oak-Pine	Intermediate/mature
7	3	Talus/Northern Hardwoods	Mature
8	16	Northern Hardwoods	Intermediate
8a	2	Oak-Pine	Mature
8b	1	Northern white Cedar	Intermediate
9	16	Hemlock	Intermediate/mature
10	13	Oak-Pine	Intermediate
11	4	Hemlock	Intermediate/mature
12	8	Hemlock	Mature
13	9	Hemlock	Mature
<b>Productive Forest Subtotal</b>	<b>123</b>		
	3	Field	
	10	Shrub Swamp	
<b>Total</b>	<b>136</b>		
<b>Whiskeag Woods</b>			
1	1	Oak-Pine	Mature
2	1	Hemlock	Mature
3	1	Hemlock	Intermediate
4	6	Oak-Pine	Intermediate
4a	2	Oak-Pine	Mature
5	2	Oak-Pine	Mature
6	5	Hemlock	Intermediate
7	3	Hemlock	Intermediate
8	4	Hemlock	Intermediate
9	3	Hemlock	Intermediate
9a	1	Hemlock	Intermediate
<b>Tower Ridge</b>	<b>3.7</b>	<b>Oak-Pine</b>	<b>Intermediate</b>
<b>Productive Forest Subtotal</b>	<b>32</b>		
<b>Power Line</b>	<b>0.7</b>	<b>Old Field</b>	<b>Early Successional</b>
<b>Forest Edge</b>	<b>2.4</b>	<b>Old Field</b>	<b>Early Successional</b>
<b>Whiskeag Creek</b>	<b>0.9</b>	<b>Emergent Wetland</b>	<b>-----</b>
<b>Public Works</b>	<b>15</b>	<b>Developed</b>	<b>-----</b>
<b>Total</b>	<b>52</b>		

<sup>1</sup> See Timber Stand Map for stand locations. Non-forest habitats are identified on the Habitat Map

<sup>2</sup> Tree species may vary within a given Focus Species Forestry Ecosystem types (see descriptions in preceding section). Timber stand type maps and descriptions are customized to the property and provide additional species information.

## **Landscape and Watershed Perspective**

When managing for biodiversity, it is important to consider the how the forest influences and is influenced by the surrounding landscape. This may be important for species that are associated with large blocks of forest and use the property as part of their overall territory and when considering unique habitats that may be present on the forest that are not found elsewhere on the landscape.

### **Butler Head**

Butler Head Preserve forms the core of one a mid-sized forest block of over 300 acres. This sized forest can provide habitat for species such as barred owl, fisher, wood thrush, and migratory woods warblers that are found in relatively unfragmented forest. The undeveloped shoreland provides an important buffer for waterfowl and wading birds habitat identified by the Maine Department of Inland Fisheries and Wildlife (MDIFW) adjacent to the property in Merrymeeting Bay.

### **Whiskeag Woods**

Whiskeag Woods is part of the largest patch of forest in the area formed between RT. 1, Whiskeag Creek, Whiskeag Road, and the Kennebec River. It is close to the urban area of Bath, but also is close to conservation lands on Thorne Head, the open space provided by the cemeteries to the south, and a large forest block west of Whiskeag Creek. Species with smaller home ranges such as porcupine, red squirrel, red fox may be found here. Whiskeag Woods borders high value inland wading bird and waterfowl habitat identified by MDIFW.



*Both Butler Head and Whiskeag Woods contribute to important wildlife habitat at the landscape scale and buffer high-value waterfowl and waterbird habitat.*

## Wildlife Observations

Because Focus Species Forestry is a habitat-based approach to ecosystem management, formal wildlife surveys are not part the standard protocol. However, informal observations recorded while visiting the forest and reconnaissance-level surveys (those not designed to provide population estimates) such example, winter tracking, Christmas bird counts, spring breeding bird counts, owl surveys, etc. can add useful information for management planning.

Because the avian observations at Butler Head were recoded well into the breeding season, these observations are indicative of some the species that nest at Butler Head. Of particular interest are species associated with medium to large-sized forest blocks, such as hermit thrush, black-throated blue warbler, black-throated green warbler, black and white warbler, and scarlet tanager. Also of interest was the relative lack of deer tracks (2 deer) after several days of snow cover. This may reflect the limited amount of woody browse in this closed canopy forest.

Only a few mammals tracks were observed at Whiskeag Woods. It is likely that a spring breeding bird survey would reveal many species associated with small forest patches and forest edges. Volunteer monitoring to identify breeding species is recommended.

Tom Barrington from the Department of Cemeteries and Parks has compiled bird and plant lists from a variety of individuals and groups for Butler Head. In the future it would be helpful to identify which species appear to be breeding on the properties, those that are year-round residents, and those that are only observed during migration. As of 2003 112 species had been observed at Butler Head. Of those, 52 species are likely breeders. Of those, over 45 are likely to occur in the forest or at forest edges.

Incidental Wildlife Observations <sup>1</sup>	
Butler Head	Whiskeag Woods
<b>6/29/07</b> Hermit thrush Red-eyed vireo Blue jay Hairy woodpecker Black-throated blue warbler Black-throated green warbler Black and white warbler Pine warbler Ovenbird Scarlet tanager  <b>12/7/07 (tracks, snow)</b> Gray squirrel Eastern coyote Porcupine Fisher White-tailed deer  <b>Other<sup>2</sup></b> Osprey Pileated woodpecker Ruffed grouse Wild Turkey Unidentified hawks and waterfowl	<b>12/07/07 (tracks, snow)</b> Red fox Red squirrel Porcupine Mouse
<sup>1</sup> Observations were recorded during a general reconnaissance of the forest and were not part a formal wildlife survey. Additional volunteer wildlife monitoring is recommended. <sup>3</sup> Additional species/sign observed by W. Armstrong during the forest inventory. See also Butler Head Bird List compiled by Tom Barrington.	

## Management Recommendations for Wildlife and Other Biodiversity

This section establishes property wide objectives and recommends practices to manage the forest to benefit wildlife and other biodiversity. Section IV describes how these practices would be implemented within in the specific compartments on the forest.

### Focus Species

A suite of focus species was identified to frame the overall approach to forest management and specific stand management recommendations consistent with the City's objectives summarized above. These include species associated with mature forests, early successional forest species, riparian species, and species associated with dead and decaying wood.

Focus Species Forestry utilizes up to 25 focus species to help guide forest management. To simplify this approach for this plan, a "short list" of species associated with the different desired stand development stages desired for the forest is shown in following Focus Species Summary Table.



Habitat management for a suite of focus species will benefit a wide range of wildlife and other native forest biodiversity. This suite includes ruffed grouse (early successional forest), fisher (olde- intermediate and mature forest) and pileated woodpecker (large cavity nest trees and decaying wood)



**Focus Species Summary Table and General Habitat Recommendations – Butler Head**

Dev. Stage	Focus Species	Forest Ecosystems and Special Habitats								Habitat Observations and Recommendations
		A-B	NH	O-P	HE	S-F	NWC	R&W	VP	
			42%	33%	14%		1%	%		
Early Succession	Ruffed Grouse, Chestnut Sided Warbler		C/D	P						Only 4% of the Butler Head forest is in early successional habitat. As other stands mature and regeneration becomes more objective, consider creating some small patches of (1/2-2 acres) of early successional habitat (for example, by using the "large group selection" method). Stand 4, which consists of 10 acres of low-grade pine and hardwood, could be managed for early successional habitat over the long term by clearcutting 1/4 to 1/3 of the area every 10-15 years. Without focused management early successional habitat will be lost. This habitat type is declining in the region. This would enhance habitat diversity wildlife observation opportunities but would conflict with users who prefer mature-forest conditions with less evidence of management.
	Snowshoe Hare		C/D	P	P		C			
Mature	Fisher		C	C	C		C			Less than 21% of the property is in the development stage and an additional 2% is late successional. 73% of the stands are in the intermediate stage and these are beginning to contribute to mature-forest values. Promoting multi-aged stands through careful, long-term management will eventually lead to the forest dominated by mature and potentially late-successional stands, elements that are under-represented on the woodlots and uncommon regionally. Management for large cavity trees and downed wood in addition to large healthy trees will benefit pileated woodpeckers and many other species associated with dead and decaying wood. Thinning even-aged stands can be used to promote the growth of desirable trees or aesthetic or timber production purposes. Over the long-term uneven-aged management can be used to stimulate understory regeneration and multiple canopy layers for wildlife. For aesthetic and scientific purposes the City may wish to identify some no-harvest reserve areas along with managed forest zones. At the landscape scale, the forest is located in a medium-sized forest block that provides important wildlife habitat for area-dependent species such as hermit thrush and black-throated blue warbler.
	Pileated Woodpecker		C	C	C		C	C		
	Barred owl		C	C	C		C	C		
	Black-throated Blue Warbler		C	C	C					
	Hermit Thrush		C	C			C			
LS	Late-successional Species		F	F	C		F			A 250-foot riparian management zone is recommended along the shoreline of Merrymeeting Bay. See the <i>Riparian and Wetland Habitats</i> section for management recommendations.
Other	Waterfowl and wading birds							C		
Legend	Habitat Key	Butler Head includes a 10-acre shrub swamp and a 3-acre field (old sand pit) and is adjacent to high value tidal waterfowl and wading bird habitat.								Maintain the field with periodic mowing.
	Focus Species	A-B: Aspen-Birch; NH: Northern hardwoods; O-P: Oak-Pine; HE: Hemlock; S-F: Spruce-Fir; NWC: Northern White Cedar; R&W: Riparian and Wetland; VP: Vernal Pool. C: currently present or potentially present as indicated by habitat; F: Future, through long-term habitat management; P: Potentially present if targeted management actions taken by landowner. D – may decline if habitat management not implemented Management for Focus Species will benefit other species and ecological conditions associated with these ecosystem types and development stages.								

**Focus Species Summary Table and General Habitat Recommendations – Whiskeag Woods**

Dev. Stage	Focus Species	Forest Ecosystems and Special Habitats									Habitat Observations and Recommendations
		A-B	NH	O-P	HE	S-F	NW C	R&W	VP		
				31%	52%						
Early Succession	Yellow Warbler			C/ D						The early successional habitat consists of three small patches along the edge of the Public Works area and Fire Department training area. Because of the small size of this lot and its high value as a recreational parcel, early successional habitat should be a low priority on this tract. However, Stand 4, which consists of 10-acres of low-grade pine and hardwood, could provide early-successional habitat if the City desires to regenerate the stand to improve timber quality. As other stands mature and regeneration becomes an objective, consider creating some a few small patches of (1/4 to 1/2 acres) of early successional habitat on the (for example, by using the "large group selection" method). An example of a natural gap of this size with abundant regeneration can be seen on the ridge. This would enhance habitat diversity wildlife observation opportunities but would conflict with users who prefer mature-forest conditions with less evidence of management.	
	Song Sparrow			C/ D							
Mature	Pileated Woodpecker			C	C			C		Less than 21% of the property is in the development stage and an additional 2% is late successional. 73% of the stands are in the intermediate stage and these are beginning to contribute to mature-forest values. Promoting multi-aged stands through careful, long-term management will eventually lead to the forest dominated by mature and potentially late-successional stands, elements that are under-represented on the woodlots and uncommon regionally. Management for large cavity trees and downed wood in addition to large healthy trees will benefit pileated woodpeckers and many other species associated with dead and decaying wood. Thinning even-aged stands can be used to promote the growth of desirable trees or aesthetic or timber production purposes. Over the long-term uneven-aged management can be used to stimulate understory regeneration and multiple canopy layers for wildlife. For aesthetic and scientific purposes the City may wish to identify some no-harvest reserve areas along with managed forest zones. At the landscape scale, the forest is located in a small forest block that provides habitat benefits for species at the fringe of the City's urban core. Additional volunteer monitoring would be desirable to identify breeding birds	
	Barred owl			C	C			C			
	Black-throated Green Warbler										
	Hermit Thrush			C?							
LS	Late-successional Species			F	F						
Rip- arian	Waterfowl and wading birds							C		A 250-foot riparian management zone is recommended along the shoreline of Merrymeeting Bay. See the <i>Riparian and Wetland Habitats</i> section for management recommendations.	
Other		9% of the area is in emergent wetland habitat and 8% is a mixture of old field/early successional habitat.								Maintain the field with periodic mowing.	
Legend	Habitat Key	A-B: Aspen-Birch; NH: Northern hardwoods; O-P: Oak-Pine; HE: Hemlock; S-F: Spruce-Fir; NWC: Northern White Cedar; R&W: Riparian and Wetland; VP: Vernal Pool.									
	Focus Species	C: currently present or potentially present as indicated by habitat; F: Future, through long-term habitat management; P: Potentially present if targeted management actions taken by landowner. D – may decline if habitat management not implemented Management for Focus Species will benefit other species and ecological conditions associated with these ecosystem types and development stages.									

## **Management Recommendations to Reach Desired Future Conditions**

### **Butler Head**

As the following table indicates, the current condition of the forest is strongly skewed toward the intermediate development stages. To increase habitat diversity over time and provide habitat for both the early successional and mature forest Focus Species listed in the previous section, the long term objectives should be to:

1. increase the area in mature stands by careful tending of intermediate stands,
2. allow portions of some mature stands to develop into a late-successional condition, and
3. periodically regenerate some stands to a continual supply of early successional (regeneration and sapling) habitat.

Habitat needs for species listed in the Focus Species Summary Table are proposed as quantitative objectives for each development stage in the following table.

<b>Current and Desired Future Development Stage Goals – Butler Head</b>			
<b>Forest Development Stage</b>	<b>2006 Current (%)</b>	<b>Long-Term (50+ years) Goal (%)</b>	<b>Comment</b>
<b>Regeneration, Saplings, and Small Poles</b>	4	10-20	The general goal is to increase the area in older, multi-aged stands while maintaining some early-successional habitat. Long-term goals are rough targets only and should be modified in the future based on current property and landscape conditions.
<b>Intermediate</b>	73	30-50	
<b>Ecologically Mature</b>	21	25-35	
<b>Late Successional</b>	2	≥10	

### **Whiskeag Woods**

As the following table indicates, the current condition of the forest is strongly skewed toward the intermediate development stages. To increase habitat diversity over time and provide habitat for both the early successional and mature forest Focus Species listed in the previous section, the long term objectives should be to:

4. increase the area in mature stands by careful tending of intermediate stands,
5. allow portions of some mature stands to develop into a late-successional condition, and
6. periodically regenerate some stands to a continual supply of early successional (regeneration and sapling) habitat.

Habitat needs for species listed in the Focus Species Summary Table are proposed as quantitative objectives for each development stage in the following table.

### Current and Desired Future Development Stage Goals- Whiskeag Woods

Forest Development Stage	2006 Current (%)	Long-Term (50+ years) Goal (%)	Comment
Regeneration, Saplings, and Small Poles	8	<10	The general goal is to manage most of the area for multi-aged, mature and late-successional stands. Once stands reach this condition they can be maintained with uneven-aged management practices. Long-term goals are rough targets only and should be modified in the future based on current property and landscape conditions.
Intermediate	73	<20	
Ecologically Mature	19	50-60	
Late Successional	0	≥20	



*Much of Whiskeag Woods is characterized by stands in the intermediate development stage. Dense competition (background) results in trees with small crowns and little understory development. Harvesting can be used to thin around desirable trees and to create gaps in the canopy that will encourage growth on the forest floor. Over time this approach will result in an increase in the area in mature stands as well as increased plant and wildlife diversity due to multiple canopy layers and varied light conditions.*

## **Rare Species, Natural Communities, and Significant Wildlife Habitat**

The Maine Department of Inland Fisheries and Wildlife and Maine Natural Areas Program provided information on wildlife and plant habitats of concern. This information and larger-scale maps can also be found in the City's *Beginning with Habitat* report.

### **Butler Head**

#### **Current Conditions**

MDIFW has identified the waters adjacent to the Preserve as high-value tidal waterfowl and wading bird habitat. The Maine Natural Areas Program report shows that rare intertidal plants have also been found in several of the coves adjacent to the Preserve. See the Appendices for additional details.

#### **Recommendations**

To protect these sensitive aquatic habitats the objective is to maintain an intact forest buffer and minimize soil disturbance that could impact water quality. Forest management within 250 ft. of the shoreline should conform to the Riparian and Shoreland Guidelines (see below) as well as the City's current Shoreland Zoning standard.

### **Whiskeag Woods**

#### **Current Conditions**

MDIFW has identified the waters adjacent to Whiskeag Woods as high-value inland waterfowl and wading bird habitat. See Appendices for additional details.

#### **Recommendations**

To protect these sensitive aquatic habitats the objective is to maintain an intact forest buffer and minimize soil disturbance that could impact water quality. Forest management within 250 ft. of the shoreline should conform to the Riparian and Shoreland Guidelines (see below) as well as the City's current Shoreland Zoning standard.

## Wildlife Trees and Retention Patches

### Identification and Ecological Significance

Wildlife trees include:

- **Snags:** Dead standing trees,
- **Cavity or den trees:** Live trees with nesting cavities or mammal dens.
- **Recruitment trees:** Large live tree that will be permanently retained (i.e., will never be harvested) and will eventually contribute to the snag, cavity tree, and downed woody material pools) for wildlife and biodiversity benefits. Typically these are large trees with significant decay or other cull defect, or beech with evidence of bear use.

**Downed Woody Material** includes fallen tree stems and branches.

**Retention Patches** are areas of roughly ¼ acre or larger that are reserved from harvesting, or managed with light thinning to maintain the overstory, in single cohort and two cohort (clearcut and/or shelterwood) silvicultural operations.

Wildlife trees and downed woody material are recognized for their value to vertebrate wildlife (e.g., woodpeckers, marten, wood ducks, and salamanders), insects, and fungi and for their role in the cycling of nutrients and organic matter in the forest. All sizes provide value, but large wildlife trees (> 16 inches) are required by species such as barred owl and wood duck. The value of downed woody material also increases with size.

Retention patches are important to retain a habitat “lifeboat” for species with low mobility (e.g., understory herbs, lichens, mosses and liverworts) whose habitat would be eliminated by even-aged management practices that clear most vegetation when regenerating the forest. Retention patches over one acre in size have the best temperature, humidity, and light conditions for retaining understory plants.

### Current Conditions

There has been no systematic inventory of wildlife trees or downed woody material. General observations during the field reconnaissance indicate that levels of both are low, which is typical of forests in intermediate development stages.



*Pileated Woodpecker Feeding Cavity in Northern White Cedar. Pileated woodpeckers prefer cavity trees over 16 inches in diameter for nesting. Retaining and growing large cavity trees will benefit many other species that use cavities such as wood ducks and barred owls.*

## Wildlife Tree and Retention Patch Guidelines

Implementation of these guidelines is the responsibility of the forester. However, loggers must be allowed the discretion to fell and tree that they consider to a hazard, in accordance with their safety guidelines.

When developing a recreational trail system, the City should also consider how to manage risks from trees and other potential hazards near trails. Because the focus of this plan is on forest ecosystem management and does not include a recreation plan, specific recreation trail risk management recommendations are not included here.

<b>Wildlife Tree Guidelines</b>	
<b>Dead Snags</b>	<ul style="list-style-type: none"><li>• All dead snags &gt;12" DBH should be considered for retention. Retain smaller snags if larger diameters are not present.</li><li>• Under conditions where hand crews are operating, snags that represent a hazard should be felled at the logging contractor's discretion as needed to comply with safety guidelines.</li><li>• Felled snags should be left in place.</li></ul>
<b>Live Cavity Trees and Recruitment Trees</b>	<ul style="list-style-type: none"><li>• The general guideline is:<ul style="list-style-type: none"><li>◦ Four trees per acre &gt;12" DBH, including one &gt;18" DBH.</li></ul></li><li>• Select cavity trees first, if present, and then use recruitment trees to meet the guideline as needed.</li><li>• All live cavity trees with evidence of advanced decay and signs of use by wildlife should be considered for retention. Cavity trees (&lt;12" DBH) may be removed from the stand unless there are not enough larger trees to meet the objective.</li><li>• Trees suitable for consideration as recruitment trees include live pulpwood-quality trees of large diameter (&gt;14" DBH) with evidence of interior defect and decay. Yellow birch and aspen with broken tops and maples with dead limbs in the lower crown are good candidates for consideration. Larger is better.</li><li>• When possible, avoid timber harvesting from April through mid July to avoid disrupting nesting birds and denning animals.</li><li>• Place a high priority on retaining cavity trees and recruitment trees in shoreland areas because of their value to cavity-nesting ducks.</li></ul>
<b>Downed and Dead Woody Debris</b>	<ul style="list-style-type: none"><li>• Avoid damaging existing downed woody material during harvesting, especially large (12"+) logs and stumps.</li><li>• Leave downed woody material on site after harvest operations where possible.</li><li>• Attempt to leave large (&gt;12 inch DBH and &gt; 6 feet long) cull logs on site. Culls bucked out at the landing should be hauled back in the woods.</li></ul>

***CAUTION! Dead and decaying trees are very dangerous, and loggers may need to fell them to comply with safety policies. If so, they should be left on the ground to provide habitat.***

## **Riparian and Wetland Habitats**

### **Identification and Ecological Significance**

Riparian areas are areas that are influenced by, and that influence, aquatic habitats. Over 60 wildlife species in Maine are dependent on riparian habitats for part of their life cycle, and many other are frequently found in riparian habitats. Riparian area include areas subject to Shoreland Zoning as well as areas near small and unmapped stream or small wetlands that may not subject to Maine's Shoreland Zoning law.

### **Current Conditions**

#### **Butler Head**

- The riparian areas along Merrymeeting Bay provide important habitat values and buffer the adjacent wading bird and waterfowl habitat.
- The area adjacent to the large shrub swamp south of Butler Cove also provide riparian values.

#### **Whiskeag Woods**

- The riparian areas along Whiskeag Creek provide important habitat values and buffer the adjacent wading bird and waterfowl habitat. Parts of the trail and fishing access points suffer from soil compaction due to high use.
- A seasonally-intermittent stream is found in the "ravine" (Stand 5) and the emergent wetland swale located immediately west of the compost piles and fire training facility (see Habitat Map).
- Stand 6 includes a forested wetland with seasonal standing water. This site should be monitored in the spring for vernal pool species.

### **Recommendations**

<b>Riparian and Shoreland Harvesting Guidelines</b>	
<b>Distance from Normal High Water</b>	<b>Guidelines</b>
<b>Merrymeeting Bay and Whiskeag Creek Shoreland Zones</b>	
0-25 ft.	<ul style="list-style-type: none"><li>• No harvest</li></ul>
25-100 ft.	<ul style="list-style-type: none"><li>• Maintain a multi-aged forest with minimum basal area of 60-80 sq. ft (hardwoods) or 100-120 square feet (softwoods).</li><li>• Maximize retention and recruitment of snags and cavity trees.</li><li>• When harvesting, do not locate collector skid trails or expose mineral soils in this zone.</li></ul>
100-250 ft.	<ul style="list-style-type: none"><li>• Maintain a multi-aged, mature forest with canopy openings &lt;10,000 sq. ft.</li></ul>
0-250 ft.	<ul style="list-style-type: none"><li>• Canopy removals not to exceed 40% in any 10 year period and otherwise meet City Shoreland Zoning Standards.</li></ul>
0-500 ft.	<ul style="list-style-type: none"><li>• Maintain a minimum of 6 super-story white pines (pines that extend 25 ft. or more above the forest canopy) per mile of mainland shoreline area for bald eagle nesting and</li></ul>

	roosting. Trees on the immediate shoreline have the highest value as "loafing" sites.
<b>Other Streams and Wetlands</b>	
0-75 ft.	Apply the General Recommendations (below)
<b>General Recommendations (all applicable areas)</b>	
	<ul style="list-style-type: none"> <li>✓ Check to ensure that proposed activity is in conformance with DEP and City standards.</li> <li>✓ Always apply appropriate <b>Best Management Practices</b><sup>2</sup> to control erosion and sediment. To protect water quality, BMP implementation on roads and trails will extend well beyond the riparian zone.</li> <li>✓ Avoid stream crossings if possible. <ul style="list-style-type: none"> <li>• Winter crossings: permitted when stream and approach soils are frozen.</li> <li>• Summer crossings: skidder bridge preferred; hard bottom ford if channel and stream bank integrity can be maintained.<sup>3</sup></li> </ul> </li> <li>✓ Minimize rutting in wet soils.</li> <li>✓ Manage for large snags, cavity trees, and downed woody material.</li> <li>✓ When winter harvests are planned flag small streams and sensitive sites prior to snowfall.</li> </ul>



*Both Butler Head and Whiskeag Woods are adjacent to high-value wading bird and waterfowl habitat identified by MDIFW. Maintaining water quality, providing a disturbance buffer, and managing for large nest and cavity trees are some of the key objectives of shoreland habitat management.*

<sup>2</sup> *Best Management Practices for Forestry: Protecting Maine's Water Quality.* Department of Conservation, Maine Forest Service, 22 SHS, Augusta, ME 1-800-367-0223

<sup>3</sup> Portable skidder bridges are preferred for crossing streams and wet drainages.

## **Vernal Pools**

### **Identification and Ecological Significance**

Vernal pools are small, fishless ponds that provide breeding habitat for a unique group of amphibians and invertebrates, including spotted and blue spotted salamander, four-toed salamander, wood frog, and fairy shrimp. Vernal pools are best identified in spring when breeding adults and/or eggs are present. By mid or late summer they are frequently dry.

### **Current Conditions**

No vernal pools are known to exist on either property, but a thorough survey has not been undertaken. At Whiskeag Creek a wet area near the south end of stand 6 has seasonal standing water and may provide habitat for vernal pool species.

### **Recommendation**

A vernal pool and amphibian breeding survey should be undertaken at Whiskeag Creek in the wet area at Whiskeag Creek referenced in the preceding paragraph<sup>4</sup>. If present, recommendations in the *Focus Species Forestry* guide should be used when conducting timber harvest operations.

## **Invasive Plants**

### **Identification and Ecological Significance**

Invasive exotic plants have been recognized as a serious threat to many forest ecosystems in the Northeast. Several species of exotic shrubs found in Maine's forests can displace native understory plant species and prevent or severely limit the regeneration of trees, thereby affecting the long-term composition and integrity of the forest. The most problematic invasive species include three honeysuckles, two buckthorn species, Japanese barberry, and Asiatic bittersweet (see Appendices).

### **Current Conditions**

A thorough invasive plant search has not been undertaken. However, during the field reconnaissance and timber cruise invasive species were observed on both properties (see Habitat Maps). Forest/edge invasive species are currently found in only a few areas and at low densities.

**Butler Head.** Japanese barberry was observed on Butler Head Road and near the field (old sand pit). Burning bush was observed in Stand 1. Purple loosestrife was observed in the shrub swamp.

---

<sup>4</sup> See *Maine Citizens Guide for Locating and Documenting Vernal Pools* (Maine Audubon, Falmouth, ME)

**Whiskeag Woods.** Bush honeysuckle was observed in several areas. Japanese barberry and multi-flora rose were also observed. Moderately high densities of purple loosestrife were observed in the wetland in Whiskeag Creek.

### Recommendations

Early detection and control is the key to managing invasive species.

Spring 2008. Because many invasive plants leaf out before native species, Spring (late April or early May) just before native species break bud is an excellent time to survey for invasive shrubs and vines. The City should locate and map invasive plants on both parcels. This would be an excellent project for volunteers. Loosestrife is easiest to locate in late July when flowering, but its dried stalks and flowers can be easily identified at other times of year.

2008-2009. Develop and implement an invasive species control plan with the assistance of a licensed herbicide applicator. Low-toxicity herbicides can be safely applied in small quantities to control the invasive shrubs that currently occur on these woodlots. Treating cut stems or the base of small stems is a safe and effective method. A two-year post-treatment check and, if needed a follow up treatment, should be included in the plan. An overview of control methods is included in the Appendices.

Purple Loosestrife control is not covered by this plan, but it may be something the City wishes to consider. The Rachel Carson National Wildlife Refuge in Wells has been using parasitic beetles to control loosestrife.

*Invasive bush honeysuckle and Japanese barberry (both with leaves). Exotic invasive plants may eventually dominate the understory and prevent establishment of native trees, shrubs, and herbs. Spring is a good time to search for invasive plants because many leaf out before native species.*



## **Recreational Use**

An overview of recreational use is included in Section III.

At the request of the Trust, a literature review of the impacts of recreational trails was undertaken. This review is included in the Appendices. Well used recreation trails have the potential to disturb some wildlife species. Disturbance will vary with species, usage level and type, and season. Following are some general considerations for ecologically friendly trails:

<b>Considerations for Recreation Trail Design and Use</b>	
<b>Trail Design and Layout</b>	<ul style="list-style-type: none"><li>✓ Well used recreation trails have the potential to disturb some wildlife species. Disturbance will vary with species, the usage level, type, and season.</li><li>✓ When planning trails, create long perimeter loops that leave large patches of habitat undisturbed rather than crossing all sections of a woodlot.</li><li>✓ To minimize disturbance to aquatic wildlife trails should not run parallel with the shore of water bodies and open wetlands. Rather, approach water bodies with spur trails to a screened viewpoint or have loop trails only approach the shoreline for short distances.</li></ul>
<b>Mechanized Use</b>	<ul style="list-style-type: none"><li>✓ Mountain bikes increase the potential for permanent soil damage, off-trail use, and conflicts with other users. However, mountain bikes have no more impact on wildlife than pedestrians.</li><li>✓ ATV use can cause severe soil damage. Current level of use at Butler Head is moderate, but could increase. Trail design techniques can minimize the attractiveness to ATV use.</li></ul>
<b>Pets</b>	<ul style="list-style-type: none"><li>✓ Require that dogs be leashed during the nesting season of ground-nesting birds (April to end of July). Examples of ground nesting birds that might be found include woodcock, hermit thrush, and ovenbird. Dogs should also be leashed during winter when snow restricts animal movement and cold temperatures require energy conservation for survival.</li></ul>

## **Recommendations**

By the end of 2008 the City should develop a recreational use plan for both parcels that

- integrates the preceding recommendations,
- includes a clear and enforceable policy on fires and camping (e.g., low impact camping only),
- considers steps to limit soil compaction on the banks at Whiskeag Creek,
- addresses removal of camping debris at Whiskeag Creek, and
- includes a system of volunteer stewards to monitor the preserves and report issue to the City.

## Planning for Climate Change

Researchers have estimated that Maine's average temperatures will increase at least by 3.5° F by 2100 if we significantly reduce climate-warming emissions and as much as 12.5° F if emissions are not reduced. By 2100 the optimum climate for spruce and fir will have shifted to north of the Canadian border, while the optimum climate for northern hardwoods such as sugar maple and yellow birch will retreat to the western Mountains and northwestern highlands of Maine. The northern limit of optimum climate for oak and pine, which are now best adapted to southwestern Maine, will shift north to the Canadian border. Trees that are outside of their optimum climate are likely to become stressed, with potential for increases in declines and mortality due to insects and diseases. Disturbances, including harvests and other management actions, can be used to facilitate the response of vegetation types to climate change.

Most of the species on the property except for white pine and red maple are expected to be increasingly stressed by global warming. The following general recommendations should be considered by the trust in developing harvest plans and other activities.



*American beech (left, foreground) may decline as the climate warms. Red oak (left, background, and shagbark hickory (right) are adapted to climate changes predicted for Maine.*

### Climate Change Forest Management Recommendations

- ✓ Consider the implications of management 100 years or more in the future.
- ✓ Because trees species ranges are likely to migrate north at one fifth to one tenth of the rate of climate change, manage for a diversity of tree species, including those such as white pine and red oak, which are adapted to a warmer climate. Other species to favor include white oak, shagbark hickory, and red maple.
- ✓ In areas currently focused on cool-climate species such as spruce and fir, northern white cedar, or northern hardwoods, leave seed sources of pine, oak, hemlock and other warmer-climate species, if present.
- ✓ If warmer-climate species are absent, consider planting a few acorns or pine and hemlock seedlings after harvest to establish a future seed source to facilitate the expansion of these populations.
- ✓ Landowners and managers can help mitigate climate change by sequestering carbon in soils, the forest floor, and in the canopy. Forest soil carbon loss can be minimized by avoiding clearcutting and other practices that heat the forest floor and increase oxidization of organic matter. Managing for older and larger trees will store more carbon on the stump. Conservation easements can ensure that the land is not converted to a carbon-consumptive use.

### Education Plan

The City could consider developing interpretive materials and programs for the forest that explain its ecological features and objectives of forest management. The two woodlots could be used as model forests for other landowners in the area to view.



*Community forests provide excellent educational opportunities for adults and younger students. An education and outreach plan can help involve the community in stewardship of the forest.*

## IV. Forest Management Plan

WALTER R. ARMSTRONG

Consulting Forester  
Maine License #376

Arborist  
Maine License #1159

Forest Management Plan

for

The City of Bath  
Sagadahoc County, Maine

The Public Works lot - Tax map #15 Lot #1  
30 forested acres

The Butler Head lot - Tax Map #4 Lot #26  
124 forested acres

December 1, 2007



### Management Objectives

- These two properties owned by the City of Bath are not in the Tree Growth Tax Classification. A forest management plan is being written under Project Canopy.
- Timber Stand Improvement (TSI) recommendations will be given in order to raise the quality of the existing stands and regeneration in order to produce future sawlogs.
- Many species of large and small animals are present, steps to protect or enhance their food and cover will be suggested.
- Recreational use of the property will be considered.
- A timber inventory will be taken to determine species mix, volume and stand timber types.
- Consideration will be given for acceptable access to carry out proper forest management practices.

### Maps

All maps are included as an aid in visualizing the property and the different categories of forest, streams, wetlands, fields, soils, wildlife habitat and boundaries. Specific, more accurate delineation of features would have to be done on the property at each site.

### Caution

Many procedures of good forestry and land management are now regulated by one or more government bodies - town, state or federal. It is the landowner's responsibility to ascertain that the recommended procedures contained in this Forest Management Plan to be performed on their land are allowed by the various governing agencies. It is the landowner's responsibility to obtain all the necessary government permits before commencing any recommended procedure.

### State of Maine Forestry Regulations

Briefly summarized below are the Forest Practices Act and the new (effective 10/1/99) Maine Forest Service Rules, Chapter 20, entitled, "Forest Regeneration and Clearcutting Standards".

Harvests are considered clearcuts when less than a well-distributed stand of acceptable growing stock of 30 square feet of basal tree stem area per acre remains. The harvested area may have a well-distributed stand of acceptable growing stock of regeneration that meets specific standards and not be considered a clearcut.

Clearcuts (acreages of categories have been changed from the previous rules) falling under State law in part are:

Category I - 5 to 20 acres, a non-clearcut (greater than 30 square feet of basal area of trees) minimum 250' Separation Zone must separate this clearcut from any other clearcut;

Category II - 21 to 75 acres, a non-clearcut (greater than 60 square feet of basal area of trees) minimum 250' Separation Zone must separate this clearcut from any other clearcut and at least equal the clearcut area in size;

Category III - 76 to 250 acres, a non-clearcut (greater than 60 square feet of basal area of trees) minimum 250' Separation Zone must separate this clearcut from any other clearcut and at least equal the clearcut area in size.

Basal Area (BA) is a forestry term calculated by measuring the diameter of the tree at 4.5 feet above the ground (DBH). An example of this would be as follows: a 14" DBH tree will be approximately 1 square foot BA, thereby needing 30 of this size tree per acre to not be a clearcut. If the crowns of these trees do not touch, these trees cover a considerable area. This is a "different picture" from a previous forestry referendum statement of "picture a 4' x 8' sheet of plywood" as the area covered by 30 square feet of basal area. One problem (personal professional opinion) that exists with the current law is that existing tree regeneration can keep an area from being considered clearcut even though there is less than 30 square feet of residual forest.

All Category II and III clearcuts over 20 acres (new acreage standards as of 1999) require a management plan (specific to the clearcut and meeting lengthy and complicated preset State guidelines) by a licensed forester. Category II plans are kept on file by the landowner while Category III plans are submitted to the Maine Forest Service for review 60 days prior to the harvest.

Separation Zone surrounding clearcuts may be shared for more than one clearcut. Separation Zones have a somewhat complicated set of criteria not discussed here and would need to be addressed at the time of harvest.

Acceptable growing stock (simplified) means healthy, undamaged trees capable of producing commercially saleable wood. The list of commercially valuable species is now a list of excluded trees - most notably, gray birch, also striped maple, mountain maple, willow, dogwood, pin or fire cherry.

Please consult with a forester before harvesting to ensure compliance with current regulations.

Other basic requirements are: no slash will remain on the ground within 50' of the berm of a public road; no slash will remain on the ground within 25' of property lines; no trees shall be felled across a property line - if one is felled across a property line by mistake, it must be pulled back onto the property being harvested before it is limbed; no slash will be left in any stream or body of water; and all slash removed from these restricted areas will not be piled but will be scattered or chipped.

Boundary lines must be clearly marked within 200' of any area being harvested. Marking of boundaries must be completed before harvesting begins or the landowner may

be fined (this section of the Forest Practices Act as changed in July, 2004). Some towns require notification of the town and/or abutters before harvests.

The timber trespass laws (including other forest and agricultural products) under Title 14 - 739:7552 (new 1995) and Title 17 - 83:2510, 3853-D spell out double, treble, specific \$ amounts or a combination of cost of professional services and penalties for any timber taken from land not owned without permission of the landowner. The total damages penalty could be very large. Also under this law, trespassers using any motor vehicle (except snowmobiles) are responsible for all damages (including woods road damage) caused while trespassing.

A "Notification of Intent to Harvest Forest Products" form must be filed before a "Commercial" (defined by Maine State Forestry officials as any \$ sale made except by clearing a small houselot) harvest. There is a new form for 2005 that supersedes all previous forms. There is an updated 2006 form currently in use.

The above are just some of the major requirements to be met. There are many more and in greater detail in "The Forest Laws of Maine" and the "Forest Regeneration and Clearcutting Standards Summary". These publications are available from the Department of Conservation's Forestry Services Office located in Augusta, Maine and can be reached at 1-800-367-0223.

### Wetlands

A simplified definition of what the Natural Resources Act of 1988 (U.S. Congress) calls wetlands are areas with Hydric soils (wet for two consecutive weeks during the growing season) that have associated aquatic vegetation and fauna. There does not seem to be a good, workable, precise and agreed-upon definition among the governing agencies.

The Army Corps of Engineers and the Maine Department of Environmental Protection (DEP) are charged with administering the Natural Resources Act with additional input from the U.S. Environmental Protection Agency (EPA), the U.S. and Maine Inland Fisheries and Wildlife (MIFW) and individual towns. At present, no two governing bodies seem to agree on interpretation of the Act or mapping of regulated features. The interpretation of size and type of wetlands affects the width of the buffer zones, harvesting and forest road-building criteria.

It is illegal to fill any wetlands without permission by written permit of Federal and State agencies - although there are constant changes in the regulations and minor exemptions.

A Maine DEP permit is needed for any soil disturbance (filling, excavation, bulldozing, crossings, etc.) within 75' horizontal from the high-water line of any water body or wetland. Many times for forestry purposes, the simpler Permit by Rule process is sufficient if the DEP standards are met. A current copy of the DEP Permit by Rule standards (which change frequently) should be acquired close to the time of harvesting.

Please be aware that Shoreland Zoning definitions of wetlands or streams do not necessarily define a wetland or stream for any other purpose than Shoreland Zoning and may not identify a wetland that is under State or Federal jurisdiction.

I have included the National Wetlands Inventory Map (NWIM) with the property boundaries drawn in their approximate location.

Although the importance of vernal pools has become of greater concern, most are not depicted on the NWI.

### State of Maine Shoreland Zone Regulations

There are statutes on the books that regulate harvesting of timber in a Shoreland Zone. These are minimum standards and the individual towns may impose stricter standards. The following is only a brief summary of the highlights from the Mandatory Shoreland Zoning Act (1988) Title 38, Sections 435-449 M.R.S.A., rules dated March 24, 1990, and L.D. 992 June 18, 1991, amended August 7, 1994, February 6, 1999, February 13, 2000. These regulations continue to be revised. There is a set of new changes coming in 2007 or 2008.

Shoreland Zones include areas 250' horizontal from the normal high-water line of any Great Pond, river, salt water body, coastal tidal wetland or non-forested wetlands (excludes areas that have woody vegetation over 6 meters tall or that were covered and are now harvested) and areas within 75' horizontal of the normal high-water line of a stream (flowing from a Great Pond or from the confluence of two perennial streams as depicted on the most recent USGS 7.5 minute topographical map). For "streams" - this is where the State recommends that Towns begin their Shoreland Zone. As of 9/1/02, the State has claimed jurisdiction over water bodies above where the "stream" starts, meaning all small first-order streams (brooks), headwater streams (seasonal brooks) and any wetland with more than a half-acre of open water. This puts a 75' State Shoreland Zone on anything that has a water channel or wetland of a half-acre or greater of open water. (This is going to be very complicated determining what really is a protected water flow.)

Within the strip of land extending 75' horizontal inland from the normal high-water line in a Shoreland Zone for Resource Protection (RP) abutting a Great Pond (natural 10 acres+ or manmade 30 acres+), there shall be no timber harvesting except to remove safety hazards. There is now a possible exemption (if each Town officially accepts the newer State guidelines of 2/13/2000) to allow a partial harvest done by specific methods within the RP 75' Zone. Between 75' and 250' horizontal distance from high water, a well-distributed residual per acre of 30 square feet of basal area of tree stems of 1" DBH and greater must be left. This is in addition to (and may reduce) a maximum selective 40% of total volume harvest of trees greater than 4" DBH between 75' and 250' distance from the water.

Other than above (Great Ponds) in a Shoreland Zone, from 1' to 250' horizontal, selective cutting of no more than 40% of the total volume of trees 4" DBH and greater in any 10-year period is permitted providing that no cleared opening is created (there are rules pertaining to small openings), and a well-distributed stand remains (including existing ground cover). The first 75' of non-Resource Protection can have a grid and point system used to determine a "well distributed" residual stand for clearing of vegetation for development purposes. It is often used by towns to test for violations; it has even been used for purposes of timber harvesting.

State guidelines generally do allow the pruning of the bottom 1/3 of limbs from living trees (some question exists when abutting a RP Great Pond) and the removal of safety

hazards. Live limbs on the upper 2/3 of tree height are not allowed to be removed.

There are more strict rules when land is or is going to be used for other than forestry purposes after the harvest - especially no cleared swath for views.

They define "Forested Wetland" as being dominated by 6+ meter tall woody vegetation and do separate them from their "Freshwater Wetland" (open water) definition.

Existing clearings may be maintained.

There are no streams running through or within 75' of these lots (by State Shoreland Zone definition). On the Public Works Lot Whiskeag Creek is a greater than 30 acre pond and should have a 250' Shoreland Zone. On the Butler Head Lot the tidal Merrymeeting Bay and Butler cove require a 250' Shoreland Zone, also the southeastern open wetland could have a 250' Shoreland Zone.

As of May 1, 2006, the State of Maine "Guidelines for Municipal Shoreland Zoning Ordinances" has significant changes that can be adopted by towns over the next two years. After that time, if Towns have not adopted approved new regulations, the State will impose a set of Shoreland Zone regulations.

#### The Town's Shoreland Zone Ordinance

The Town standards are similar to the State's and many are addressed in the previous Shoreland Zone section. The Town Office should always have a Shoreland Zone map displayed that can be viewed before any activity takes place in a Shoreland Zone.

The Town may still negotiate with the Maine DEP regarding specific changes to the Ordinance.

There are wetland areas that do not have a Shoreland Zone but would have applicable regulations under the DEP to protect these wetlands from being degraded.

The above are just summaries, and you should check with the Town office, the Codes Enforcement Officer (CEO) before any timber harvesting, vegetation removal, road construction, etc., begins.

#### Tree Growth Tax System

Since these properties are owned by the City of Bath Tree Growth Status would not be of benefit by reducing taxes. However, if Butler Head were to be transferred to a Land Trust, Tree Growth would be an option.

#### Erosion

I did not observe any current serious erosion problems on the woodlots. There is minor erosion of a brook channel emptying into Merrymeeting Bay on the southwest corner of the Butler Head lot.

I would strongly urge exercising care on any slope that drains into one of the small brooks or into the tidal waters.

The Maine Forest Service published a helpful guide entitled, "Erosion and Sediment Control Handbook for Maine Timber Harvesting Operations - Best Management Practices" (1991, revised 1994). (A copy of this handbook is included with this plan.) It is the landowner's responsibility to make sure harvesting is done to the standards of the handbook guide in order to meet DEP requirements. The handbook gives Best Management Practices (BMP) for forest management roads, skid roads, skid trails, log yards and landings. Water quality protection is addressed by proximity of operations to water bodies, water crossings and methods to offset problems created by steep slope.

#### Assistance from Federal and State Agencies

The USDA - FSA office for Sagadahoc County is located in Lewiston, Maine and can be reached at (207) 753-9400. The Maine Forest Service can be reached at 1-800-367-0223.

#### Boundary Lines

The boundary line on the Butler Head lot south side has ribbons scattered along a line from a recent survey of the abutting property that might be for sale. Most of the lines on the Butler Head lot should be more obviously marked.

The Public Works lot has the powerline as the majority of the southern boundary and fence remains for the remainder. Whiskeag Creek is the entire western boundary, Oak Grove Avenue is the eastern boundary, with only a small section of private line on the north.

Good boundary markings could help prevent future trespass, especially if an outside contractor were doing any harvesting on neighboring parcels. Deep snow makes it difficult to find ground evidence.

If you use plastic tape/flagging, it will need to be replaced approximately every five to eight years if it is the higher quality "arctic" or "-40 degrees" tape. Please bear in mind that the tape/flagging will have to be replaced sooner if of lower quality.

**I would recommend tree blazes along the entire property line. However, do not recut old blazes as these are "historical" markings.**

#### Wildlife

Both parcels have a good diversity of wildlife with varied habitat.

The Public Works lot borders the shallow ponded Whiskeag Creek, the open powerline along the southern line, a large vernal pool in the south central area, and a ledge ridge. This lot will become more important to wildlife if the abutting property to the south is developed. However, there is excessive human use by fisherman and a dozen or so

extended use campsites. There is a large truck load of abandoned campsite debris that needs to be removed.

The Butler Head lot has the tidal Merrymeeting Bay on the west and Butler Cove on the northeast, the marsh wetland on the east, the open CMP powerlines on the east and the rubble cliff along the south central property line.

The observed wildlife on this parcel of land is as follows: signs of whitetail deer, gray and red squirrel, snowshoe hare, fox or coyote, hairy and pileated woodpeckers, grouse, turkey, osprey, hawks, many waterfowl (no specific identified species) and small songbirds.

I am sure there are many species that I did not observe; such as, eagles (several in area), owls, herons, moose, beaver, porcupine, otter, mink, weasel, turtles (snapping, eastern painted, yellow-spotted in area), salamanders, etc.

I did not observe any eagle's nests on this property.

The Maine State Fish and Wildlife office out of Grey, Maine covers this area. There are no listings of threatened or endangered animal species habitat on the MIFW map. They do list high value Tidal Wading Bird and Waterfowl Habitat on both lots. A copy of each MIFW map is included.

General good wildlife habitat considerations are:

- Encouraging diversity of plant species and age groups - this gives a variety of food and cover for a variety of animal species;

- Maintaining some openings in the forest canopy large enough to allow sunlight to reach the forest floor and allow grass and shrub growth (does not need to be on every property if a close neighbor has fields);

- Clearing competition from around wild apple trees (sometimes pruning and fertilizing the remaining apple trees to increase production of this prime animal food);

- Leaving several snags (dead trees used as feeding stations and perches) per acre (when not a safety hazard);

- Leaving several large den trees (live but cull \$ value - providing a home for cavity-dwelling birds and mammals) per acre;

- Encouragement of nut-producing trees (oak, beech, possibly hickory and chestnut);

- Reseeding of ground covers (native species) on woods roads and yarding area, thus, reducing erosion and providing wildlife food much sooner than natural revegetation;

- Protection of streams and wetlands plus associated shoreland, which are some of the most productive habitats.

Den and snag trees are very important. Many people have seen various woodpeckers feeding on these trees but many other species also use them. The following are cavity-nesting species: woodpeckers - pileated, downy, hairy, redheaded, flicker, sapsucker and others; chickadees - boreal and black-capped; ducks - wood, goldeneye, great-crested flycatcher; swallows - purple martin and tree; nuthatch - red-breasted and white-breasted; tufted titmouse, brown creeper; wrens - house and winter; eastern bluebird; bats - little brown, Keen's, silver-haired and big brown; squirrels - gray, red and flying; porcupine; raccoon; and, no doubt, many others. Not all the above species would necessarily be native to this particular property or immediate area.

I would recommend specifically to construct wildlife piles scattered throughout the

woodlot. We do not have much natural protection from predation by coyotes. You could construct these piles from brush generated by future TSI work. (There is a labor cost to this if not done by the landowner as this is not normally done by the logger.) The piles should be about eight feet high and ten feet around to start because the snow load will compress them quickly. I have had particular success with snowshoe hare and grouse on my own woodlot.

Luckily, based on the presence of seedlings of red oak, sugar maple and cedar the deer are not as over populated on the Butler Head lot as in much of the immediate area. Deer are changing (perhaps negatively) the species mix of the future forest.

The rubble cliff on the Butler Head lot has a large number of dens.

The most productive forest for trees and wildlife will not look cleaned and manicured like a state park. Do not clear the small natural regeneration from the forest floor; it is not significant competition to the larger trees.

Please refer to the expanded Wildlife and Ecosystem report done by Robert Bryan of the Maine Audubon Society.

#### Timber Stand Improvement - Pruning

High-quality sawlog production can be enhanced by pruning of small limbs on the butt log, usually to a height of 17'.

In general, when doing improvement work on your woodlot, you should prune side branches on high-value trees such as red oak, ash, sugar maple, yellow birch and white pine. Pruning should only be done on trees that are healthy, straight and are not going to be harvested soon. The younger the tree to start, the more productive the pruning will be. The smaller the limb pruned (1/2" to 2" diameter branch), the better the future log quality. Pruning should be done close to the trunk, being careful not to damage the main stem's bark. Pruning can vastly improve log quality, with future growth creating sawlogs and veneer logs instead of pulp and firewood. Stumpage \$ value can be increased by at least double to over twenty times.

#### Timber Stand Improvement - Sapling/Pole-Size Tree Thinning

Thinning is needed when the foliage crown of individual trees are interlaced with neighboring tree crowns and competing for sunlight. Some species of trees can grow to maturity under the canopy of other trees. Most species, however, need direct sunlight to produce merchantable sawlogs.

Most trees need close, competing trees to force them to grow toward the sunlight. If there is no competition, then the trees will just spread out to increase the amount of sunlight received. The taller, less spread out trees will have more straight and clear trunk for sawlogs. Even though competition is necessary, it can be too intense and spread the nutrients, moisture and available sunlight over too many trees, causing stress (susceptibility to disease and insect damage) and slow growth for the entire stand.

The tallest (dominant and co-dominant) trees need to be thinned sufficiently to allow some sunlight penetration to the side of their crowns and not just the very tip. This allows

the formation of increased leaf area for photosynthesis to produce more food and healthier, more rapid growth. The thinning should allow enough space between trees for growth until the next scheduled thinning (in five to ten years). Too much thinning will promote too much side growth and reduction in height growth. Oaks are particularly negatively affected by too much sunlight on the trunk, causing side sprouts to grow that seriously reduce the log values.

Veneer red oak is our highest dollar value product, with the next value group being sawlog red oak, white pine and spruce. Other sawlogs of lower value (current market) are white oak, ash, hemlock and red maple. Unfortunately, pulpwood is of very little value. The highest value pulpwood is spruce, fir and hemlock (all of which are barely breakeven with the cost of harvesting). Aspen and white pine are worth less than the cost of harvesting. Firewood (hardwood) is currently worth more than most pulpwood but considerably below most sawlogs.

We generally strive for a good mix of tree species to maintain biodiversity. This improves wildlife habitat and reduces the risk of loss due to tree-specific insects and diseases that could eliminate a species.

We are also generally working with those trees that are currently inhabiting the site and mostly with the intermediate height trees of +/- 2-6" DBH.

When thinning sapling (+/- 2" DBH) to pole-size (+/- 4-6" DBH) trees, firewood could be a byproduct. Otherwise, we will leave the cut trees and limbs (slash) to decompose on the soil surface or piled for wildlife habitat.

Each tree that is to remain should have its own column of sunlight (it does not have to be a perfect circle of crown). Choose the residual trees based on future value and current physical condition. The stems should be fairly straight for, hopefully, 12' +. Damage to the bark (of greater than 6" diameter area) that has penetrated the wood of the trunk on the base of the tree usually ruins the value of the future butt log.

Single stem, naturally seed-produced trees are more desirable than stump sprouted trees (primarily hardwoods). When thinning out a stump sprout clump, all but the best single stem should be removed. If none of the stems are perfect and there are other nearby trees, then all stems can be removed. In some areas you may be removing 25-90% of the 2-6" DBH stems.

Proper thinning will allow for generation to be established and released to form the future stand at the time the dominant trees are harvested.

#### Insects and Disease

I have observed a few gypsy moth egg clusters in the immediate vicinity. They have been a serious problem in the past but seem to be at a low ebb now. These moths, in their larval stages in early spring, eat the leaves of hardwoods (especially oak). These larvae are between 1.5 and 2.5 inches long with five pair of blue dots and six pair of red dots down their back with tufts of hair along either side. They will eat softwoods (such as pine needles) if hardwoods are already defoliated. The moths emerge from their pupae stage in late July or August. The males are tan/brown in color, are 1"+ long and 2-1/2"+ in wingspan. The females are larger, white in color and rarely fly. The egg masses are deposited under loose stones, tree stem bases, beneath loose bark (especially on white

oaks) and under lower limbs. The egg masses are light tan in color, 1/2" x 2"+ and fuzzy. To help limit the moth population on a small scale, the egg masses can be scraped off any time before spring hatching and disposed of in a wood stove, sealed trash removal container, etc. They will still hatch if just scraped onto the ground. Hardwoods can withstand up to three years' defoliation without causing mortality but softwoods can be killed in just one season's total defoliation. The gypsy moths have natural cycles of population peaks and collapses when shortage of food can cause stress and induce disease outbreaks. There are also increases in parasite populations that are helping to control the gypsy moth population.

The beech trees present have a bark canker-causing fungus. This fungus destroys small areas of cambium and bark, reducing the vigor of the tree and degrading the future sawlogs to firewood. Not much can be done to eradicate or control the fungus. Beech nuts are an excellent wildlife food so it is best to leave the trees even if they will not provide future sawlogs.

I did observe white pine killed by White Pine Blister Rust; this is another problem in the area. This fungus attacks the cambium and bark, causing mortality. Younger trees with live foliage on the lower limbs are usually more vulnerable than older, taller, clear-bole trees. The rust fungus needs an alternate host to reproduce each spring (the Ribes family composed of currants and gooseberries). The best way to eradicate the rust is to remove the Ribes.

White pine weevil damage is evident on many of the pines. Weevils cause the multiple and/or crooked main stems. In the spring, the larvae (1/4" to 1/2" long and yellowish in color) eat the cambium and new wood of the terminal shoots, causing wilting and death for the shoot. The tree sends up one or more of the side branch tips to replace the terminal shoot, which causes a crook in the trunk. You can prune back affected shoots, within reach, to the next green healthy whorl of branches as soon as you notice any yellowing or wilting of needles in early to mid-spring. The pruned tips should be safely burned, if possible, or disposed of in a sealed trash removal container to prevent emergence of the adult weevil. Corrective pruning to remove all but one of the first healthy whorl's branches will provide a single lead stem for further height growth. Currently, the open grown sapling pine regeneration does have weevil damage. Regeneration under a canopy does not seem to be the adult female weevil's favorite place to lay her eggs. Natural regeneration within a timber stand seems to be our best hope of future high-quality sawlogs. Open, sunny areas are generally more infested.

In the last few years, I have observed a significant increase in the mortality of mid-age to mature white pine. There is a definite decline in health of white pine in the greater area. I have not yet heard a reasonable explanation as to the decline. There are white pine in several spots (especially Stand #12) on the Butler head lot exhibiting this decline.

At present, there is minor damage (Stand #6 of Butler Head) from hemlock loopers, which has been a serious problem (1980's) in this area. They will eat the foliage of hemlock, balsam and spruce. Looper larvae are light brown or green in color, are up to 1-1/4" long and are very thin (appearing to look like the classic inch worm). The larvae consume the oldest foliage first, causing a tree to look lighter green but seemingly still fully covered by needles. The larvae usually only chew part of a needle and move on to the next, often causing damaged needles to drop prematurely. The larvae are active from mid-June to late July, pupate early August, emerge as moths late August and are active to October. The moths have a 1-1/4" wingspan, are light brown/tan/gray in color, are delicate

looking and have a narrow brown band or two from wing edge to wing edge. There is no affordable control for loopers in the forest.

The East Brunswick area just southwest of here has had pockets of severe brown tail moth infestations. They seem to be primarily in the red oaks, black cherry and serviceberry trees. The larvae, measuring about 1.5 inches long, have two red dots on the top side of the posterior end, mostly brown/black in color, have rows of white markings down either side and are covered with tufts of hairs. These hairs can cause severe allergic reaction. The caterpillars (alive or dead) and their web nest should be avoided. The larvae over-winter in the webs. If you are not allergic to the hairs (wearing a breathing mask and disposable gloves is always recommended), you can cut the nests off during winter and place them in plastic trash bags. This will help reduce their numbers come spring.

The balsam on this parcel and in the greater area seem to die off when they reach 6" to 8" DBH. I do not think there is any specific disease or insect problem. It is probably a combination of many influences, including soils, insects and disease.

There are other serious insect and disease threats to our forests that have already caused significant damage, such as Dutch Elm Disease and Chestnut Blight and many that are potentially devastating in the future. Woolly adelgid, now in states to our south, could be a serious future problem. Always keep a watchful eye on the forest for signs of problems.

#### Critical Areas

The State's Natural Areas Program has a database for rare plants and habitats. A report was obtained from MNAP, 93 State House Station, Augusta, Maine 04333-0093.

The Butler Head lot, primarily in Butler Cove plus smaller areas along the western shore have listings for several rare plants within the tidal areas.

The MNAP maps are included with this plan.

#### Recreation

Presently, the Butler Head woodland is used for foot travel, cross-country skiing, snowshoeing, hunting, and snowmobiling as well as ATV's.

Butler Head has the best potential of either lot for mixed recreational use without destroying the wildlife habitat value. The current ATV trail use is probably at an upper limit without excessive negative effect. Constructing a walking trail loop on the north side of Butler Head Road would enhance non-motorized recreational use for viewing Merrymeeting Bay and wildlife.

The Public Works lot is heavily used by fishermen along the shore of the ponded Whiskeag Creek. The lot is overused by long term camping of people setting up tarp and tent camp areas.

#### Logging Practices

One newer method of harvesting that I have reservations about is whole-tree chipping. The value to the landowner of the chips is very low - from only \$2.00 to \$5.00 per cord (about 4,500-5,500 pounds). The only beneficial purpose of such a harvest is for thinning of a stand. Unfortunately, much damage is done to the remaining sawtimber by skidding out the cut whole trees. This residual damage to valuable standing timber can be far greater than the meager price paid for the chips. Another problem with removing the whole tree is loss of nutrients. Our soils here are very shallow and low on nutrients, causing slower plant growth. The limbs, branches and foliage of a tree contain 85% (+/-) of the nutrients of a living tree (that has been absorbing and concentrating these nutrients for its lifetime).

Firewood thinning and whole-tree chipping often remove the small, good-quality hardwoods that would provide the most valuable stand of the near future. Leaving these small trees will provide a future high-value harvest compared to a very low current income. Properly marked thinnings will only remove poor quality and/or overcrowded trees.

My opinion, based on over 35 years of experience, is that the smaller the equipment, the less damage to the residual forest and the land itself; this is generally known as "low impact harvesting". While mechanical harvesting equipment - where the operator never sets foot on the ground - cuts the tree and lays it down for the next machine to pick up and drag out to the next machine that limbs and cuts to length is not low impact. Very little of the land area is not driven over by the heavy equipment with this type of harvesting. A knowledgeable operator using a cable winch small skidder or farm tractor dragging already hand-limbed and cut-to-length logs out to the landing is considerably less damaging to the residual forest. If a log forwarder (a trailer with its own log loader) is used instead of dragging the logs to the landing, even less damage is done to the residual forest and the woods roads.

In addition to the details in the Erosion and Regulations sections of this plan, following are some other basic and good logging practices.

Avoid any heavy equipment movement when the soils are saturated and would cause deep soil disturbance. The ruts could cause erosion and/or make the trails unusable for hiking, riding or vehicle use. It can be time consuming and costly to regrade or fill the equipment ruts.

Avoid log skidding on steep slopes and, if necessary, at least skid perpendicular to the slope. Even if it is not wet during the harvest, future rains could flow rapidly down these skid trails and cause washouts.

Log landing and yards should be located on flat or slightly sloped ground. These areas will be heavily used and could have significant erosion if too steeply sloped but can become a real "mud pit" if the ground is too flat or a hollow. Keep yarding at least 250' from water bodies. Upon completion of logging, regrade landings and yards, if necessary, and reseed immediately with a perennial grass or conservation mix. Preferably, use a native seed mix to avoid introduction of alien species.

When selective harvesting, one of the major concerns is damage to the remaining trees. Often when skidding out felled logs, standing trees have their trunk bases "skinned". This damage will often ruin the butt log of the residual (remaining) standing trees. One way to protect good trees along skid trails is to leave 4" to 8" DBH poor-quality trees next to the trail, and especially on corners and curves, to act as bumpers to deflect the logs being

skidded out. The remaining "bumper" trees can be cut at the end of the harvest or left (since they are smaller and probably noncompetitive trees) if there will be another harvest soon.

I recommend that all trees be marked (painted) that will be harvested. I do not recommend allowing a logger to cut to a certain tree diameter or to cut to a sawlog minimum size. Many trees are large enough to sell as a sawlog but could grow very rapidly into a larger diameter tree in a short time (ten to twenty years versus fifty years) to get to the minimum log size.

The woodlots could provide income every five, ten or fifteen years if properly logged. A bad logging job now can wipe out all possibilities of a higher, or any, future income in a person's lifetime.

Please be aware that markets do constantly change and that there are some harvests that are just not economically viable.

**Please do not think this plan provides sufficient information to enter into a timber harvest on your own! Please do not think that by turning this plan over to a logger things will be done properly or the way you request! Please do not sign any logging contract without first consulting with a qualified forester!**

#### Forest Management Roads

Presently, the old woods roads on the Public Works lot do give sufficient useable access if a crossing of a wet area is installed just north of the fire practice area.

The north side of the Butler Head lot needs access trails constructed to allow proper forest management activities and for future fire control. Most of the southern section has a good trail system with only a few spur trails needed.

I would keep most new trails small but wide enough for a small tractor to take tools into the woods and bring out the future forest products. I would recommend locating the best sites for several logyards that can be used multiple times each year for years to come for TSI work and harvests.

In general, the road should avoid crossing streams/brooks when possible and constructed at right angles to the stream (or drainage channel) when crossings are needed. The road should be kept on land of minimal slopes. On sustained slopes, broad-based dips should be built into the road base to conduct rain run-off away from the road and, thus, avoid the typical erosion gullies.

#### Future Harvesting

Neither woodlot has been harvested in the last +/- 30 years.

There could be a near-term TSI firewood harvest and a limited hemlock sawlog and pulpwood harvest on the Butler Head lot. There is also a very poor quality white pine stand that should be harvested for pulpwood and possibly replanted to another species. There would not be a large sum of money generated by this harvest. There is a

considerable quantity of sawlogs on this lot but a heavy harvest would severely change the character of the woodland. Please refer to the text under "Timber Stand Descriptions and Recommendations" for specifics.

The Public Works lot could also have a TSI firewood harvest and a limited hemlock sawlog and pulpwood harvest. There is also a stand of very poor quality white pine that should be harvested for pulpwood or chips and replanted to another species. There would not be a large sum of money generated by this harvest. Please refer to the text under "Timber Stand Descriptions and Recommendations" for specifics.

You must file the "Notification of Intent to Harvest Forest Products" form with the Maine Forest Service before any commercial harvest begins.

### Market Value of Timber

Obviously, market prices will constantly change over time. Sagadahoc County is within trucking distance to other markets. There are numerous factors influencing value, i.e., market demand, timber species mix, volume of wood to be cut, timber quality/final product use, size of average harvested tree, logging terrain, distance of skidding to log yard, type of logging equipment, season of year, woods labor costs, landowner requirements, distance to market, landowner/forester/logger negotiations, type of harvest (selective to clearcut), and governmental regulations.

Grades of logs are often not addressed on log price sheets. Log grade is very important and will be how most logs are sold in the future since they reflect the value of the product coming from individual logs. As an example, white pine sawlogs may bring only \$150.00 per Thousand Board Feet (MBF) at the mill for poor quality but the Select grade may bring \$450.00 per MBF. Log length is also a factor in value. Usually longer is more valuable (i.e., logs that are 16', 14' and 12' are more; logs that are 10' or 8' are less). A log requires an extra 5" in length or the sawmills will consider the log to be the next length shorter. Because veneer grade logs are the highest grade and are a different length, they are generally separated from the sawlogs. The white pine listed in the Timber Inventory as pulp may contain low-grade 8' sawlogs (it is difficult to tell until the tree is felled and bucked into logs) that can be sold at a higher price.

Hardwoods can be of very high value and should not be eliminated for softwoods. Whatever is growing on the site should be encouraged to grow if the quality is good or can be improved. Thinning of poor-quality trees on an individual basis can be done with consideration given to highest market value. A mismanaged harvest for firewood can often eliminate a future crop worth big \$. Veneer red oak currently brings \$700.00 to \$1,200.00 MBF at a few local buyers (calculated @ +/- 2 cords/MBF @ \$15.00/cord firewood stumpage), which means you may get only \$30.00 as compared to \$350.00 to \$600.00 for the same volume of wood! Sugar maple veneer can exceed the value of red oak.

Stumpage paid for firewood is very low and the harvest has to be carefully monitored or the money received is not worth the loss of the future crop. Firewood stumpage will often be higher than for pulp or chips.

The 2007/2008 timber market is currently under downward price pressures and not a great time for a harvest other than TSI and firewood. I would not recommend harvesting sawlogs until prices increase. I can give updates of values to the City when requested.

## Soils

### USDA Soil Conservation Soils Survey

Included is a USDA map of soils with property located and a complete legend.

Also included is a chart of soils showing site index (how well various tree species grow comparatively) and the best species suited to the site.

One caution I have for the USDA recommended plantings is that white pine will almost always be attacked by the weevil. Please refer to the "Insects and Disease" section of this plan. Also, on wet soils literally every spot a seedling is to be planted is a judgment decision.

Another caution I have is about the windthrow hazard. My observations seem to be that windthrow is a considerable problem on the wet areas and shallow soil areas.

In most situations, there will be sufficient near-term natural regeneration and planting would only be needed to fill in open areas or to change the species mix.

## Forest Fire Hazard

This is not generally a high fire hazard area. A few short times a year and possibly an occasional sustained summer drought are the only higher risk times. We normally do not have large amounts of fuel on the forest floor. This is due to our normally wet conditions that promote decomposition of organic detritus.

TSI work and/or harvest will add more fuel to the forest floor. During a harvest, the logging debris (slash) should be cut so that any branches lay within 18" of the forest floor (this being the dampest zone). TSI generated brush could be stacked in wildlife piles, which would concentrate the debris and break the continuity of fuel on the forest floor.

The current and future woods roads would be strategic for access in fighting a forest fire.

## Ice Storm Damage

The 1998 ice storm has not significantly damaged this woodlot.

## Reforestation

If you should wish to do any supplemental planting of a specific species, I recommend using Maine-grown seedling stock. One source for such stock is Western Maine Nursery located in Fryeburg, Maine and can be reached at 1-800-447-4745. They grow their own seedlings and dig each spring. They grow primarily softwood species. You can pick up your stock preferably in May to assure freshness and increase the survival rate. Be sure to order by February or they may be sold out of the stock you need. Seedling transplanting is generally done in May but September plantings are showing promise.

Hardwoods such as red or white oak, shagbark hickory, Chinese chestnuts (mostly for wildlife food) or basswood could be sourced elsewhere. Musser Nurseries of Indiana, Pennsylvania has hardwood and wildlife food seedlings and can be reached by dialing 412-465-5685.

A variety of seedling species would be recommended to increase the odds of survival if attacked by disease or insects.

Deer browsing is a serious problem for red oak and cedar seedlings. Male deer, by rubbing off their velvet, severely damage most European larch saplings. White pine seedlings/saplings are now almost always ruined by white pine weevil, unless in a partially shaded forest environment.

### Archaeology

There are several old stone walls in the southern section of the Butler Head lot.

I did not observe any historical sites. There could be old house/farm sites that I did not find.

The State Historical Preservation Commission report did not list any known sites. A copy of their report is included.

### Stand Descriptions and Recommendations

Please refer to the included Forest Stands Map where each differing stand is located and numbered.

The timber stands were delineated by using recent color leaf-off aerial photographs and timber sample plots taken through out each woodlot.

The timber types by species, DBH size and volume were determined by sample plots taken through out each stand. The majority of sample plots were GPS located and mapped to ensure sufficient coverage of each stand.

There were 33 fixed radius 1/10 acre random plot samples taken and 22 factor 10 prizm random samples taken on the Public Works lot.

There were 82 fixed radius 1/10 acre random plot samples taken and 50 factor 10 prizm random samples taken on the Butler Head lot.

Basal area (BA) numbers were calculated for comparison of the density/volume of the forest for each stand. I do not recommend a harvest be done to reduce a stand density to any particular BA number.

In general both woodlots are significantly overstocked and too dense for a healthy forest and to allow establishment of tree seedling regeneration for the future forest.

Overall my recommendations for initial TSI work and harvesting might be a financially

break even proposition. Availability of Forest Service cost share programs would have a major effect on what work could be accomplished.

A more intensive harvest schedule could undertaken for near-term financial gain but would impact the future timber value of the woodlots, aesthetics and wildlife habitat.

Timber stand descriptions and recommendations;

Forest Management Plan for the City of Bath woodlots;

Public Works woodlot Tax Map 15 Lot #1 on Oak Grove Avenue

The ±30 acre woodlot is located along the ponded Whiskeag Creek. The property is overused by people camping and fishing. There is considerable trash around a dozen "camps". There is considerable heavy equipment activity in the adjoining public works yard.

Stand #1,#2,#3 - 1 acre each - Softwood growth (White pine /Hemlock) - 6-28" DBH - 13' DBH average -  
BA = 148

Location: These are 3 northern points of land jutting into the ponded Whiskeag Creek. The elevations are only from water level to 20-30'.

USDA - Primary soils - HsC/ScA - Woodland group #6 - site index 50/60 fair site for existing white pine and hemlock.

Notes: These areas have the largest DBH white pine and hemlock except for stand #4a and the ravine stand #5. They appear to have escaped the last timber harvest (30± years ago) and previous farming activities. These stands are overstocked. The quality of the largest trees is declining. Many of the largest trees have little sawlog value. These stands are within the 250' Shoreland Zone of Whiskeag Creek.

Recommendations: These stands could have a very limited selective harvest of the largest higher quality white pine and hemlock. The harvest could open small areas of the forest floor for natural regeneration. The largest remaining over-mature poor quality trees could provide future wildlife cavity nesting.

Stand #4,4a - 6 acres & 2 acres - Softwood growth (white pine/red maple) - 4-13" DBH - 9" DBH average -  
BA = 92 ; #4a - 5-28" DBH - 12" DBH average  
(white pine 17.5" DBH average) - BA = 148

Location: The first stand west of the public works brush and gravel storage area. A fairly level, possibly more recently farmed area. The elevation is at 20-30'. Stand #4a is just south of the main garage and is a small summit. This stand is a forested buffer between the powerline and the Town garage. The elevation is from ±40-80' and steep in places.

USDA - Primary soils - HsC/BuB2 - Woodland group #7/#4 - site index 50/60 fair site for existing white pine and hemlock, possibility of replanting to white spruce.

Notes: Very poor quality, multi-weeviled stem white pine with scattered red maple. The north end of the stand is within the 250' Shoreland Zone.

Stand #4a is an overstocked large diameter white pine dominated poor quality stand.

Recommendations: The weeviled white pine should be removed for pulp or chips. The stand could be allowed to naturally regenerate to mixed species as early succession wildlife habitat. Replanting of sections with white spruce could add another species to the site and provide future sawlogs.

4a - A limited harvest of the largest mature white pine could provide a few sawlogs and open a few small pockets for regeneration. The quality of the largest trees is declining. Many of the largest trees have little sawlog value.

Stand #5 - 2 acres Mixed-wood growth(hemlock/white pine/red oak) - 4-30" DBH - 10" DBH average - BA = 113

Location: This is the second stand in from the storage yard and is a ravine.

USDA - Primary soils - Sca - Woodland group #7 - site index 55/67 fair to good site for existing mixed species.

Notes: This is an overstocked older growth stand that may have been protected by the topography. The northern end of the stand is in the 250' Shoreland Zone. The main logging road to the interior of the woodlot could run through the south end of this stand where the topography levels out.

Recommendations: Harvesting some of the intermediate size red oak and hemlock could be done to lower the stand density and improve the overall health of the stand. The remaining forest could be reserved as an old growth stand rather than being managed for timber production.

Stand #6 - 5 acres - Mixed-wood growth(hemlock/beech/red maple/red oak/white pine) - 5-20"DBH  
8" DBH average - BA = 124

Location: This is the central stand between the ravine and the ledge ridge.

USDA - Primary soils - BuB2 - Woodland group #4 - site index 55/65 fair to good site for existing mixed species (there is an excessively wet area on the south end).

Notes: This is a more level and wet (vernal pools on south end) overstocked stand. The main access woods road should run north

of the vernal pool area.

Recommendations: There should be a general firewood/pulpwood thinning harvest of the northern 2/3 of the stand. The southern area of vernal pools could have the scattered larger higher quality white pine and red oak harvested (on frozen ground only) for sawlogs.

Stand #7 - 3 acres - Mixed-wood growth (hemlock/red oak/red maple) - 4-14" DBH - 7" DBH average - BA = 75

Location: This stand is on the northwesterly side and running from the pond south into a small "U" shaped valley of the ridge. The elevation slopes from pond level to  $\pm 40'$ .

USDA - Primary soils - HsC - Woodland group #7 - site index 50/60 fair site for existing mixed species. (The growth is a bit better than the soil type would indicate.)

Notes: Probably the most recently harvested (still 30+ years ago) and overstocked with smaller stems. The northern and western areas are within the 250' Shoreland Zone.

Recommendations: There should be a substantial TSI mixed species thinning harvest. A buffer needs to be maintained along the shore.

Stand #8 - 4 acres - Softwood growth (hemlock/white pine) - 4-14" DBH - 6" DBH average - BA = 95

Location: This is the ledge ridge elevation. The elevations are sloped rather steeply from  $\pm 50'$ - $100'$ .

USDA - Primary soils - HsC - Woodland group #7 - site index 50 or less - very poor site due to ledges.

Notes: The lack of soil has reduced the size of the trees. The stand is mostly overly dense except for open ledge areas. There is an area of die-off (hemlock looper ?) just to the south of the largest open ledge area. The western ridge is within the 250' Shoreland Zone.

Recommendations: The topography would seem to prevent safe operation of machinery on much of the area. TSI work by hand, on foot, could thin out the smaller, overly dense, mostly hemlock, forest cover.

Stand #9 & 9a - 3 acres & 1 acre - Mixed-wood growth (hemlock/beech/red maple/red oak/white pine) - 4-14" DBH

6" DBH average - BA = 94

Location: This is the western stand along the pond. The area is gently sloped up from the top of the pond embankment to  $\pm 30'$  elevation.

USDA - Primary soils - HsC - Woodland group #7 - site index 50/60 fair to good site for existing mixed species.

Notes: This overstocked stand is not of the highest quality but has potential. There are large hemlocks lining the shore banking. The entire western side of the stand is within the 250' Shoreland Zone.

Recommendations: There should be a medium intensity TSI thinning harvest, but leaving a buffer along the pond.

Timber stand descriptions and recommendations;

Forest Management Plan for the City of Bath woodlots;

Butler Head Tax Map 4 Lot #26 on Butler Head Road

This is a remote ±124 acre block of woodland with ±10 abutting summer camps along part of the shoreline. The property is a "headland" that juts northerly into tidal Merrymeeting Bay. There is a tidal marsh on the east side, a swamp on the southeast side, a major CMP powerline on the south east side, and a ±150' elevation ledge ridge (with a rock rubble westerly face) on the south side.

Stand #1 - 4 acres (3 acres scrub hardwood + 1 acre softwood)  
(red maple/ash + white pine/cedar) - 4-11" DBH +  
9-18 " DBH - 6" DBH average + 9" DBH average  
BA = 133

Location; This is the eastern most stand between the entrance Butler Head Road and the CMP powerline.

USDA - Primary soils - HrC - Woodland group #2 - site index 48/56 poor site, existing species best possibility.

Notes: Next to the powerline it is mostly scrub and early regenerating forest with a pocket of large white pine and cedar understory on the ledge drop to the marsh. There are grouse present. There are some woody stemmed invasive species on the higher ground. At least half of this stand is within the 250' Shoreland Zone of Butler Cove.

Recommendations: This area is primarily scrub hardwood from the swamp to the higher ground. I would recommend an occasional firewood harvest to help keep this a scrub growth area for wildlife habitat. Even though there is a newer house just north of this stand, the existing large white pine on the shore of Butler Cove could provide large bird nesting sites.

Stand #2 - 10 acres - Softwood growth (white pine/red maple/ash) - 6-18" DBH - 10" DBH average

Location: This is the first stand west of the swamp, south of Butler Head Road. The land slopes gently easterly from ±50' elevation down to the swamp.

USDA - Primary soils - SzA - Woodland group #5 - site index 55/60 fair to good site, possible replacing of white pine with white spruce.

Notes: This area is probably an abandoned farm field. The primary cover is heavily weeviled white pine. The northern end of the stand is within the 250' Shoreland Zone of Butler Cove. Most of the stand is within 250' of the 10 acre open wetland swamp and should have a Shoreland Zone there also.

Recommendations: This stand is primarily very poor quality white pine with interspersed red maple, ash, and birch. I would recommend removal of the white pine for puplwood/chips. Keeping in mind the Shoreland Zone maximum harvest of 40%, the removal could be done in two blocks, one now and one in 10 years. The area could be allowed to naturally regenerate as a young mixed growth stand for wildlife habitat. White spruce could be planted for future sawlogs and species diverstiy.

Stand #3 - 20 acres Hardwood growth (red oak/sugar maple/white birch/red maple) - 4- 18" DBH - 9 " DBH average  
BA = 101

Location: This is the eastern slope of the high ridge south of Butler Head Road. The elevation slopes up to the west from ±50' to ±150'.

USDA - Primary soils - Cfd2 - Woodland group #3 - site index 60 good site for existing mixed hardwood species.

Notes: This is an overstocked good quality stand and potential sugarbush. Perhaps a bit much ATV trail use.

Recommendations: This is a stand that deserves a more intensive management schedule. A near-term firewood harvest thinning would be very beneficial to the residual trees and would encourage more natural regeneration. Another thinning could be done in ±10years.

Stand #4 - 2 acres - Softwood growth (white pine/hemlock) - ±18" DBH average stem of hemlock and white pine  
BA = 155

Location: This is the north tow slope (at ±100' elevation) of the ridge just south of Butler Head Road.

USDA - Primary soils - Cfd2 - Woodland group #3 - site index 72 good to excellent site for existing white pine and hemlock.

Notes: This is an "island" of large fairly healthy, fairly good quality white pine and hemlock. This pocket could be preserved as is.

Recommendations: None at present.

Stand # 5 - 10 acres - Mixed-wood growth (white birch/white pine/red maple/hemlock) - 4-18" DBH - 8" DBH average  
BA = 69

Location: A narrow band along the south side of Butler Head Road and the east side of Mallard Road. The stand wraps around the toe slope (at  $\pm 100'$  elevation) of the north end of the ridge.

USDA - Primary soils - ChC/CfD2 - Woodland group #3 - site index 52/72 fair to excellent site for existing mixed species.

Notes: This stand is mostly low quality mid-age regenerating forest, and was possibly an abandoned field.

Recommendations: A fairly intensive firewood/pulpwood/chips harvest would improve this stand. Both wildlife habitat and future sawlog production would benefit.

Stand #6 - 5 acres - Softwood growth (white pine/hemlock)

Location: The summit of the ridge at  $\pm 150'$ - $180'$  on the south property line with Lot #29.

USDA - Primary soils - HsD - Woodland group #7 - site index 50/55 generally poor site.

Notes: There are several ATV trails and a large camp site (luckily no debris). The poor thin soil produces shorter, poorer quality trees and is overstocked except on the very summit.

Recommendations: A limited sawlog harvest of white pine and hemlock and light TSI work would improve the forest and the aesthetics.

Stand #7 - 3 acres - rock rubble cliff - with scattered large yellow birch/white pine/hemlock

Location: This area is along the west side of the ridge summit along the property line with lots #29 & 28.1. The elevation takes a sharp drop to the west from  $\pm 150'$  down to  $\pm 100'$ .

USDA - Primary soils - rubble - Woodland group #7 - very poor site.

Notes: A large rock rubble cliff with possibly hundreds of animal dens. I observed no rare plants, however the fern and lichen cover is impressive. I measured a 18" DBH ironwood at the base of the rubble. There are very old yellow birch in the rubble.

Recommendations: No harvesting should be done on or around the rubble.

Stand #8 - 17 acres - Hardwood growth (red oak/white pine/red maple/shagbark hickory) - 4-20" DBH (scattered 24-26") - 8 " DBH average - BA = 108  
cedar glen of 1 acre within #8  
#8a - 2 acres Mixed growth (the southern end of #8)  
has more scattered large DBH white pine and hemlock

Location: This is the southwest section but not the shorefront, mostly to the east of Mallard Road, but does have a 2-3 acre area on the north end of the stand on the west of the road. The area is gently sloped with level areas. The elevations are between  $\pm 50'$ - $100'$ .

USDA - Primary soils - HrC/SyC - Woodland group #2/4 - site index 48/56/67 fair to excellent site for existing mixed species.

Notes: There are scattered very large white pine, ash, red and white oak and a considerable component of  $\pm 5\%$  of shagbark hickory (which is not common in this area). There is a  $\pm 1$  acre pocket of larger cedar and large white pine (with at least seven species of fern) that should be preserved as is.

Recommendations: This stand is another that deserves more intensive management. There could be a light harvest of the mature better quality white pine and hemlock. The hardwoods should be thinned for firewood. Large poor quality hardwoods should be left for aesthetics and wildlife. The shagbark hickory and white oak should be left for diversity and wildlife.

Stand #9 - 16 acres - Softwood growth (hemlock/white pine/white birch) - 6-20" DBH - 8"+ DBH average - BA = 165

Location; This is the western side of Mallard Road along Merrymeeting Bay. The elevation is mostly from  $\pm 80'$  sloping down to a  $\pm 20'$  embankment to the bay.

USDA - Primary soils - ChD/HsD/SyC - Woodland group #2/7/4 - site index 55/72 good site for existing white pine and hemlock.

Note: This area could be described as a slope wetland with a very overstocked older growth hemlock forest. The forest floor is almost unwalkable in many places due to dead cedar trunks. The entire western side of this stand is within the 250' Shoreland Zone of Merrymeeting Bay.

Recommendations: This stand is so dense that the tree growth rings in a core sample are can hardly be counted due to the

slow growth. With a light to medium intensity TSI thinning of the poorer quality intermediate hemlocks, this could be a health and aesthetically pleasing stand for decades.

Stand #10 - 13 acres - Mixed-wood growth (white pine/hemlock/  
white birch/red maple) - 4-18" DBH - 8" DBH average  
BA = 113

Location: This is a band of forest along the north side of Butler Head Road. The area is a wet gently sloping plateau at  $\pm 70-90'$  elevation.

USDA - Primary soils - ChC/HrC/SyC - Woodland group #3/7/4 - site index 52/60/72 good site for existing mixed species.

Notes: This is a fairly poor quality, overstocked, mid-age regenerating forest. This could have been an abandoned farm field previous to this stand. The northwest end of the stand is within the 250' Shoreland Zone of Merrymeeting Bay and the southeast end is within the 250' Shoreland Zone of Butler Cove.

Recommendations: This stand is similar to Stand #5 on the other side of Butler Head Road. A similar intensity harvest should be done at the same time.

Stand #11 - 4 acres - Softwood growth (hemlock/white pine/ red  
oak/ red maple) - 5-8" DBH - 10" DBH average -  
BA = 120

Location: This is a central pocket north of Butler Head Road, on a gently sloping plateau at  $\pm 70'$  elevation.

USDA - Primary soils - HrC - Woodland group #2 - site index 48/56 poor site.

Notes: A non-distinct edge, overstocked stand of older trees.

Recommendations: A medium intensity harvest of the hemlock and white pine could be done to improve the health, aesthetics and future sawlog production.

Stand #12 - 8 acres - Softwood growth (hemlock/white pine)  
7-20" DBH - 13" DBH average - BA = 134

Location: The eastern side of the "head" from the single powerline to the shore of Butler Cove. The elevation slopes fairly gently from  $\pm 70'$  to a  $\pm 20'$  embankment to tidal waters.

USDA - Primary soils - SyC - Woodland group #4 - site index

67 good to excellent site for existing white pine and hemlock.

Notes: A very overstocked stand of very large white pine on the west side of the stand transitioning into large hemlock toward the shore. The eastern half of the stand is within the 250' Shoreland Zone of Butler Cove. There is excessive white pine mortality on the south end of the stand near the outholding camp lot.

Recommendations: This is a great example of a late successional softwood stand. The stand deserves a light selective thinning of the intermediate height/diameter hemlocks. This stand will have a "cathedral" park like aesthetic feel. Even after thinning the forest floor will probably still remain mostly open without regeneration.

Stand #13 - 9 acres - Hardwood growth (red oak/beech/white pine/red maple/hemlock) - 4-40" DBH - 9" DBH average  
BA = 85

Location: The northern tip of the "head". The area is a fairly level plateau at ±50-70' elevation sloping to a ±30' embankment to the bay.

USDA - Primary soils - ChC/ChD - Woodland group #3 - site index 52/62 fair to good site for existing mixed hardwood species.

Notes: A classic older growth red oak stand. There is a border of hemlock along the shore banking. This could have been a farm field ±100 years ago. Stand #12 and #13 combined are a very aesthetically pleasing forest area. The northern half of this stand is within the Shoreland Zone of Merrymeeting Bay.

Recommendations: A very light selective firewood harvest thinning would enhance the health and aesthetics of this stand.

## V. Monitoring Plan

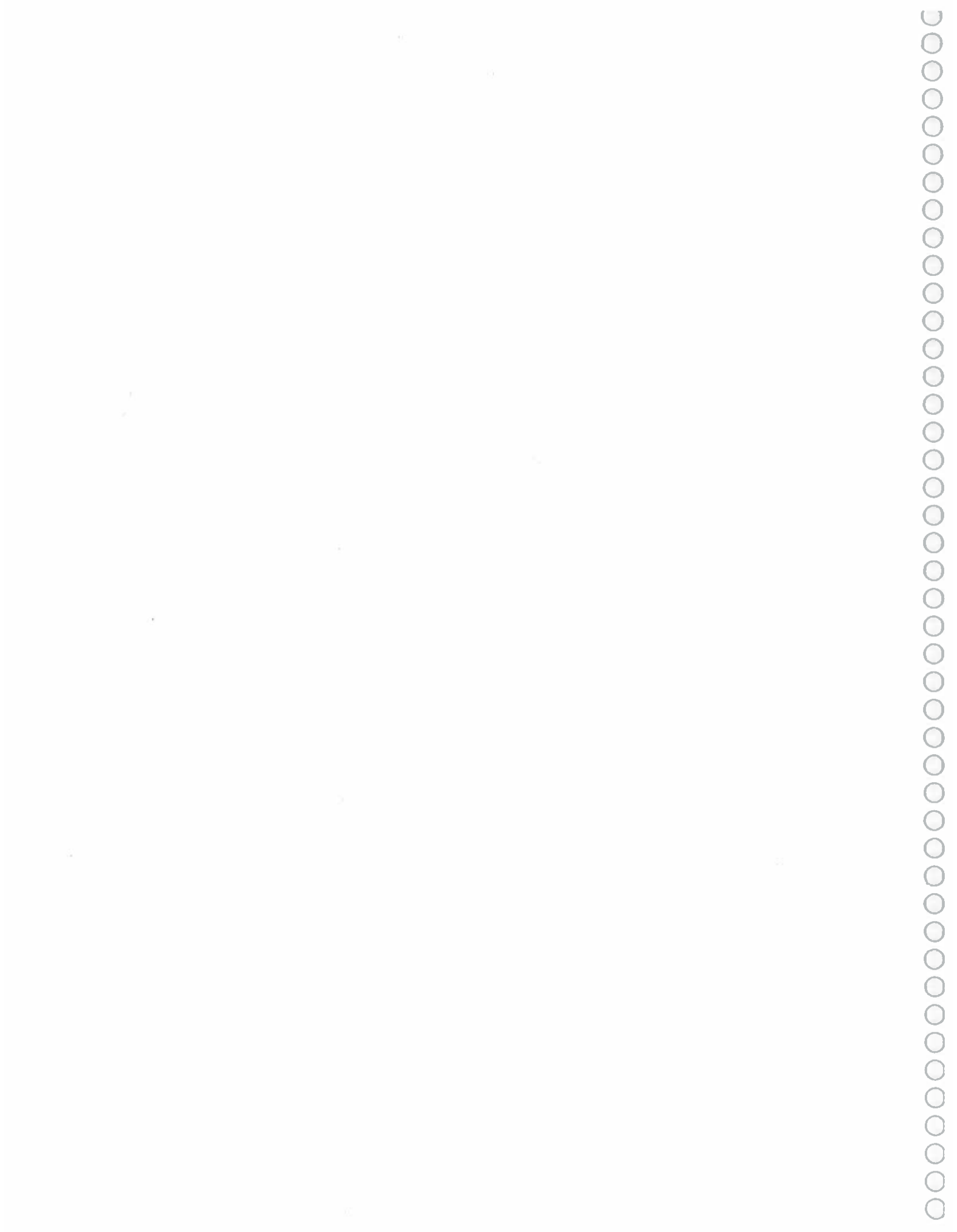
A comprehensive approach to ecologically sustainable forestry involves monitoring of the forest. This information will be used to update new management plans, track progress toward meeting goals, evaluate the success of past treatments and need for follow up, and monitor for potential adverse impacts of management (e.g., soil erosion on trails).

The following table includes both “strongly recommended” and “desirable” monitoring recommendations. The “desirable” recommendations and some of the “strongly recommended” items could be undertaken by volunteers.

Monitoring Plan			
Element	Frequency	Strongly Recommended	Desirable
Forest inventory	Every 10 years	<ul style="list-style-type: none"> <li>• Tree species, size and density</li> <li>• Focus Species Development Stage</li> <li>• Refer to Maine Forest Service Stewardship Plan inventory requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Species distribution by canopy layer (overstory, understory, ground cover) and percent cover of each layer.</li> <li>• Shrubs, wildflowers and other herbs, ferns and bryophytes.</li> <li>• Snags, cavity trees, and large downed woody material</li> </ul>
Invasive species	Every 5 years	<ul style="list-style-type: none"> <li>• Treated sites and trails (every 5 yrs.)</li> <li>• Entire forest, include as part of regular 10-year inventory.</li> </ul>	
Regeneration	Within 3 years of a regeneration harvest	<ul style="list-style-type: none"> <li>• Quantitative or qualitative monitoring designed to see if regeneration objectives are being met.</li> </ul>	
Erosion and sedimentation	Post harvest: during and at the conclusion of operations, within 12 months of harvest (or sooner if very heavy rains), and within 3 years. Recreation trails: annually	<ul style="list-style-type: none"> <li>• Check skid trails, water crossings, and landings.</li> <li>• Check all recreation trails.</li> </ul>	
Wildlife inventory	Annually for 3 years to establish baseline, every 5 years thereafter.		<ul style="list-style-type: none"> <li>• Breeding bird inventory</li> <li>• Winter mammal tracking</li> <li>• Owl nesting surveys</li> <li>• Search for vernal pools</li> </ul>
Recreation Use	Annually	<ul style="list-style-type: none"> <li>• Monitor soil compaction, erosion, and other impacts of recreation use.</li> <li>• Check for unauthorized trails and other activities.</li> </ul>	



## VI. Appendices



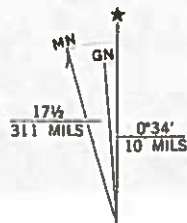
Property owned by: City of Bath  
Butler Head, Varney Mill Road  
Town Tax Map #4 Lot #26  
Sagadahoc County, Maine

Scale - 1" = 2,000'

**BATH QUADRANGLE  
MAINE**

**7.5 MINUTE SERIES (TOPOGRAPHIC)**

Mapped, edited, and published by the Geological Survey  
Control by USGS, NOS/NOAA, USCE, and Maine Geodetic Survey  
Topography by photogrammetric methods from aerial photographs  
taken 1972 and 1973. Field checked 1974. Map edited 1980



UTM GRID AND 1980 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

Property owned by: City of Bath  
Public Works Woods, Oak Grove Avenue  
Town Tax Map #15 Lot #1  
Sagadahoc County, Maine



# Butler Head

1 inch equals 500 feet



Property owned by: City of Bath  
Butler Head, Varney Mill Road  
Town Tax Map #4 Lot #26  
Sagadahoc County, Maine

Map # 5  
Lot # 1  
3.9A

# Public Works

1 inch equals 250 feet

Property owned by: City of Bath  
Public Works Woods, Oak Grove Avenue  
Town Tax Map #15 Lot #1  
Sagadahoc County, Maine



**True North**

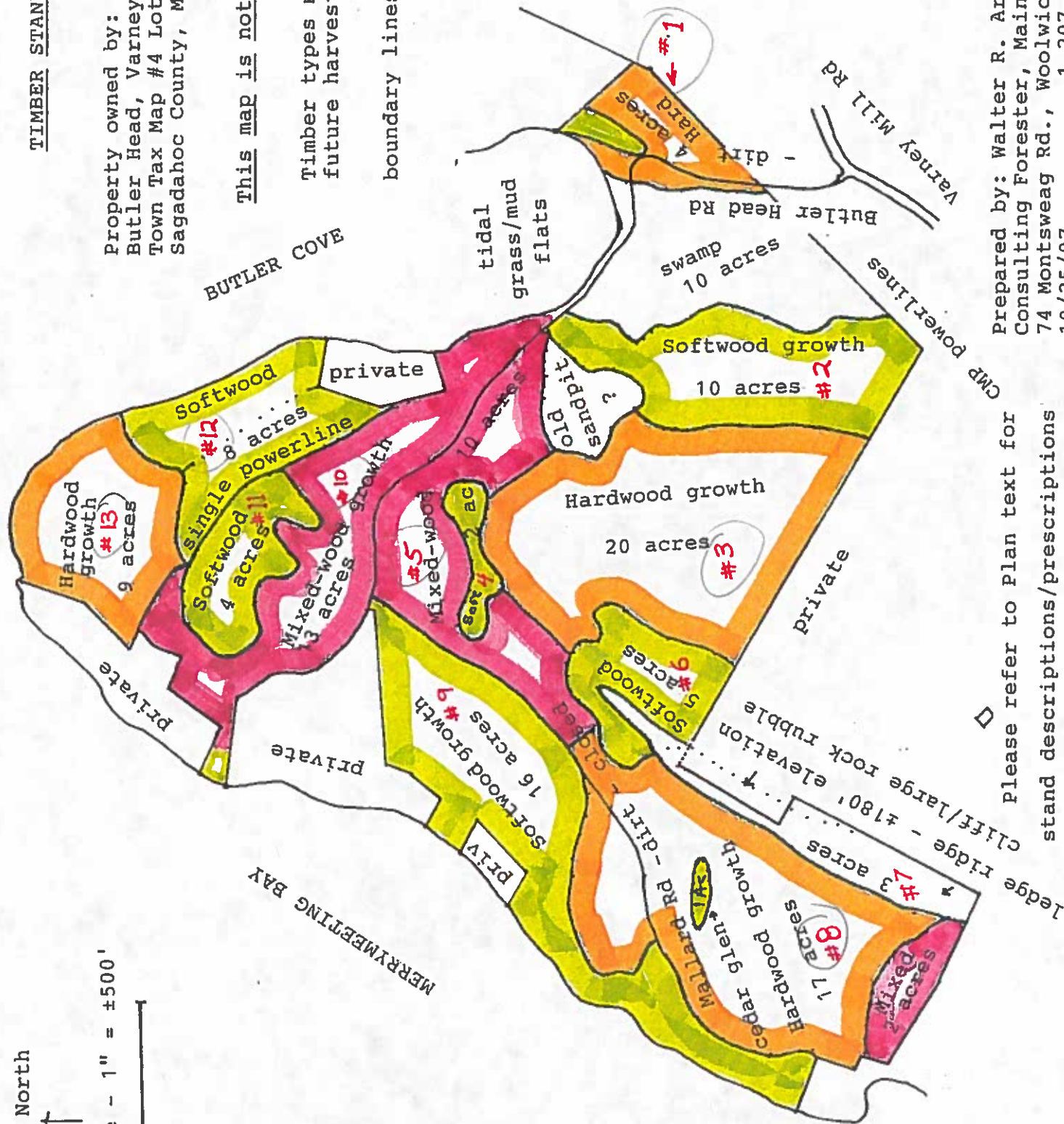
Scale - 1" = ±500'

Property owned by: City of Bath  
Butler Head, Varney Mill Road  
Town Tax Map #4 Lot #26  
Sagadahoc County, Maine

This map is not a legal survey!

Timber types may change due to future harvesting and growth

boundary lines are approximate



Please refer to Plan text for  
stand descriptions/prescriptions

Prepared by: Walter R. Armstrong  
Consulting Forester, Maine License #376  
74 Montsweag Rd., Woolwich, Maine 04579  
10/25/07 1-207-442-7450

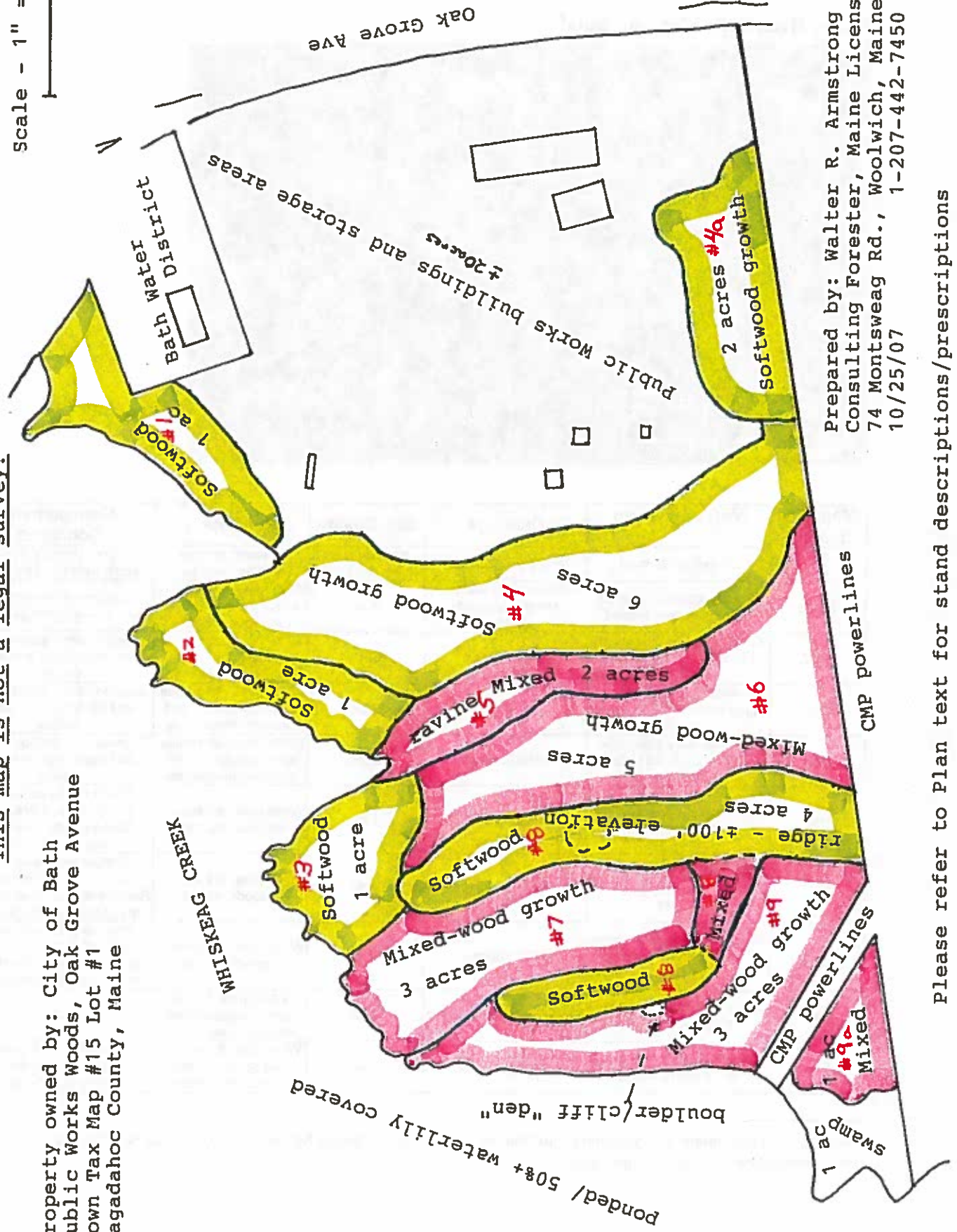
TIMBER STAND MAP

This map is not a legal survey!

Property owned by: City of Bath  
Public Works Woods, Oak Grove Avenue  
Town Tax Map #15 Lot #1  
Sagadahoc County, Maine

True North  
↑

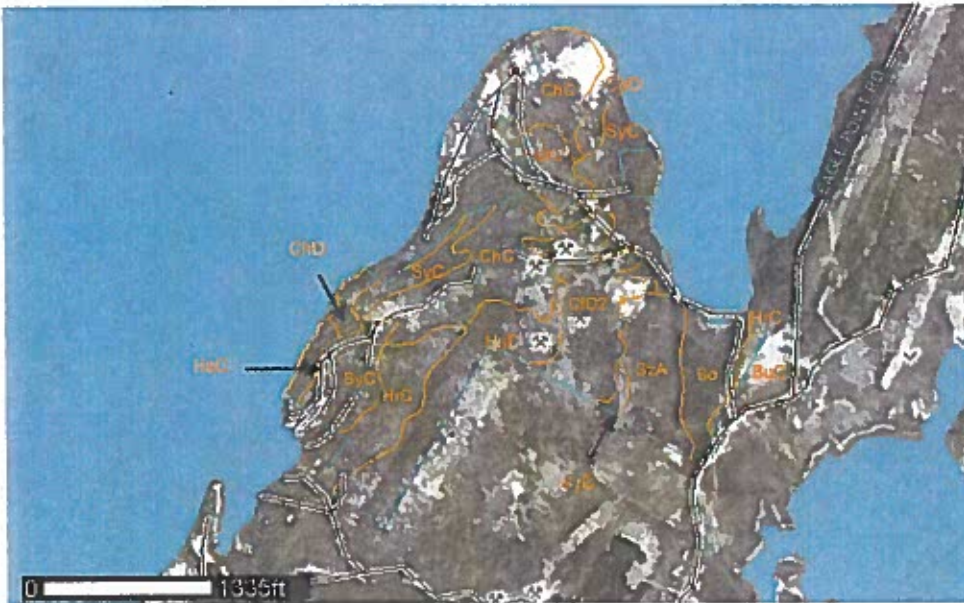
Scale - 1" = ±250'



Prepared by: Walter R. Armstrong  
Consulting Forester, Maine License #376  
74 Montsweag Rd., Woolwich, Maine 04579  
10/25/07 1-207-442-7450

Please refer to Plan text for stand descriptions/prescriptions

## Butler Head Soils Map and Data<sup>2</sup>



Map Unit Symbol	Map Unit Name	Drainage	Site Quality	Vegetation	Management Concerns
Bo	Biddeford silt loam	Very poorly drained	Not suited for timber production	Grasses, sedges, wetland shrubs	Do not cross with equipment unless frozen
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	Moderately well to somewhat poorly drained	Fair	White pine, red spruce, white spruce, fir and northern hardwoods	Equipment use limited during seasonal high water
ChD2	Charlton fine sandy loam, 15 to 25 percent slopes, eroded	Well drained	Good	White pine, red spruce, white spruce, fir and northern hardwoods	Erosion, steep slopes may limit equipment in some places
ChC	Charlton very stony fine sandy loam, 8 to 15 percent slopes	Well drained	Good	White pine, red spruce, white spruce, fir and northern hardwoods	Erosion, steep slopes may limit equipment in some places
ChD	Charlton very stony fine sandy loam, 15 to 25 percent slopes	Well drained	Good	White pine, red spruce, white spruce, fir and northern hardwoods	Erosion, steep slopes may limit equipment in some places
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	Well drained	Fair	White pine, red spruce, hemlock, red oak	Shallow soils subject to windthrow and drought. Steep slopes may limit equipment use.
HsC	Hollis very rocky fine sandy loam, 8 to 15 percent slopes	Well drained	Fair	White pine, red spruce, hemlock, red oak	Shallow soils subject to windthrow and drought. Rockiness and steep slopes may limit equipment use.
HsD	Hollis very rocky fine sandy loam, 15 to 45 percent slopes	Well drained	Fair	White pine, red spruce, hemlock, red oak	Shallow soils subject to windthrow and drought. Rockiness and steep slopes may limit equipment use.
SyC	Sutton very stony loam, 8 to 15 percent slopes	Moderately well drained	Good	White pine, fir, red spruce, white spruce, northern hardwoods	None
SzA	Swanton fine sandy loam, 0 to 3 percent slopes	Poorly drained	Fair	White pine, balsam fir, red spruce, white spruce, red maple	Wetness increases windthrow and limits equipment use

<sup>2</sup> Source: US Department of Agriculture, Soil Survey of Sagadahoc County Maine and NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>).

## Whiskeag Creek Soil Map and Data<sup>1</sup>



Map Unit Symbol	Map Unit Name	Drainage	Site Quality	Vegetation	Management Concerns
BuB2	Buxton silt loam, 0 to 8 percent slopes, eroded	Moderately well to somewhat poorly drained	Good	White pine, spruce, fir and northern hardwoods	Equipment use limited during seasonal high water
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	Moderately well to somewhat poorly drained	Fair	White pine, spruce, fir and northern hardwoods	Equipment use limited during seasonal high water
HsC	Hollis very rocky fine sandy loam, 8 to 15 percent slopes	Well drained	Fair	White pine, red oak, hemlock	Shallow soils subject to windthrow and drought. Rockiness and steep slopes may limit equipment use.
ScA	Scantic silt loam, 0 to 3 percent slopes	Poorly drained	Fair	White pine, fir, red maple, white ash	Wetness increases windthrow and limits equipment use
Tn	Tidal marsh ( <i>the creek has been dammed and this is now non-tidal</i> )	Very poorly drained	—	Grasses, sedges, shrubs	—

<sup>1</sup> Source: US Department of Agriculture, Soil Survey of Sagadahoc County Maine and NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>).



JOHN ELIAS BALDACCI  
GOVERNOR

STATE OF MAINE  
DEPARTMENT OF CONSERVATION  
17 ELKINS LANE  
93 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0093

PATRICK K. McGOWAN  
COMMISSIONER

October 15, 2007

Walter R. Armstrong  
74 Montsweag Road  
Woolwich, ME 04579

Re: Forest Management Plan Review

Dear Mr. Armstrong:

I have searched the Maine Natural Areas Program's (MNAP) files in response to your request of October 10, 2007 for information on the presence of important habitats documented from the vicinity of the Butler Head Woods and Public Works Woods in the City of Bath.

For individual parcel reviews, we have started using a simple checklist that summarizes our findings. The checklist includes our review of several data sets, some of which are maintained by MNAP and others that are maintained by the Maine Department of Inland Fisheries and Wildlife (MDIFW). If a parcel intersects with a data set maintained by MDIFW, please contact the appropriate regional biologist indicated on the checklist for additional information. Several rare plants and tidal wading bird and waterfowl habitat abut Butler Head Woods. Inland wading bird and waterfowl habitat is within and tidal wading bird and waterfowl habitat abuts the Public Works Woods parcel.

Thank you for using the MNAP in the forest management planning process. Please do not hesitate to contact me if you have further questions about the MNAP or about important habitats at this site.

Sincerely,

Lisa St. Hilaire  
Assistant Ecologist / Acting Information Manager  
93 State House Station  
Augusta, ME 04333-0093  
207-287-8046  
[Lisa.St.Hilaire@maine.gov](mailto:Lisa.St.Hilaire@maine.gov)

Enclosures

Cc: James Connolly, MDIFW Regional Biologist

## MNAP Forestry Notification and Forest Management Plan Checklist

Date Received: October 15, 2007

Designated Agent:

Landowner: City of Bath

Licensed Forester: Walter R. Armstrong

Harvester:

Notification #:

Town: Bath

Have Rare, Threatened and/or Endangered Plants been documented to occur at site? ☒ Yes ☐ NoHave Rare and/or Exemplary Natural Communities been documented to occur at site? ☐ Yes ☒ NoHave Rare, Threatened and/or Endangered Animals been documented to occur at site? ☐ Yes ☒ No  
(If yes, contact MDIFW regional biologist)Have MDIFW Significant Habitats been documented to occur at site? ☒ Yes ☐ No  
(If yes, contact MDIFW regional biologist James Connolly, 547-5318)Does the parcel intersect with Atlantic salmon habitat?  
(If yes, please contact the Atlantic Salmon  
Commission for potential impacts )☐ Yes, within salmon watershed  
☐ Yes, adjacent to spawning habitat  
☐ Yes, adjacent to rearing habitat  
☒ NoDoes the parcel occur in a town that may provide habitat for lynx? ☐ Yes ☒ No  
(If yes, please contact Mark Stadler, Director of Wildlife Division,  
Maine Dept. of Inland Fisheries and Wildlife, 41 State House Station, Augusta, ME 04333)

## Summary List of Known MNAP/MDIFW Features

Feature Name	Common Name	Last Seen	SRank	GRank	EO Rank	Conservation Considerations
<i>Bidens eatonii</i>	Eaton's Bur-marigold	1998	S2	G2G3	CD	Threatened, Butler Head Woods
<i>Bidens hyperborea</i>	Estuary Bur-marigold	2001	S3	G4	C	Special Concern, Butler Head Woods
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	Water Pimpernel	2001	S3	G5T5	B	Special Concern, Butler Head Woods
<i>Limosella australis</i>	Mudwort	2001	S3	G4G5	B	Special Concern, Butler Head Woods
<i>Sagittaria calycina</i> var. <i>spongiosa</i>	Spongy Arrow-head	2001	S3	G5T4	BC	Special Concern, Butler Head Woods
<i>Eriocaulon parkeri</i>	Parker's Pipewort	2002	S3	G3	C	Special Concern, Butler Head Woods
Tidal Wading Bird and Waterfowl Habitat	Tidal Wading Bird and Waterfowl Habitat					Special Concern, Butler Head Woods
Inland Wading Bird and Waterfowl Habitat	Inland Wading Bird and Waterfowl Habitat					Public Works Woods
Kennebec Estuary Focus Area						Special Concern, Butler Head Woods

Does parcel intersect with MNAP land trust focus area? ☒ Yes ☐ No  
Comments: Kennebec Estuary Focus AreaHas parcel been targeted by MNAP for inventory? ☐ Yes ☒ No  
Comments:Initial review completed by: LRS  
Date: 10/15/07 Time spent: 15 min.Additional review completed by MNAP or IFW staff (circle one):  
Reviewer: Date: Time spent:

John E. Baldacci  
Governor



Roland D. Martin  
Commissioner

**DEPARTMENT OF INLAND FISHERIES AND WILDLIFE**

Wildlife Division, Region A  
358 Shaker Road  
Gray, ME 04039  
Phone: (207) 657-2345 x 109  
Fax: (207) 657-2980  
[judy.camuso@maine.gov](mailto:judy.camuso@maine.gov)

December 11, 2007

Rob Bryan

RE: Bath, City Forest

Dear Rob,

You contacted our offices regarding any wildlife resources on Butler Head, and the Public Works Woods, in Bath, Maine. As you can see from the attached map, there are mapped high value wading bird and waterfowl habitats, a significant wildlife habitat under NRPA, associated with each site on the map you provided. Based on a review of the most current data available, there are not any documented occurrences of rare, threatened or endangered wildlife species on either site. I am not aware of any significant vernal pools on this property, however no formal surveys have been conducted. Vernal pools of management concern include those with documented reproduction of the following species; wood frog, spotted salamander, four-toed salamander, blue-spotted salamander, and fairy shrimp.

Please feel free to contact me if you have additional questions.

Sincerely,

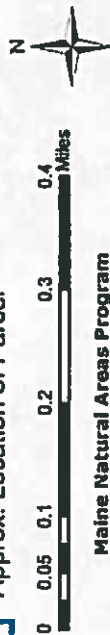
*Judy Camuso*

Judy Camuso  
Assistant Regional Wildlife Biologist

# Habitats of Management Concern

Forest Management Plan  
Butler Head Woods  
Project Canopy, City of Bath

- Rare Plant
- Tidal Wading Bird & Waterfowl Habitat
- Bald Eagle Essential Habitat
- Approx. Location of Parcel



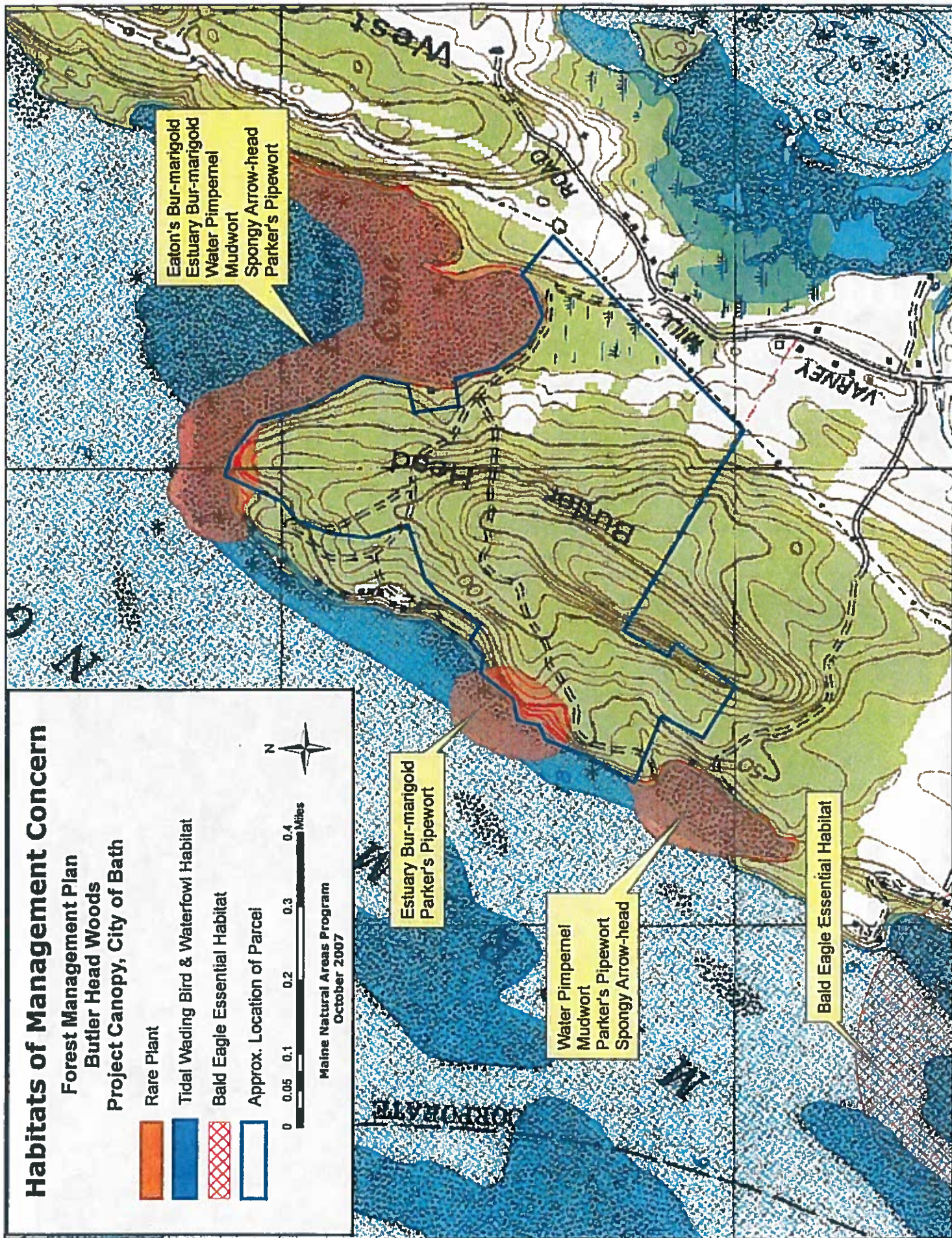
Maine Natural Areas Program  
October 2007

Eaton's Bur-marigold  
Estuary Bur-marigold  
Water Pimpernel  
Mudwort  
Spongy Arrow-head  
Parker's Pipewort

Estuary Bur-marigold  
Parker's Pipewort

Water Pimpernel  
Mudwort  
Parker's Pipewort  
Spongy Arrow-head

Bald Eagle Essential Habitat



# Habitats of Management Concern

Forest Management Plan  
Public Works Woods  
Project Canopy, City of Bath

- Inland Wading Bird and Waterfowl Habitat
- Tidal Wading Bird & Waterfowl Habitat
- Rare Plant
- Approx. Location of Parcel



Maine Natural Areas Program  
October 2007

Brackish Tidal Marsh  
and a long list of tidal marsh species  
similar to those at Butler Head

Maple C  
Cen



Maine Department of Conservation  
Natural Areas Division

Rare Plant Fact Sheet  
PDAST180M0

*Bidens eatonii* Fern.

Eaton's Bur-marigold

**Habitat:** Tidal shores. [Tidal wetland (non-forested, wetland)]

**Range:** Tidal portions of Merrimac River, St. Lawrence River, Kennebec River, and Hudson River. Also listed as rare in Connecticut and Massachusetts; does not occur elsewhere in New England.

**Phenology:** Flowers August - September.

**Family:** Asteraceae



**Aids to Identification:** Bur-marigolds are herbaceous plants with yellow daisy-like or button-like flowers and opposite leaves. The term "bur-marigold" refers to the "sticktight" fruits which attach themselves readily to clothing or fur. *B. eatonii* differs from other Maine bur-marigolds in the following combination of characters: the leaves are simple (as opposed to compound); the leaves are stalked, with the stalk (petiole) somewhat winged; and the largest heads are few-flowered (7-30 flowers). Other similar species which could occur in Maine estuaries have compound or sessile leaves or broader flower heads, with at least the terminal head having 30-150 flowers. The species is divided into several varieties by some botanists.

Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed. Image shown here is *Bidens cernua*.

**Ecological characteristics:** *Bidens eatonii* is characteristic of brackish estuaries and occupies the upper intertidal zone. In some cases it has been found with the also rare *Bidens hyperborea* (which has sessile leaves).

**Synonyms:** *Bidens eatonii* var. *fallax* Fern., *Bidens eatonii* var. *interstes* Fassett, *Bidens eatonii* var. *kennebecensis* Fern., *Bidens eatonii* var. *major* Fassett, *Bidens heterodoxa* (Fern.) Fern. & St. John var. *athesitica* Fern.

**Rarity of *Bidens eatonii***

<b>State Rank:</b>	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
<b>New England Rank:</b>	Division I	Globally rare plant occurring in New England. Only a few occurrences in New England
<b>Global Rank:</b>	G2	Imperiled globally.



Maine Department of Conservation  
Natural Areas Program

*Bidens hyperborea* Greene

Estuary Bur-marigold

- Habitat:** Localized in fresh to brackish estuaries.  
[Tidal wetland (non-forested, wetland)]
- Range:** Massachusetts to Nova Scotia and Quebec.
- Phenology:** Flowers August - September
- Family:** Asteraceae



Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed. Image shown here is *Bidens cernua*.

**Aids to Identification:** Bur-marigolds are herbaceous plants with yellow daisy-like or button-like flowers and opposite leaves. The term "bur-marigold" refers to the "sticktight" seeds which attach themselves readily to clothing or fur. *B. hyperborea* differs from other Maine bur-marigolds in the following combination of characters: the leaves are simple (as opposed to compound) and without stalks, and the heads are usually erect (as opposed to the common nodding beggar ticks, *B. cernua*). For certain identification, one must look at the fruits (cypselas) which in *B. hyperborea* are coarsely striate and have a convex, cartilagenous apex. This species is presently divided into several varieties, two of which are known to occur in Maine. Most specimens are not distinguished to variety.

**Ecological characteristics:** *Bidens hyperborea* is characteristic of tidal estuaries and occupies mudflats. In some cases it has been found with *B. eatonii* (S1), which has stalked leaves.

**Synonyms:** *Bidens hyperborea* var. *cathancensis* Fern., *Bidens hyperborea* var. *colpophilus* (Fern. & St. John) Fern., *Bidens hyperborea* var. *laurentiana* Fassett, *Bidens hyperborea* var. *svensonii* Fassett.

Rarity of *Bidens hyperborea*

<b>State Rank:</b>	S3	Rare in Maine
<b>New England Rank:</b>	Division 2	Regionally rare plant. Fewer than 20 occurrences in New England.
<b>Global Rank:</b>	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

Status of *Bidens hyperborea*

<b>Federal Status:</b>	None	No Federal Status.
<b>State Status:</b>	Threatened	
<b>Proposed State Status:</b>	Special Concern	Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

### Known Distribution in Maine:



- ▲ Historical (before 1982)  
● Recent (1982 - present)

This rare plant has been documented from a total of 13 town(s) in the following county(ies): Hancock, Kennebec, Lincoln, Penobscot, Sagadahoc, Waldo, York.

Dates of documented observations are: 1921, 1936, 1937, 1964, 1979, 1983, 1984, 1986, 1990 (7), 1991, 1995 (8), 1997, 1998 (13), 1999 (2), 2001

### Reason(s) for rarity:

A polymorphic species with varieties restricted to specific geographic areas.

### Conservation considerations:

Prevent degradation of marsh and estuary habitat from adjacent land uses.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 28 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,  
please contact the Natural Areas Program  
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation  
Natural Areas Program

Rare Plant Fact Sheet  
PMER101670

*Eriocaulon parkeri* B.L. Robins.

**Parker's Pipewort**

- Habitat:** Fresh to brackish tidal mud and estuaries.  
[Tidal wetland (non-forested, wetland)]
- Range:** Virginia to Maine, estuaries of the St. Lawrence River, Quebec. Has become rare as far south as Connecticut; its Maine populations are particularly significant as they are at the northern edge of its range. It is rare anywhere in Canada, also rare in New York and Pennsylvania.
- Phenology:** Flowers July - October.
- Family:** Eriocaulaceae



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

**Aids to Identification:** Parker's pipewort looks like a diminutive version of the common pipewort (*E. aquaticum*) which is found in shallow freshwater throughout the northeast. Parker's pipewort, however, grows only 5-10 cm high, with narrow lance-shaped leaves in a basal rosette. Its hemispherical flower heads, each borne on a scape above the foliage, are like small white buttons, measuring 3-4 mm wide. The inflorescences of *E. aquaticum* are subglobose and measure 4-5 mm wide.

**Ecological characteristics:** Grows primarily on fresh tidal mudflats, and is often visible only at low tide. It may occur in relatively extensive colonies, or as only a few plants.

**Synonyms:**

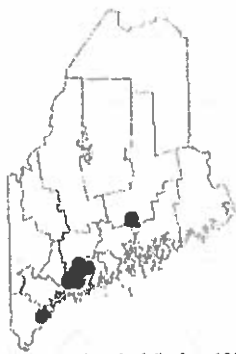
**Rarity of *Eriocaulon parkeri***

<b>State Rank:</b>	S3	Rare in Maine.
<b>New England Rank:</b>	Division 1	Globally rare plant occurring in New England: Only a few occurrences exist within New England.
<b>Global Rank:</b>	G3	Rare or uncommon globally.

**Status of *Eriocaulon parkeri***

<b>Federal Status:</b>	None	No Federal Status.
<b>State Status:</b>	Special Concern	
<b>Proposed State Status:</b>	Special Concern	Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

### Known Distribution in Maine:



- ▲ Historical (before 1983)  
● Recent (1983 - present)

This rare plant has been documented from a total of 14 town(s) in the following county(ies): Cumberland, Kennebec, Lincoln, Penobscot, Sagadahoc, York.

**Dates of documented observations are:** 1924, 1937 (2), 1979, 1983 (2), 1985 (3), 1986, 1990 (4), 1992, 1994, 1995 (2), 1996 (2), 1998 (11), 1999 (2), 2000, 2001, 2002 (5)

### Reason(s) for rarity:

Unknown; at northern edge of its range.

### Conservation considerations:

Prevent degradation of estuary habitat from adjacent land uses.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 29 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,  
please contact the Natural Areas Program  
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation  
Natural Areas Program

*Limosella australis* R. Br.

Mudwort

- Habitat:** Fresh to brackish shores and wet sands.  
[Tidal wetland (non-forested, wetland)]
- Range:** Newfoundland, Gulf of St. Lawrence,  
south along coast to Virginia.
- Phenology:** Flowers July - October.
- Family:** Plantaginaceae (formerly in Veronicaceae)

**Aids to Identification:** Mudwort is a small annual that grows in clumps of narrow, fleshy leaves (2-5 cm high) surrounding tiny, five-petalled, white flowers on naked pedicels. It may occur singly or in patches of clumps connected by above-mud runners.

**Ecological characteristics:** Mudwort is tolerant of both completely fresh and moderately saline water. In Maine it most often grows in the mid to lower intertidal zone where it is completely submerged at high tide. Apparently preferring open mud, it usually has few immediate associates, but may form colonies of many plants a few centimeters apart, connected by the fragile runners.



Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed. Image shown here is *Limosella aquatica*.

**Synonyms:** Formerly known as *Limosella subulata* Ives, *Limosella aquatica* L. var. *tenuifolia* Hoffman.

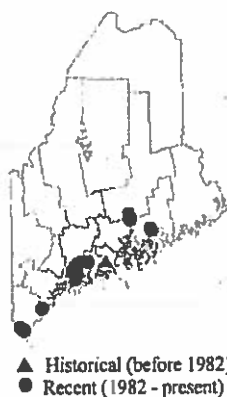
**Rarity of *Limosella australis***

- |                          |      |   |
|--------------------------|------|---|
| <b>State Rank:</b>       | S3   | Rare in Maine.  |
| <b>New England Rank:</b> | None |   |
| <b>Global Rank:</b>      | G4G5 | Widespread, abundant, and apparently secure globally but possibly with cause for long-term concern. |

**Status of *Limosella australis***

- |                               |                 |   |
|-------------------------------|-----------------|---|
| <b>Federal Status:</b>        | None            | No Federal Status.  |
| <b>State Status:</b>          | Special Concern |   |
| <b>Proposed State Status:</b> | Special Concern | Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered. |

### Known Distribution in Maine:



This rare plant has been documented from a total of 17 town(s) in the following county(ies): Hancock, Knox, Lincoln, Penobscot, Sagadahoc, Waldo, York.

**Dates of documented observations are:** 1916, 1982, 1983 (3), 1984 (2), 1985 (4), 1986, 1988, 1990 (4), 1991 (4), 1992, 1993, 1995, 1996, 1998 (7), 1999 (2), 2000

### Reason(s) for rarity:

Habitat naturally scarce, and in some areas declining.

### Conservation considerations:

Prevent degradation of estuary habitat from adjacent land uses.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 29 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,  
please contact the Natural Areas Program  
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation  
Natural Areas Program

Rare Plant Fact Sheet  
PMAL04042

*Sagittaria calycina* Engelm.

Spongy Arrow-head

**Habitat:** Tidewater marshes and streams. [Tidal wetland (non-forested, wetland)]

**Range:** On estuarine rivers, New Brunswick to Virginia.

**Phenology:** Flowers and fruits July - October.

**Family:** Alismataceae

**Aids to Identification:** Arrowheads are aquatic plants with 3-petalled white flowers and numerous stamens and carpels. The septate nodulose roots are distinctive. Young plants of many arrowheads often grow as clumps of narrow leaves which differentiate to various arrow shapes as they mature and emerge above water. This species, however, typically retains its thick, spongy, bladeless phyllodia (modified petioles), only occasionally showing narrowly sagittate leaves. Flowers, often single, on drooping thick pedicels, with sepals ascending in fruit.

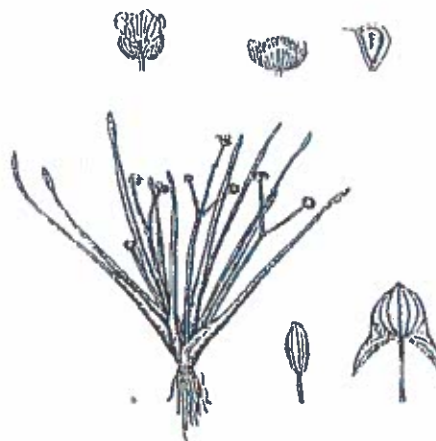


Illustration from Crow's New England's Rare, Threatened, and Endangered Plants.

**Ecological characteristics:** Being somewhat more tolerant of mild salinity than many other estuarine species, *Sagittaria calycina* usually grows in the mid to lower intertidal zone in our area. It can be found under a sparse canopy of *Spartina alterniflora*, *Scirpus acutus*, or *Zizania aquatica* or on open mud. Its occurrence is patchy, varying with microtopography, proximity of freshwater springs and the salinity of the tidal water. The further upstream in the estuary, the lower in the intertidal zone it will be found.

**Synonyms:** Represented in Maine by the variety *spongiosa* Engelm., and formerly known as *Lophotocarpus spongiosus*, *Sagittaria montevidensis* ssp. *spongiosa*, and *Sagittaria spatulata*.

**Rarity of *Sagittaria calycina***

**State Rank:** S3 Rare in Maine.

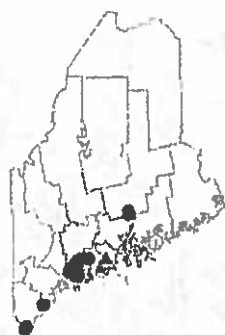
**New England Rank:** None

**Global Rank:** G5T4 Species demonstrably widespread, abundant, and secure globally. Subspecies widespread, abundant, and apparently secure, but with cause for long-term concern.

### Status of *Sagittaria calycina*

<b>Federal Status:</b>	None	No Federal Status.
<b>State Status:</b>	Special Concern	
<b>Proposed State Status:</b>	Special Concern	Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

#### Known Distribution in Maine:



- ▲ Historical (before 1982)
- Recent (1982 - present)

This rare plant has been documented from a total of 21 town(s) in the following county(ies): Knox, Lincoln, Penobscot, Sagadahoc, Waldo, York.

**Dates of documented observations are:** 1937, 1958, 1983 (3), 1984 (2), 1985 (3), 1989, 1990 (6), 1991 (5), 1992 (2), 1995, 1996 (2), 1998 (10), 1999 (2), 2000 (2), 2001 (3), 2002 (3)

#### Reason(s) for rarity:

Habitat naturally scarce and being altered/depleted by human activities.

#### Conservation considerations:

Prevent degradation of estuary habitat from adjacent land uses.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 30 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,  
please contact the Natural Areas Program  
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation  
Natural Areas Program

*Samolus valerandi* (Raf.) Hulten

Water Pimpernel

- Habitat:** Shallow water and wet soils. [Tidal wetland (non-forested, wetland)]
- Range:** New Brunswick, south to Florida, west to Mexico and California, north to Alaska.
- Phenology:** Flowers July - October. Perennial, the basal rosette of leaves persisting through the winter.
- Family:** Primulaceae



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

**Aids to Identification:** Water pimpernel has a basal rosette of oval, light-veined leaves at all seasons. In summer an elongate branched raceme (10-50 cm) bearing small alternate leaves and tiny white bell-shaped flowers (2-3 mm wide) arises from the rosette. The stamens occur opposite the corolla lobes, in contrast to the usual arrangement of stamens alternating with the corolla lobes.

**Ecological characteristics:** Though to the south water pimpernel may grow in brackish sites, and inland grows on muddy banks of fresh streams, in Maine it seems to be restricted to the upper edge of the intertidal zone of estuarine rivers where the water that reaches it briefly at high tide is strictly fresh. It most often grows on rocky shores or cobbly beaches in the shade of overhanging trees, herbaceous vegetation, or ledges. It can be variable in size but always seems to flower profusely over an extended period.

**Synonyms:** Represented in Maine by subspecies *parviflorus* (Raf.) Hulten, and formerly known as *Samolus parviflorus*.

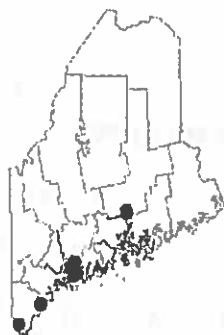
**Rarity of *Samolus valerandi***

<b>State Rank:</b>	S3	Rare in Maine
<b>New England Rank:</b>	None	
<b>Global Rank:</b>	G5T5	Species and subspecies both demonstrably widespread, abundant, and secure globally.

**Status of *Samolus valerandi***

<b>Federal Status:</b>	None	No Federal Status.
<b>State Status:</b>	Special Concern	
<b>Proposed State Status:</b>	Special Concern	Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

### Known Distribution in Maine:



- ▲ Historical (before 1982)  
● Recent (1982 - present)

This rare plant has been documented from a total of 10 town(s) in the following county(ies): Lincoln, Penobscot, Sagadahoc, Waldo, York.

**Dates of documented observations are:** 1979, 1985 (3), 1990 (5), 1991 (3), 1992, 1995, 1996 (4), 1998 (6), 1999, 2000 (3), 2001 (5)

### Reason(s) for rarity:

Habitat naturally scarce, near northern limit of range.

### Conservation considerations:

Prevent degradation of estuary habitat from adjacent land uses.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 30 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,  
please contact the Natural Areas Program  
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





MAINE HISTORIC PRESERVATION COMMISSION  
55 CAPITOL STREET  
65 STATE HOUSE STATION  
AUGUSTA, MAINE  
04333

JOHN ELIAS BALDACCI  
GOVERNOR

EARLE G. SHETTLEWORTH, JR.  
DIRECTOR

**ARCHAEOLOGY AND HISTORIC RESOURCES REVIEW  
FORESTRY PLAN**

Township Bath Parcel name/designation Public Works Parcel  
Butler Head Parcel  
Forester City of Bath Date of review 11/28/07

\*\*\*\*\*This worksheet was completed for informational purposes only\*\*\*\*\*

**Prehistoric (Native American) Archaeology** (for further information: [arthur.spiess@maine.gov](mailto:arthur.spiess@maine.gov))

- ☐ No prehistoric archaeological sites known. Based on location, soils and topography, none are expected.
- ☒ No prehistoric archaeological sites known because no survey has been conducted. However, the following area is archaeologically sensitive. Within 100m of Wabberg Creek and Merrymeeting Bay.
- ☐ The property includes known sites of archaeological importance. (See attached info)

**Historic Archaeology** (e.g. 1800s farms, etc.) (for further information: [leon.cranmer@maine.gov](mailto:leon.cranmer@maine.gov))

- ☒ No sites are known, and none are expected (based on historic maps and documents).
- ☐ There are possible sites from former houses, barns, and outbuildings shown on maps from 1850 to 1920, now possibly recognizable as foundations or cellar holes. (See attached map.)
- ☐ The property contains known sites of archaeological importance. (See attached info)

**Historic Buildings or Structures** (for further information: [robin.stancampiano@maine.gov](mailto:robin.stancampiano@maine.gov))

- ☒ No historic buildings or structures are known or expected on the property (based on 7.5' USGS topographic maps and MHPC records).
- ☐ Buildings or structures may exist on the property that have not been evaluated for National Register eligibility. Our office will provide an assessment if a request letter, photos of any buildings over fifty years of age that are on the subject parcel, and a 7.5' USGS topographic map with all photos keyed to it are submitted to our office.
- ☐ Buildings or structures exist on the property that are either listed in or eligible for nomination to the National Register of Historic Places. (See attached info)

***This review by MHPC does NOT constitute completion of consultation procedures pursuant to Section 106 of the National Historic Preservation Act.*** Under this Act, consultation with the State Historic Preservation Officer (SHPO) will be required for any activities/projects that have the potential to impact historic properties AND that utilize federal funding or permitting. Planning activities (field reconnaissance, surveys, etc.), in and of themselves, including Forest Management Planning, are not considered to have a potential to affect historic properties.

Earle G. Shettleworth, Jr., State Historic Preservation Officer

11/29/07  
Date

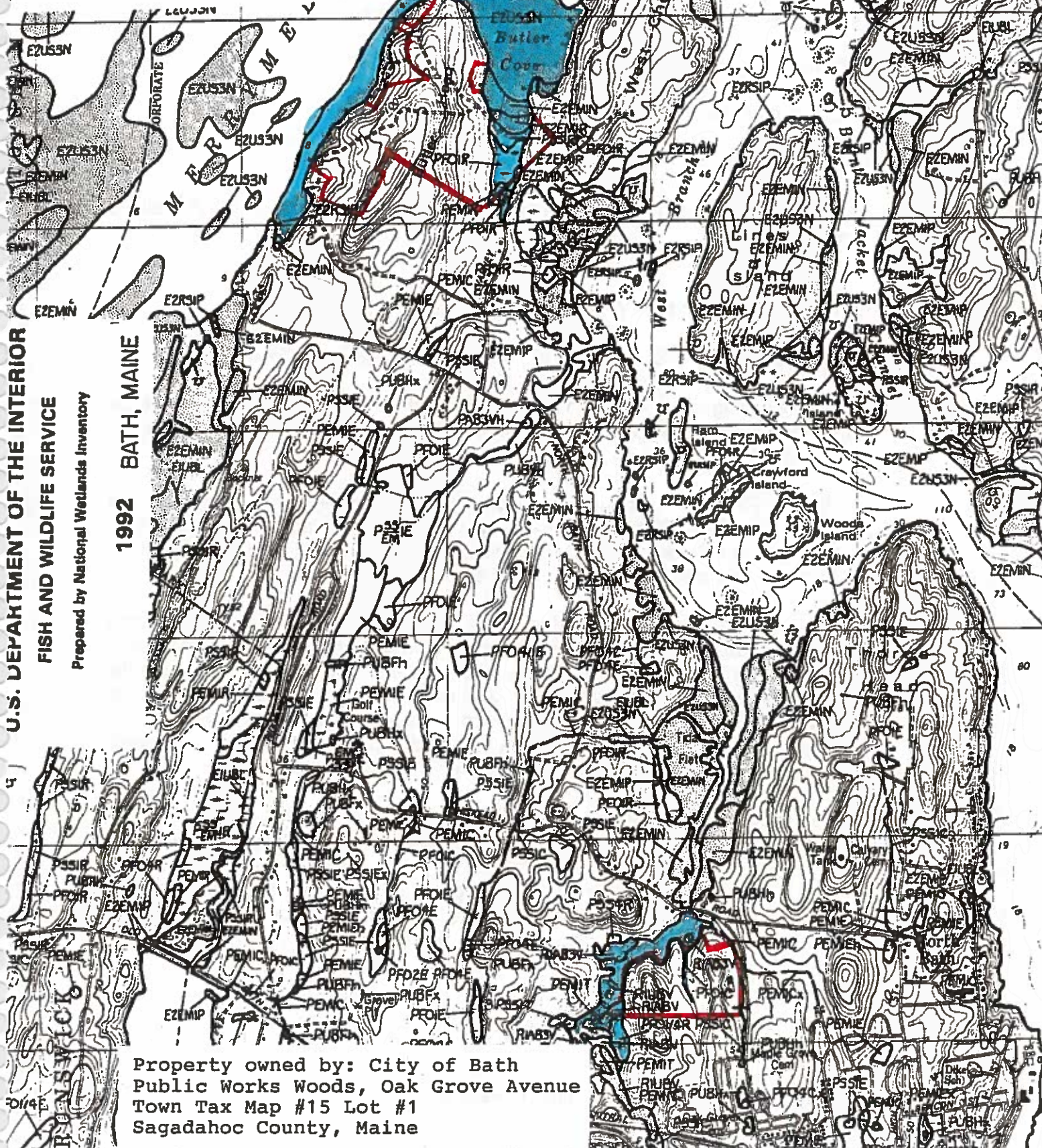


True North



Scale - 1" = 2,000'

Property owned by: City of Bath  
Butler Head, Varney Mill Road  
Town Tax Map #4 Lot #26  
Sagadahoc County, Maine



City of Bath  
Codes Enforcement  
Office 12/13/07

1. The use must be incidental to a construction project in Bath.
2. May not contain sleeping or cooking accommodations.
3. Must be removed upon completion of the construction project.

#### C. Christmas Tree Sales

1. The maximum length of display and sales is 45 days.

#### D. Portable Class Rooms

1. Allowed for Planning Board-approved school renovations and to relieve overcrowding.

### SECTION 11.32 TIMBER HARVESTING [Entire Section amended May 16, 2001]

#### A. Timber harvesting in the Shoreland Zone must conform with the following provisions:

1. Selective cutting of no more than 40 percent of the total volume of trees 4 inches or more in diameter measured at 4 ½ feet above ground level on any lot in any 10 year period is permitted. In addition:
  - a. Within 75 feet, horizontal distance, of the normal high-water line of water bodies, tributary streams, or the upland edge of a wetland, there may be no clearcut openings and a well-distributed stand of trees and other vegetation, including existing ground cover, must be maintained.
  - b. At distances greater than 75 feet, horizontal distance of the normal high-water line of water bodies or the upland edge of a wetland, harvesting operations may not create single clearcut openings greater than 10,000 square feet in the forest canopy. Where such openings exceed 5,000 square feet they must be at least 100 feet apart. Such clearcut openings must be included in the calculation of total volume removal. For the purposes of these standards volume may be considered to be equivalent to basal area.
2. Timber harvesting operations exceeding the 40 percent limitation in item 1, above, may be allowed by the ZBA upon a clear showing, including a forest management plan signed by a Maine licensed professional forester, that such an exception is necessary for good forest management and will be carried out in accordance with the purposes of this Code. The ZBA must notify the Commissioner of the Department of Environmental Protection of each exception allowed, within 14 days of the ZBA's decision.

3. No accumulation of slash may be left within 50 feet of the normal high-water line of a water body. In all other areas slash must either be removed or disposed of in such a manner that it lies on the ground and no part thereof extends more than 4 feet above the ground. Any debris that falls below the normal high-water line of a water body must be removed.
  4. Timber harvesting equipment may not use stream channels as travel routes except when:
    - a. Surface waters are frozen; and
    - b. The activity will not result in any ground disturbance.
  5. All crossings of flowing water require a bridge or culvert, except in areas low with banks and channel beds which are composed of gravel, rock or similar hard surface which would not be eroded or otherwise damaged.
  6. Skid-trail approaches to water crossings must be located and designed so as to prevent water runoff from directly entering the water body or tributary stream. Upon completion of timber harvesting, temporary bridges and culverts must be removed and areas of exposed soil revegetated.
  7. Except for water crossings, skid trails and other sites where the operation of machinery used in timber harvesting results in the exposure of mineral soil must be located such that an unscarified strip of vegetation of at least 75 feet in width for slopes up to 10 percent must be retained between the exposed mineral soil and the normal high-water line of a water body or upland edge of a wetland. For each 10 percent increase in slope, the unscarified strip must be increased by 20 feet. The provisions of this paragraph apply only to a face sloping toward the water body or wetland, provided, however, that no portion of such exposed mineral soil on a back face may be closer than 25 feet from the normal high-water line of a water body or upland edge of a wetland.
- B. All other timber harvesting must conform to the requirements of 12 M.R.S.A. sections 8867-8869 and the rules adopted by the Commissioner of the Department of Conservation to implement said sections.

## ***Most Problematic Invasive Plants in Maine***

Invasive species monitoring and control projects should, at minimum, target the following species.

<b>Most Problematic Terrestrial Invasive Plant in Maine</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat</b>
Barberry, Japanese	<i>Berberis thunbergii</i>	Forest understory
Buckthorn, common	<i>Rhamnus cathartica</i>	Forest understory
Buckthorn, glossy	<i>Frangulus alnus</i>	Forest understory
Honeysuckle, bush	<i>Lonicera morrowii</i>	Forest understory
Honeysuckle, Japanese	<i>Lonicera japonica</i>	Forest understory
Honeysuckle, Tatarian	<i>Lonicera tatarica</i>	Forest understory
Japanese knotweed	<i>Fallopia japonica</i>	Edges
Bittersweet, asiatic	<i>Celastris orbiculata</i>	Edges, forest canopy vine
Loosestrife, purple	<i>Lythrum salicaria</i>	Wetlands
Rose, multiflora	<i>Rosa multiflora</i>	Old field, edges
<b>Source:</b> Maine Natural Areas Program 2006		

## Invasive Plant Management Overview

Common Name	Scientific Name	Habitat	Control
Autumn Olive & Russian Olive	<i>Elaeagnus umbellata</i> , <i>Elaeagnus angustifolia</i>	Edges and open areas	Mechanical: Pull smaller plants, followed by mowing or pulling sprouts as needed. Chemical: Glyphosate on cut stumps. (1)
Barberry, Japanese	<i>Berberis thunbergii</i>	Forest understory	Mechanical: Pull shrubs, followed by mowing or pulling sprouts. Flame torch to lower stem may also be effective. Chemical: Glyphosate or triclopyr on cut stumps. (1, 2)
Bittersweet, Asiatic	<i>Celastrus orbiculata</i>	Edges, forest canopy vine	Mechanical: Repeated cutting or pulling plants. Chemical: Glyphosate or triclopyr on cut stems. Seed bank may necessitate treatments repeated for several years. The flowers and fruit of Asiatic bittersweet grow from the joints where leaves join the vine, whereas American bittersweet's flowers re in terminal clusters. (1)
Buckthorn, common & glossy	<i>Rhamnus cathartica</i> <i>Frangulus alnus</i>	Forest understory	Mechanical: Flame torch stems <42 inches diameter. If cutting, repeated treatment is required. Chemical: Glyphosate or triclopyr cut stem or foliar treatment. Treat in fall when green leaves persist after native trees and shrubs have lost their leaves. Resprouting may occur and seed bank may last 3 years. (1, 2)
Honeysuckle, bush	<i>Lonicera morrowii</i>	Forest understory	Mechanical: Cutting, burning. Repeated treatments may be required. Chemical: Glyphosate or triclopyr on leaves or cut stumps. (1, 2)
Honeysuckle, Tartarian	<i>Lonicera tatarica</i>	Forest understory	Note: all non-native shrub honeysuckles have a hollow pith that is usually brown
Honeysuckle, Japanese	<i>Lonicera japonica</i>	Forest understory	Mechanical: Pull shrubs and roots when soil is moist, (repeated treatment likely required). Chemical: Glyphosate or triclopyr on leaves or stems. A vine that is distinguished from Maine's rare native vine honeysuckles by the separate leaves at the tip of the stem (on natives, a single fused terminal leaf wraps around the stem). (1)
Knottweed, Japanese	<i>Fallopia japonica</i>	Edges	Mechanical: Repeated cutting (3 or more times/season). Chemical: Cutting followed by glyphosate (repeat may be necessary). (1)
Mustard, garlic	<i>Aliaria petiolata</i>	Forest understory, esp. moist/rich soils	Mechanical: Hand pulling in early season. Chemical: Glyphosate foliar or dormant season basal spray (1)
Loosestrife, purple	<i>Lythrum salicaria</i>	Wetlands	Mechanical: Pulling individual plants. Chemical: Glyphosate foliar spray or cut stem treatments.
Rose, multiflora	<i>Rosa multiflora</i>	Old field, edges	Biological: Release of beetles that feed exclusively on loosestrife has been effective on large infestations. (1) Mechanical: Repeated mowing (up to six time per year for 2 years) Chemical: Glyphosate or triclopyr in cut stems. (1, 2)

### Notes:

- This table is intended to provide a broad overview problematic forest invasive species and methods to control them. Consult the sources below and other experts (e.g., an ecologist and/or forester and a licensed herbicide applicator) to develop and implement an invasive species control plan.
- Herbicides used on areas open to the public must be applied under the supervision of a licensed applicator, or for terrestrial application only if applied by an employee or volunteer and the area is closed for 7 days.
- Both glyphosate ("Roundup," Rodeo, "Accord" etc.) and triclopyr ("Garlon," "Pathfinder," "Remedy," "Renovate," "Tahoe," etc.) may be used on forests certified by the Forest Stewardship Council if the FSC Pesticide Policy (2005) is followed

### References:

- University of Maine Invasive Plant Fact Sheets
- Wisconsin Manual For the Control of Ecologically Invasive Plants

### Other Sources of Information:

Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas (The Nature Conservancy, mechanical and chemical control methods)  
The Nature Conservancy - Wetlands Invasive Species Program (information, links, workshops, on-line forums, etc)  
Weeds Gone Wild: Alien Plant Invaders of Natural Areas (lists, species fact sheets, and other information)





