

Fort Williams Forestry and Arboriculture Assessment and Maintenance Program

**Fort Williams Park
Cape Elizabeth, Maine**

**Prepared for the
Town of Cape Elizabeth**

Prepared by

OEST Associates, Inc.
343 Gorham Road South Portland, Maine 04106

In conjunction with

The Fort Williams Advisory Commission

**November 2004
360.27.01**

**FORT WILLIAMS FORESTRY AND ARBORICULTURE
ASSESSMENT AND MAINTENANCE PROGRAM
FORT WILLIAMS PARK
Shore Road
Cape Elizabeth, Maine**

**Prepared for
The Town of Cape Elizabeth**

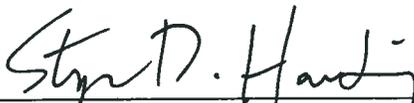
**Prepared by
OEST Associates, Inc.
343 Gorham Road
South Portland, Maine**

**In Conjunction with
The Fort Williams Advisory Commission**

November 2004

360.27.01

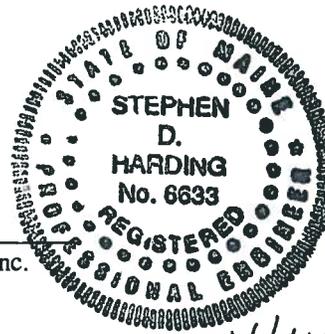
Submitted by:



Stephen D. Harding, P.E., OEST Associates, Inc.
Cape Elizabeth Town Engineer



David I. Maass, L.P.F., OEST Associates, Inc.
Licensed Professional Forester



11/10/04

**FORT WILLIAMS FORESTRY AND ARBORICULTURE
ASSESSMENT AND MAINTENANCE PROGRAM**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
1.0 INTRODUCTION	4
2.0 OBJECTIVES	4
3.0 METHODOLOGY	5
4.0 CONSIDERATIONS	5
4.1 PESTICIDES	5
4.2 FERTILIZATION	6
5.0 AERIAL LOCATION PLAN OF ECOLOGICAL AREAS	7
6.0 EXISTING CONDITIONS INVENTORY AND RECOMMENDATIONS	8
6.1 EXISTING WOODLAND PRESERVE AREA: CHAPEL ROAD PRESERVE.....	8
6.2 EXISTING WOODLAND PRESERVE AREA: OFFICERS ROW PRESERVE.....	10
6.3 EXISTING WOODLAND PRESERVE AREA: SOUTHWEST PRESERVE	13
6.4 SUCCESSIONAL GROWTH AREA: BATTERY KEYES	14
6.5 SUCCESSIONAL GROWTH AREA: AREA BETWEEN POWERS ROAD AND WHEATLY ROAD	16
6.6 SUCCESSIONAL GROWTH AREA: HUMPHREYS ROAD.....	17
6.7 SUCCESSIONAL GROWTH AREA: CHRISTIAN ROAD	17
6.8 SUCCESSIONAL GROWTH AREA: BATTERY GARESCHÉ.....	18
6.9 COASTAL SHRUB LAYER.....	18
6.10 FORMAL LANDSCAPE: FRONT ENTRANCE	20
6.11 FORMAL LANDSCAPE: NEAR POND.....	20
6.12 PERIMETER BUFFER: NORTH BUFFER	22
6.13 PERIMETER BUFFER: SOUTH BUFFER.....	24
6.14 PLANTINGS	25
7.0 SUMMARY OF RECOMMENDATIONS	27
8.0 IMPLEMENTATION AND FUNDING	28
9.0 CONCLUSION	29
10.0 APPENDICES	30
10.1 NATURAL AREA DESCRIPTION.....	30
10.2 INVASIVE PLANT LISTING AND CONTROL RECOMMENDATIONS.....	30

Executive Summary

The Fort Williams Advisory Commission along with the Town of Cape Elizabeth Town Council recently completed an April 7, 2003 update of the Fort Williams Park Master Plan. This Master Plan Update has identified Fort Williams Park's arboriculture and forestry as an ongoing maintenance issue and has recommended the development of an established Arboriculture and Forestry Program to outline the maintenance of the health and appearance of the Park's vegetation. Fort Williams Park covers approximately 90 acres. Its vegetative areas include existing woodland preserve areas, successional growth areas, perimeter buffer areas, formal landscape areas, and coastal shrub layers. These areas contain a diversity of plant materials which contribute to the Park's character and the overall enjoyment of the Park for its visitors. It is a primary goal of the Master Plan to promote and preserve the well being of the Park's ecological composition.

The development of the Arboriculture and Forestry Program began with the study of the existing conditions of the Park's vegetative areas. Based on this assessment, a list of ongoing and specific recommendations was prepared to address areas that require management. Specific recommendations are as follows:

1. Maintain the high canopy hardwood stands in the existing woodland preserve areas by periodically thinning the understory, controlling invasive plants, and planting younger trees as older ones die.
2. In the successional growth areas, the existing views, atmospheres, and visual transitions should be maintained. Specific recommendations for these areas include the removal of declining trees, the control of invasive plants, the release of natural vegetation such as red-osier dogwood and lilacs, and the clearing of views to the ocean where appropriate.
3. Opening views to the ocean where appropriate is also a recommendation for the coastal shrub layer. Additional recommendations for this area include the planting of *Rosa rugosa* to hold soils in place and to minimize erosion, and the maintenance of headland plant communities.
4. To preserve and enhance the formal nature of the formal landscape near the front entrance and the formal landscape near the pond; dead and dying oaks and aspen should be removed, long-lived species should replace them at a lower density, and botanical specimens should be maintained for diversity and botanical interest.
5. In the perimeter buffer areas, controlling invasive plants, removing dead trees, and planting widely-spaced evergreens and perennial hedge is recommended to maintain and improve the long-term viability of the buffers.

Park-wide ongoing maintenance recommendations include continuing the dead wood removal program in hazardous areas; continuing the sanitation leaf removal; developing methods to control poison ivy, bittersweet, and black swallowwort; periodically thinning understory in specific areas; preserving remnant natural headland communities; and weed identification training. Specific information on invasive plants and tree identification is located in the appendix.

An implementation process is also outlined so that these important maintenance considerations can be conducted to preserve the ecological benefits of the Park in a manner that is within the financial resources of the Town. By undertaking the specific action items and continuing the ongoing maintenance efforts as recommended in this report, the Town can assure that future generations of visitors to the Park will be able to enjoy its diverse vegetation.

1.0 Introduction

The Fort Williams Park Master Plan, updated in April of 2003, has recommended the development of a “forestry and arboriculture program for the Park’s trees, shrubs and plants as part of an ongoing maintenance program” (Section 2.5: Park Ecology Conclusions, pg. 41). Specific recommendations of the Master Plan Update include:

- Identifying and locating specific trees/shrubs or areas of vegetation that require management.
- Reviewing and evaluating existing vegetation and make recommendations for specific situations.
- Developing preliminary cost estimates for recommended work.
- Submitting findings to the Fort Williams Advisory Commission for review.

Upon these recommendations, the Fort Williams Advisory Commission has retained OEST Associates, Inc. (OEST) to outline the maintenance of the health and appearance of the Park’s vegetation and ecological system. This Forestry and Arboriculture Report is intended to be an accompanying report to the 2003 Master Plan Update which continues in greater detail the goals and recommendations for the provision and preservation of the Park’s ecological system.

The Park’s ecological system can be grouped into the following categories: existing woodland preserve areas, successional growth areas, coastal shrub layer, existing formal landscapes, and perimeter buffers. These areas are depicted on the attached sketch plan. These categories are used to outline the Forestry and Arboriculture Program for Fort Williams Park.

2.0 Objectives

The main objectives for the development of the Fort Williams Park Forestry and Arboriculture Program are as follows.

1. Conduct an inventory and assessment of the existing conditions of the vegetation and tree growth within the park.
2. Based on this assessment, develop a set of recommendations for the various areas of the Park as identified in the Master Plan Update of 2003.
3. Provide a phased planting and maintenance program plan to use as a framework for future tree and vegetation maintenance within the park.
4. Utilize plantings natural to the Park’s setting unless otherwise dictated by more formal landscaping needs.
5. Evaluate cost considerations to accomplish the annual maintenance efforts to establish an annual maintenance budget.

Specific issues were also addressed in the development of the Fort Williams Park Forestry and Arboriculture Program. These issues include the health and maintenance of specific tree growth, the removal of understory, the use of fertilization, the various methods of weed control, the viability of dead limb pruning, tree replacement recommendations and implementation, shade tree planting in specific areas, and coastal shrub layer considerations.

3.0 Methodology

An inventory and assessment of the existing conditions of the park was carried out by a Licensed Professional Forester during the summer of 2004. A Registered Landscape Architect also visited the site during the summer of 2004 as part of this program's development. Dr. Clark Granger, a Pathologist from the Maine Department of Conservation also accompanied the Forester on a visit to the Park. Dr. Granger was contacted to assess the nature of the basal cavities of the live oak trees and decay of oak stumps near the Officers Quarters.

Walking the entire park, permanent vegetation was examined by visual observation to determine its condition and health. Each of the existing woodland preserve areas, successional growth areas, coastal shrub layers, existing formal landscapes, and perimeter buffers were evaluated for vegetative health and condition. Observations were recorded with field notes, photographed by a digital camera, and significant locations were located with hand-held GPS unit. While a specific tree-by-tree inventory was not conducted, a majority of the trees and vegetation were examined from several sides through the various investigations made in the Park.

4.0 Considerations

Specific considerations were taken in the formulation of recommendations in the Fort Williams Forestry and Arboriculture Program. The primary concern of the program is to meet the goals for vegetation outlined by the Master Plan Update. The vegetation provides the backdrop for the various activities taking place within the Park. Maintaining healthy and viable perennial vegetation is critical to the Park's use and enjoyment.

Recommendations consider the health and safety of the visitors to the Park and to the Town employees who work there. The recommendations also consider the privacy concerns of abutting property owners. In the interest of assuring abutters privacy, seclusion and security from the activities of the Park, recommendations have been made to continue to provide a buffer between the activities of the park and its neighboring properties.

4.1 Pesticides

The term "pesticides" is used to describe a broad class of chemicals used to control pests, including weeds, insects or diseases. Pesticides can be separated into several categories, including herbicides and insecticides. Herbicides are used to control unwanted vegetation such as poison ivy. Insecticides are used to control insects such as brown-tail moth or gypsy moth.

Manual/mechanical treatments or pesticide treatments can both be effective and viable. The manual and mechanical treatment applications need to be repeated frequently to achieve control of pests causing continued expense and some level of pollution. Pesticides have been subject to public concern. It is understood that as an ongoing policy, the Town of Cape Elizabeth has minimized the use of pesticides in the Park. In the description of the weeds in the Appendix, both chemical and mechanical control methods are discussed. While herbicides are among the recommendations to control weeds, it is recognized that the Town must make decisions about the public concern and effectiveness of any of the methods used.

4.2 Fertilization

Fertilizers are sometimes used to maintain and enhance the growth of perennial vegetation. Because fertilization over large areas can be expensive, the use of fertilization was only considered for the Park areas containing high-canopy oak stands. Fertilization does not appear to be warranted at this time in any of the wooded areas of the Park. However, routine fertilization at the time of planting young trees is usually considered beneficial to the survival and growth of the trees.

An annual review and evaluation should be conducted to determine if fertilization is necessary. The need for fertilization can be determined either quantitatively or qualitatively. A quantitative method of determining nutrient levels is to analyze leaves for major nutrients. This method can be expensive, not only in the collection of leaves, but also in the analyses. The qualitative method looks at the color, size, shape and condition of the foliage and crowns. If the crowns of several trees become pale green or yellow, then fertilization may be in order.

Growth in trees is more often limited by nitrogen than phosphorous or potassium. Therefore, when fertilizer treatments are deemed necessary, typical fertilization recommendations for shade trees suggest ratios for nitrogen, phosphorous, and potassium, at 3:1:2 or 3:1:1, respectively. These ratios are achieved in typical 12- 4- 8 or 12- 4- 4 fertilizers. The Cumberland County Soil and Water Conservation District suggests fertilizing with 18-6-12 at a rate of 10 lbs per 1000 square feet when maintaining shade trees. Fertilizers should not be applied all at once; they should be applied two or three times during the growing season. Applications should not be made late in the growing season, because new growth may be susceptible to frost.

5.0 Aerial Location Plan of Ecological Areas



FORT WILLIAMS FORESTRY PLAN

SCALE: 1"=100'

PLEASE NOTE: THIS DOCUMENT MAY NOT ACCURATELY REPRESENT THE FINAL DOCUMENT. ONLY AN ENGINEER, ARCHITECT OR SURVEYOR SIGNED, SEALED AND DATED PAPER COPY, PROVIDED BY THIS OFFICE, MAY BE UTILIZED FOR BIDDING OR CONSTRUCTION PURPOSES.

OEST
 Associates, Inc.
 343 Corham Road · South Portland, ME 04106
 Tel: (207)781-1770 Fax: (207)774-1248
 Web: www.oest.com Email: info@oest.com

FORT WILLIAMS ADVISORY COMMISSION

FORT WILLIAMS PARK FORESTRY PLAN

FORT WILLIAMS VEGETATION FEATURES

SCALE: AS NOTED

DATE :

DES BY:

DWN BY:

CHK BY:

PROJECT NO.

360.27.01

SHEET OF

1 1

DRAWING NO.

C-1

Cadd: 3602701_C1.dwg

6.0 Existing Conditions Inventory and Recommendations

Consultations with the Fort Williams Advisory Commission and various Cape Elizabeth Town staff members have identified specific areas of concern and priorities for forestry and arboriculture improvements in the Park. These specific areas of concern and recommended improvements have been established through an assessment of the existing conditions of the Park's woodland preserve areas, successional growth areas, coastal shrub layer, existing formal landscapes, perimeter buffers, and other areas to be considered for plantings.

6.1 *Existing Woodland Preserve Area: Chapel Road Preserve*

The Chapel Road Preserve can be divided into two components. The area north of Chapel Road is referred as **CR1**. The two oak stands areas south of Chapel Road are referred as **CR2**.

CR1 is a generally younger stand of oaks and other trees developing on native rocky sites. There are several larger oak trees, however, adjacent to Chapel Road. This area appears to have developed naturally over the years and forms a significant buffer on the northern edge of the park. Some dead wood removal has occurred here. The trees in this area appear to be in good health due to their size, shape, and color of the foliage, and the shape and fullness of the crowns. There are no signs of insect or disease problems. There remains some dead wood in the crowns, but as this area is largely inaccessible to the public the dead wood poses little threat to people or property.



Dead limbs in oak canopy in CR1.

Honey locust is growing at the western edge of this site. Presumably, this species was planted and has since escaped and flourished. It is competing with the native oak. This competition should be allowed to continue as it has created diversity in vegetation which enhances this area's ability to serve as a natural buffer to surrounding properties.



Honey locust along path near Chapel Road.

Black swallowwort, an invasive weed with dark green leaves and a pungent odor, is evident on the northern bank of Chapel Road. The Black swallowwort is competing for ground cover with native grasses and annuals.



Close-up of Black swallowwort.

Goals for this area: Maintain high canopy oak and hardwood stand.

Recommendations: Continue to allow the oak and mature Honey locust to develop. The Honey locust provides some diversity in the canopy in an area that is not widely seen in the Park. Over time and as budgets allow, thin the understory so that native replacement trees are in place as the older oaks die out. Controlling the Black swallowwort will improve the diversity of the understory.

CR2 consists of two stands of oaks south of Chapel Road. These stands form one of the signature views for the Park as visitors enter the Park on Powers Road. The large overstory canopy offers a sense of strength and endurance consistent with the notion of a rock bound coast of Maine. The twisted branches of the overstory trees provide an interesting contrast to standard notion of tree form. Red oak and occasional hickory make up the overstory. The

trees in this area appear to be healthy as well. These trees are believed to be as old as 150 years and are probably growing quite slowly. Occasionally, dead or dying trees have been removed and some dead wood pruning has been done.



Oakstand near The Meadow.

The understory consists of oak, ash and hickory. The Public Works Department has cut and chipped the understory in an effort to open up the views of the overstory oaks. The current understory has grown in a response to these treatments.

Goals for this area: Maintain high canopy oak and hardwood stand.

Recommendations: In conducting future thinning treatments in the understory, one or more younger trees should be designated to replace older trees as the older trees die. Such a strategy will create a two-tiered stand, which should be as aesthetically pleasing as removal of the entire understory.

6.2 Existing Woodland Preserve Area: Officers Row Preserve

This area runs from Ocean Road to the Officers Quarters Buildings and includes the Bandstand. This area is also one of the seminal areas of woody vegetation that defines the vegetation of the Park. Although these trees are not as large as those on the Chapel Road Preserve, they are still quite old. Painted picture postcards from the early 1900's show young sprout-derived oaks in front of the Officers Quarters. The trees are smaller and probably younger closer to the ocean side of the Park.



Red oak with heartwood rot in front of Officers Quarters.

The species in this area include Red oaks, Paper birches and Red and Sugar maples. On the whole, this grouping of trees looks to be in good to excellent health. The oaks nearest the remaining Officers Quarters show substantial signs of decay at the base of the live trees and the cut stumps show a heart-rot fungus has invaded these trees. No perennial fungus has developed, however, indicating that the disease has been contained to the heartwood. Review of this problem by Maine Department of Conservation Forest Pathologist indicated that while these trees may visually appear stressed and may be vulnerable in the future, it is not likely to be immediate concern as the trees remain quite sturdy due to their exterior strength.

Unlike other areas of Red oaks, no understory has been allowed to develop. Mowing of grasses under these trees continues to provide a park-like atmosphere to the area.

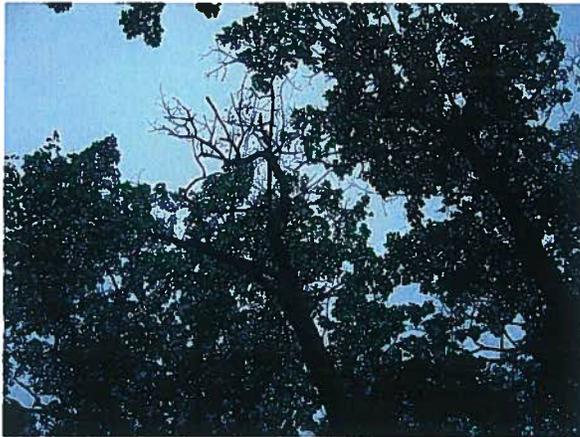
Some trees in this area are currently showing signs of decline. Many of the birches and a few of the oaks show weak crowns. These trees should be removed individually as budgets allow. One birch, in particular, near the Bandstand should be removed immediately because of its hazard to the Bandstand and visitors to this area. The remaining trees will naturally grow to fill in the open canopy. As trees are removed, new trees could be planted near their stumps to fill in the canopy over time.

The stumps themselves do not have to be removed for any reason associated to the viability of the Park's vegetation. Their removal, however, may be more aesthetically pleasing for visitors to the park and may ease lawn maintenance operations. Therefore, stump removal should be conducted throughout the Park on a case-by-case basis as conditions and budget dictate.



Hazardous birch tree near Bandstand.

Dead limb removal has been performed by the Town either by the Public Works Department or contracted tree removal services. This work is a prudent program that minimizes liabilities and helps keep the trees healthy. Sanitation removal of the leaves also eliminates a source of another potential disease, oak anthracnose.



Dead wood in oak canopy.

At the time of this assessment, the oaks appear to have healthy foliage and crowns. Around the Officers Quarters, several older lilacs are growing. Some are overtopped by trees and others by weeds. Release of these perennials by removing the overstory and weeds would be aesthetically pleasing.



Overtopped lilacs.

Goals for this area: Maintain high canopy oak and hardwood stand.

Recommendations: Continue with dead limb removal program as needed particularly near buildings, walkways and other structures. Continue with sanitation removal of leaves. Remove declining trees before they die and become a hazard. Only individual trees should be removed to allow others to fill in the canopy. Removing groups of trees can make the remaining trees susceptible to wind throw.

As trees are removed, plant young oaks or hickories. Seedlings growing in the Reserves in the Park could be used as a source of plant stock. Acorns could also be harvested from the remaining trees, and new seedlings could be grown to replace harvested trees.

Release lilacs where they exist.

Regular annual review of the health and condition of the trees would determine which trees should be considered for removal.

6.3 Existing Woodland Preserve Area: Southwest Preserve

The Southwest Preserve is probably the most natural area in the Park. Around the edges of this area, weeds have invaded. Internal to the Preserve, native Red oak, White pine, Hemlock, Red spruce, White birch and Quaking aspen are growing. The soils are most likely shallow to bed rock. There is a diverse group of annual vegetation growing, however, along with bountiful regeneration of tree species. The majority of the trees appear to be healthy. There is a high level of competition throughout the canopy for light which has caused some trees to decline somewhat in their condition. It was noted that one large oak tree has blown over within the last few months. Surrounding trees will soon occupy the opening in the canopy.

As mentioned previously, weeds are invading the edges of the Preserve. Bittersweet abounds in the area immediately behind the garages and threatens the integrity of the Preserve. Staghorn sumac and Choke cherry are growing at the edges and are threatening to grow where ever they can find light, water and nutrients.



Interior view of Southwest Preserve.

It appears little tree work has been done in this area. The Public Works Department has used a portion of this area for piles of sorted hard material for trails and road bases. This space provides an area that is out-of-sight of most of the public and is a needed component of the Park given its size.

This area is one of the few areas in the Park that is relatively natural in development towards native tree species. Because this area is currently undergoing successional development, it also provides an intriguing place for those who appreciate dynamic stages of nature. Informal foot trails allow visitors to walk through the area.

Goals for this area: Provide a location for natural growth to proceed.

Recommendations: This area is not regularly visited so the priority for maintenance is lower than in other areas. This area should have the bittersweet removed as budgets allow. Staghorn sumac and Choke cherry should be considered weeds in this area and should be cut when possible. Removal of the weeds will allow for natural vegetation to develop.

A formal trail system with signage for educational tree identification might be considered in the future for this area. Another option for this area might be to leave it in its current state as a living laboratory for research and observation.

This area should be used as a source of seedlings or saplings for tree replacement.

6.4 Successional Growth Area: Battery Keyes

This area is a fairly large forested area running from the back of the Goddard Mansion down slope to Battery Keyes. The woods are relatively young and have developed from seedlings and sprouts probably as the use of the Mansion declined. Species in the area include Paper birch, oak, ash, and Red, Sugar and Norway maple. At the rear of the Goddard Mansion, several older lilacs currently are growing overtopped by maples. There is also a half-acre patch of bittersweet which appears to have already pulled down one tree while growing into the crowns of several others. While this area does not attract many visitors, there are several trails through the area.



Old lilacs overshadowed by maples.

The Public Works Department has cut and chipped a small grove of Paper birch along the access road to Battery Keyes. This is an appropriate example of augmenting a natural setting with management to improve aesthetics.

Goals for this area: Provide a location for natural growth to proceed while continuing to provide a buffer for neighboring properties.

Recommendations: In this area, bittersweet poses a threat to the health and condition of the woody vegetation. It has also caused the decline of the buffer along the northern fence. Although this area does not attract heavy visitor use, control of the bittersweet should be considered to limit its spread to other areas in the Park.



Bittersweet climbing into tree canopy near northern buffer.

The lilacs throughout the Park will offer a secondary source of significant botanical highlights. Lilacs should be released from overtopping trees provided that the removal of the overstory maples does not adversely affect the preservation of the buffer area.

6.5 *Successional Growth Area: Area between Powers Road and Wheatly Road*

This area is also widely viewed by visitors to the Park as they progress toward the Portland Head Light. The topography here is rough and rocky as the elevation change between Powers Road and Wheatly Road is approximately thirty feet. The Power Station was likely built here to obscure it from war ships in the ocean. The largest and older trees in this area are Paper birches which grow quickly in disregarded areas. The understory trees in this area are mostly young ash and sumac with some oak and hickory. While these are not well-formed straight trees, they appear to be healthy. The older birches, which grew initially, are showing signs of decay. They will need to be removed in the next five to ten years. In doing so, the younger trees will naturally replace the older trees.



Dead birch in successional growth area.

As visitors turn onto Wheatly Road from Ocean Road, there is a large and expanding patch of Japanese knotweed which is considered by many to be an invasive unattractive plant. At the other end of Wheatly Road, there is a lovely hedge of Red-osier dogwood near the wall that overlooks the Powers Road entrance. Botanical specimens such as these should be preserved and expanded by either replanting or removing other areas in the immediate vicinity to provide growing space.



Red-osier dogwood near Wheatly Road.

Goals for this area: Provide a visual transition between the Meadow and the Parade Grounds.

Recommendations: Declining birches should be removed. The ash, oak and hickory that are currently growing in this area will replace these trees. Japanese knotweed should be controlled and replaced with a native perennial shrub. Red-osier dogwood should be released if it becomes overtopped or invaded by weeds.

6.6 Successional Growth Area: Humphreys Road

This is an area of younger oak trees. The Parks Maintenance Division of the Public Works Department mows the lawn beneath the trees to maintain ocean views from the Picnic Shelter and Officers Row. The trees here also appear to be in good health and condition.

Goals for this area: Maintain open views with overstory oak canopy.

Recommendations: Allow the area to develop naturally. Eventually, this area will begin to look like the oak stands near Chapel Road.

6.7 Successional Growth Area: Christian Road

This area is an open area of trees and has developed similarly to the Officers Row Preserve.

Goals for this area: Maintain park-like feel of the area.

Recommendations: This area should be managed similarly to the Officers Row Preserve. Continue with dead limb removal program and sanitation removal of leaves. Remove individual declining trees to allow others to fill in the canopy. Removing groups of trees can make the remaining trees susceptible to wind throw. As trees are removed, plant young oaks or hickories.

Regular annual review of the health and condition of the trees would determine which trees should be considered for removal.

6.8 *Successional Growth Area: Battery Garesche*

This is a wild area that has grown recently into early successional species of Staghorn sumac, Choke cherry, Quaking aspen and White birch. White birch is the tallest tree group in the area, and there is also an understory of later successional species of White pine, Red spruce, Red oak and maples. Native and non-native honeysuckle abounds here as well. Much of this area has grown over rubble of destroyed buildings, bunkers and infrastructure.



Choke cherry and Stag horn sumac near Battery Garesche.

Visitors to this area are limited and typically stay on the roads and paths. The vegetation has blocked the view from Battery Garesche towards the ocean.

Currently there is a plan to develop Cliff Walk South from the Portland Headlight to Battery Garesche, which includes a portion of the Successional Growth Area. No new plantings are planned here.

Goals for this area: Allow area to develop naturally and open views where appropriate and possible.

Recommendations: As budgets allow, clear view to the ocean. Otherwise, allow this area to develop naturally. Watch for bittersweet or other weeds to develop. Coordinate treatment plans with the new Cliff Walk South.

6.9 *Coastal Shrub Layer*

As displayed in the Portland Head Light Gift Shop, early pictures of Fort Williams taken from the Portland Head Light indicate that all of the vegetation near the coast was removed. The Coastal Shrub Layer has likely developed since the Fort was turned over to the Town in 1964. This area is a severe site with poor, shallow, well-drained soils subject to a rugged environment of salt spray, fog, and strong winds. The Coastal Shrub Layer consists of Staghorn sumac, native and non-native honeysuckles, and Choke cherry, as well as a variety of other species, including invasive weeds. The Coastal Shrub Layer is important in preventing soil erosion and hosts migratory and overwintering birds. The shrubs also provide a barrier to largely keep people and pets on designated trails. The shrubs do block desired scenic views, however, along the cliff walk and other areas.



Ocean views blocked by Choke cherry and sumac.

Remnant natural plant communities representative of coastal headlands are growing in small areas. Given the level of development along the coast, these should be preserved and maintained by removing invasive plants that are incompatible with these plant communities. This should be done to the extent that budgets allow.

As mentioned above, the new Cliff Walk South encompasses a portion of the Coastal Shrub Layer. Planting of shrubs in strategic areas are planned along the new cliff walk.



Example of headland plant community.

Goals for this area: Maintain nature of Coastal Shrub Layer and open views to ocean where appropriate and possible. Minimize erosion. Direct visitors to stay on designated paths. Maintain headland plant communities.

Recommendations: There are several options for maintenance along the Coastal Shrub Layer. A workable strategy to achieve pedestrian control, minimize erosion, and create full views of the ocean should be developed over time. In more remote areas where Choke cherry and Staghorn sumac block views, a few of the trees should be cut to open up the views. Choke cherry is a short-lived tree and will likely not grow back. Conversely, Staghorn sumac suckers readily from roots and grows rapidly. If limited vegetation removal trials are successful, they should be expanded for other areas over a period of years. In areas where they may not be successful, planting of *Rosa rugosa* may be necessary to hold soils in

place after the cutting of woody vegetation. Coordinate treatments with the new Cliff Walk South.

Preserve and maintain the remnant natural plant communities in this area.

6.10 *Formal Landscape: Front Entrance*

This area provides visitors their first glimpse of the Park. As visitors make their way to the Portland Head Light, this area provides the setting for the Park. Norway spruce has been planted and other species are growing naturally in this area. A majority of the trees in this area appear to be in good health. Some Quaking aspen (poplars) have grown here naturally and are now dying, likely because of shallow soils.



Dying aspens near front entrance.

Goals for this area: Preserve and enhance formal nature of front entrance.

Recommendations: Although they do not appear to pose a significant threat to people or property, the aspen should be removed because they are dying and are unsightly. Long-lived species, such as oak, sugar maple, hemlock, pine or spruce should be planted in their place, but at a lower density.

6.11 *Formal Landscape: Near Pond*

The Formal Landscape area near the Pond offers a quiet setting unlike anything else in the Park. The pond is spring fed and because of its topography receives rainfall drainage as well. The outflow is through a storm drain that drains into a large wetland area across Shore Road. The pond suffers from a profusion of Duck weed and is inhabited by ducks which leave unwanted remains. Cattails on one side of the pond make the pond appear more like a bog, rather than a formal setting.

There is a range of options for the pond area depending on specific goals for the area. The Master Plan Update identifies this area as one with a more formal character and states that these areas require their own review and assessment process to insure that they are properly maintained.

There is an interesting array of plantings here including Austrian pine, Bald cypress and Norway spruce, as well as Sugar and Red maples along Farnsworth Road. On the north side of the pond, there is an enormous yew which is currently overtopped by a Norway maple. Access to the pond from the Parade Grounds is down a staircase now overrun with forsythia which flourishes in the spring. The forsythia could be replanted to other areas of the Park.



Bald cypress near The Pond.



Forsythia near The Pond.

There is a picnic enclosure near the tennis courts under a canopy of oak trees. This area provides an inviting open-air setting for picnics. There are three dead oaks, however, overhanging the enclosure. The construction of the enclosure may have damaged the roots contributing to their death.

Black swallowwort is also a problem weed in this area near the fence along Shore Road. It has invaded in what appears to have been flower beds near the fence on the west side of the pond. In addition, the weed now covers a bank above the tennis courts next to the pond. As mentioned before, this weed eliminates other perennial, native and non-native vegetation.

Goals for this area: Preserve and enhance the formal nature of the Pond area.

Recommendations: Remove dead oaks overtopping the picnic enclosure. The goals for the pond should be considered more definitively before specific recommendations in reference to the pond are made.

The maple could be removed to release the yew. Other unusual botanical specimens in this area should be maintained for diversity and botanical interest. Black Swallowwort should be controlled to allow native vegetation to develop.

6.12 *Perimeter Buffer: North Buffer*

Smaller divisions of this area are made: North Perimeter Buffer 1 (NPB1), North Perimeter Buffer 2 (NPB2), and North Perimeter Buffer 3 (NPB3).

NPB1 is located near the northwestern corner of the Park adjacent to Shore Road. Along the fence, bittersweet has overtaken the woody vegetation in the area. In order to maintain the more desirable trees in this area, control of the bittersweet will be necessary. Due to its low visibility and few visitors, however, this is low priority area.



Bittersweet near Chapel Road gate.

Goals for this area: Maintain and improve the long-term viability of the buffer.

Recommendations: Control bittersweet as budgets allow.

NPB2 is located to the north of Chapel Road Preserve 1 (CR1). A young oak and maple stand is growing on rocky, shallow soils in this area. It is in apparent good condition at this time and no specific maintenance is suggested. There are a few dead limbs in the area. Between the high rocky hillside and the tree vegetation, this area continues to provide a contiguous buffer.



Oak and maple stand near northern perimeter.

Goals for this area: Maintain and improve the long-term viability of the buffer.

Recommendations: Allow the oaks and maples to develop. Be aware of potential invasion by bittersweet. Remove dead limbs and trees and budgets allow.

NPB3 is located between CR1 and the Goddard Mansion lawn and is an area of Red and Sugar maples and birch forming a significant buffer between the Park and its abutters to the north. The buffer varies in width from just a few feet to approximately 200 feet. The trees are of sprout-growth origin and have developed large, low-lying limbs extending thirty feet or more from the main trunk of the trees.



Dense interior of Perimeter Buffer.

These trees are considered of poor form and their quality is not expected to improve with age. Because of the low-lying, dense canopy, little light is available to allow development of regeneration under the primary trees. Therefore, there is no current viable replacement for the trees at this time. Bittersweet has invaded this area.

Goals for this area: Maintain and improve the long-term viability of the buffer.

Recommendations: This area is a highly visible area for those who visit the Goddard Mansion. Without control of the bittersweet, it is likely that the current buffer will be lost in the next 10 years. This is a high priority area for control of bittersweet.

The poorly-formed trees in this area are not expected to live very long. The limbs are believed to break under snow loads and the area will suffer from poor aesthetics. Because of the dense canopy, no new seedlings are growing. Planting of new buffer materials will be necessary at some point in time. This area should be watched closely and new buffer planting conducted as openings naturally occur in along the buffer.

6.13 Perimeter Buffer: South Buffer

This area separates the activities of the Park from abutting residences in Delano Park. Unfortunately, the entire length of the fence on the property line appears to be covered in bittersweet and poison ivy. This situation represents a problem for the Park in terms of relations with abutters and establishing a viable living buffer.



Bittersweet climbing fence adjacent to Delano Park.

Near the ocean, there is an area of remnant natural plant communities of Open Headlands and Maritime Shrubland. Details of these plant types are identified in the Appendix. This area is identified in the Master Plan Update as susceptible to erosion.

Goals for this area: Maintain and improve the long-term viability of the buffer.

Recommendations: Control of bittersweet and poison ivy. Replace with widely-spaced evergreens and perennial hedge, such as viburnum, which will tolerate local conditions. Preserve and maintain remnant natural plant community of the headland area. Check annually and control persistent bittersweet and poison ivy.

6.14 *Plantings*

Overflow Lawn parking at Family Crisis Building

Shade trees planted in this area will enhance the aesthetics. The soils here are probably shallow, and also lack rubble as in other areas of the Park. Planting one or two of the following species is suggested:

- Shagbark hickory
- Linden
- Local Red oak
- Horse chestnut

Central Parking area

Planting shade trees in this area will offer shade and will break up the wide open feel of a parking lot. Building a berm between the road and the parking area is recommended to visually separate the parking area from the road. Planting one or two of the following species is suggested:

- Shagbark hickory
- Linden
- Local Red oak
- Horse chestnut

New playground area

This area falls between the Central Parking area and Overflow Lawn Parking at the Family Crisis Building and has recently been completed. The improvements for this area leave the existing mature trees and planting trees and shrubs in the immediate vicinity of the playground. It is believed that these improvements will meet the expectations of “providing a secluded and shady area ... removed from the more active areas of the Park” (letter from Carroll Associates to Cape Elizabeth Planning Board, January 30, 2004).

Other areas to be considered for planting

The Master Plan calls for view protection from the overlook adjacent to Goddard Mansion. The Public Works Department recently cut and chipped the understory vegetation in this area. In the course of the summer, the sprout growth has nearly overwhelmed the view. It is recommended that this area be planted with a dense canopy of low-lying perennial shrubs to maintain the open view under the residual tree canopy.



Open ground cover maintains view.



Open area behind basketball courts.

Another area to consider for planting is the Successional Growth Area near Humphrey's Road. The Public Works Department has also recently cut and chipped the vegetation growing behind the basketball court. Planting a dense canopy of low-lying perennial shrubs to maintain the views is recommended in this area.

7.0 Summary of Recommendations

Recommendations for the Fort Williams Park Forestry and Arboriculture Program include the following specific and ongoing action items:

Specific action items:

1. Remove currently dead and dying trees. Specifically remove oaks near picnic enclosure, birch near band shelter, and aspens in front entrance.
2. Plant one new long-lived tree for each long-lived tree removed.
3. Consider the release of lilacs near Goddard Mansion and Officers Quarters.
4. Control bittersweet and poison ivy along southern perimeter buffer.
5. Plant new buffer along southern perimeter buffer.
6. Control Japanese knotweed near Wheatley Road. Replace with perennial shrubs.
7. Plant trees at Central Parking Lot and new Playground Area.
8. Systematically cut and remove Choke cherry and Staghorn sumac from Coastal Shrub Layer locations where significant views are blocked. Evaluate results of treatment.
9. Plant areas as recommended.

Ongoing maintenance items:

1. Continue with dead wood removal program in high hazard areas near buildings and over walkways and roads.
2. Continue with sanitation leaf removal from Officers Quarter Preserve.
3. Control of poison ivy, bittersweet and black swallowwort along more visited areas and moving this control toward the perimeters of the park.
4. Periodically thin understory in Chapel Road preserves, but select one or two understory trees for each tree in overstory to be used as a replacement tree.
5. Preserve and maintain areas of remnant natural headland communities.
6. Conduct annual review of trees in Chapel Road and Officers Quarter Preserve and Main Entrance for evaluation of trees for health and condition. If trees display signs of decline, schedule these for possible removal in the following year or future years.
7. Establish removal treatments in the annual budget.
8. Conduct annual review of weed situation.

9. Conduct annual review and evaluation to determine if fertilization is necessary. If budgets allow, foliage analysis should be done about every five years to analyze for major nutrients and provide quantitative confirmation of fertilization needs.
10. Conduct annual evaluation of vegetation in Coastal Shrub Layer as a result of removal of Cherry and Sumac. Adjust future activities accordingly.
11. Train maintenance crew on identification of weeds to allow for manual control or reporting to supervisor to contract treatment.
12. Conduct annual review of the condition of the northern perimeter buffer for tree damage and possible replacement.

8.0 Implementation and Funding

In order to sustain the health of the Fort Williams Park ecological system, an implementation program and a funding strategy must be developed. The implementation program has already been informally begun by the Town Council, the Fort Williams Advisory Commission, and the Town's Public Works Department. These entities have been tasked with the ongoing maintenance of the Park and with providing the funding support necessary to accomplish the maintenance work.

Tree removal, limbing, planting, and general maintenance within the Park has traditionally been funded between \$5,000 and \$20,000 a year. Given that the removal of just one large oak tree specimen can cost up to \$1,000 and that the cost of procuring a new tree can range from \$250 to \$500 depending on its species and size, the minimum level of funding for tree support services should be at a \$10,000 per year minimum to accomplish the necessary removal of dead trees and limbs and to cover the replanting costs. The Public Works Department should continue its practice of supporting this effort by removing smaller trees within the park, removing undesirable brush and weeds, and by planting the new tree specimens throughout the Park.

Additionally, a tree professional, such as the Town's Tree Warden, should conduct an annual inspection of the trees and plans throughout the Park to review the health of the trees in general and to scrutinize those trees that should be continually observed. This professional should prepare a report that notes the overall health of the trees within the park, annual recommendations for specific tree removal or limb removal, comment on the status of weed control and buffer preservation efforts, and meet with the Fort Williams Advisory Committee to review the findings and recommendations of the field assessment. Additionally, this professional should initiate any specialty type of care such as a fertilization program should the conditions within the Park dictate additional efforts be undertaken beyond those currently recommended in this report. Ideally, these reviews would be carried out by the same professional to provide consistency.

The implementation of steps necessary to sustain the tree health within the Park should begin each year and cycle through a series of steps in a programmed fashion throughout the year. Trees in deteriorating and precarious health should be monitored continually for changes that warrant immediate attention such as removal or isolation. Tree removal limb trimming should begin in the early part of the spring for obvious conditions that must be addressed prior to the period in which park visitation begins to increase. A professional review and report should then be prepared in the early part of the growing season to allow for the maximum opportunity to react to any necessary conditions that occur in the Park. Recommendations for specific tree action

(i.e., cutting, limbing, planting), buffer enhancement, and weed control should then continue throughout the spring and summer season. Brush removal and weed control should then continue into the fall as conditions allow. As winter approaches, activity in the Park with regard to the tree care should be concentrated in monitoring the tree condition to identify and react immediately to any hazardous situation that may compromise the safety of visitors to the park.

9.0 Conclusion

The sustained provision and preservation of the Fort Williams Park vegetation is essential for the Park's long-term use and enjoyment. This Forestry and Arboriculture report outlines the strengths of the existing conditions of the Park and the future challenges facing the Town in maintaining the ecological beauty that the Park contains. By implementing the specific action items and recommended maintenance operations detailed in this report, the Town can continue to promote for generations to come the sustained vegetative diversity of the Park while controlling undesirable elements that would detract from the well-being of the Park's ecological system.

10.0 Appendices

10.1 Natural Area Description

10.2 Invasive Plant Listing and Control Recommendations

*Natural Landscapes
of Maine*

A CLASSIFICATION OF VEGETATED NATURAL
COMMUNITIES AND ECOSYSTEMS

SUSAN C. GAWLER
ANDREW R. CUTKO

© Copyright 2004 by Maine Natural Areas Program

Copies of this report may be obtained from the Natural Resources Information and Mapping Center, Department Of Conservation, 22 State House Station, Augusta, Maine 04333.

Gawler, S.C. and A.R. Cutko. 2004.
Natural Landscapes of Maine: A Classification of Vegetated Natural Communities and Ecosystems. Maine Natural Areas Program, Department Of Conservation, Augusta. 349 pp.

All Rights Reserved.

Book and Cover Design: Jen Feldman, Dragonfly Publishing
Illustration, pg 51: Andrew Cook





Rose - Bayberry Maritime Shrubland

SDU1 | STATE RARITY RANK: S4 | ROSE MARITIME SHRUBLAND

Community Description

Medium-height shrubs (1-2 m) usually cover 30-60%, but may be dense thickets. Bayberry and roses are characteristic; raspberry and poison-ivy are frequent associates. On some islands, shrublands are dominated by raspberry or bush-honeysuckle, with little or no bayberry and rose. Wild-raisin and winterberry may occur in more protected or moist pockets. Lowbush blueberry and northern dewberry are occasional as dwarf shrubs. Herbs include salt-tolerant shore species, such as beach grass, beach-pea, sea-beach sandwort, sea-beach angelica, and seaside goldenrod. They grow in patches, sometimes extensive, among the shrubs. Bryoids are absent, except for small amounts of lichens in some areas.

These seaside bluffs and islands are exposed to onshore winds and salt spray; sometimes covering extensive areas on stabilized dunes or rocky islands. Except on dunes, soils are thin, usually less than 25 cm deep, and acidic (pH 4.8 - 5.5).

Diagnostics

This type is typified by a seaside setting and dominance of upland shrubs, particularly bayberry and roses; shrub cover (> about 1 m tall) > 20%.

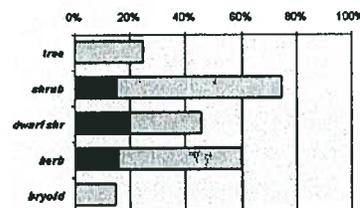
Similar Types

Crowberry - Bayberry Headlands can share many species, but have dwarf shrub cover more abundant than taller shrub cover and lack poison-ivy. Other sandy beach community types can be adjacent to Rose - Bayberry Maritime Shrublands and share some species, but have different physiognomy: Pitch Pine Dune Woodlands have a tree canopy of >25%; Dune Grasslands are dominated by grasses, not shrubs, and Beach Strands are sparsely vegetated with herbs and no shrubs.

CHARACTERISTIC SPECIES

SAPLING/SHRUB:	
Bayberry	(FC)
Virginia rose	(FC)
Meadowsweet	(FC)
Red raspberry	(FC)
Rugosa rose	(FC)
Bush-honeysuckle	(C)
Western poison-ivy	(C)
Winterberry holly	(C)
DWARF SHRUB:	
Large cranberry	(C)
Lowbush blueberry	(C)
HERB:	
Wire rush	(F)
New York aster	(F)
Sea-beach angelica	(F)
Rough-stemmed goldenrod	(F)
Yarrow	(F)
Beach grass	(C)
Canada mayflower	(C)
Greene's rush	(C)

VEGETATION STRUCTURE (TOTAL COVER BY STRATUM)

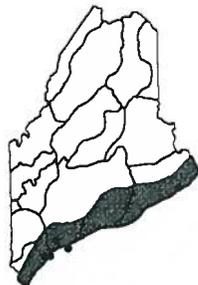




Conservation, Wildlife and Management Considerations

Most known sites have been used historically for grazing sheep. Evidence of fire is common in most. The extent to which this community has developed as an artifact of clearing and grazing is unknown and would be an interesting study (along with the successional dynamics). At least some small sites along the immediate coastline appear to have developed and be persisting through natural processes. Several occurrences are on public lands or private conservation lands.

Maritime shrubland communities, especially those that occur on uninhabited islands, may provide nesting habitat for some pelagic bird species, such as the Atlantic puffin, razorbill, and Leach's storm petrel. Coastal breeders such as the common eider, black duck, herring and great black-backed gulls, and common puffin may also use this habitat in appropriate settings.



Distribution: Along Maine's immediate coastline and islands (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

CROSS REFERENCE TO OTHER CLASSIFICATIONS

NEW HAMPSHIRE

Coastal rocky headland	S1
Coastal interdunal marsh/swale	S1

NATIONAL VEGETATION CLASSIFICATION

CEGLO06295	Morella pensylvanica - Rosa rugosa Shrubland	G4
------------	---	----

EXAMPLES ON CONSERVATION LANDS

Seawall Beach, Morse Mountain Preserve	Sagadahoc Co.
Popham Beach State Park	Sagadahoc Co.
North Libby Island Wildlife Management Area	Washington Co.
Stratton Island	York Co.
Little Duck Island	Hancock Co.

ASSOCIATED RARE PLANTS

Beach plum
Seabeach sedge
Small saltmarsh aster
Tall goldenrod

Literature References | Rappaport and Wesley 1985, Mulligan 1980,
Nelson and Fink 1980, Dunlop and Crow 1985

MAINE INVASIVE PLANT FACT SHEET

Black Swallowwort

Cynanchum louisae
(Milkweed Family)

Threats to Native Habitats:

Black swallowwort is particularly troublesome in open areas and along edges and banks where it grows over other vegetation blocking light and creating tangled thickets. It alters and degrades natural habitat by crowding out native plants and is a threat to rare species in some locations in New England.

Description:

Black Swallowwort is a perennial vine with a single unbranching stem that grows up to 6 feet in length. The vines typically twine and sprawl over other vegetation and die back to the ground each year. The dark green leaves are opposite on the stem and are lanceolate to heart-shaped. Flowers are purplish-brownish, approximately ¼ inch wide, 5-petaled, and fragrant. They appear in June and may be found until late summer, particularly on plants growing in the shade. Fruits are long slender green pods (2-3 inches), that turn dark brown when ripe; in pairs or sometimes threes, similar to milkweed pods, but longer and narrower. Seeds are also like common milkweed seeds, rounded and flattened each with an attached tuft of silky hair. Seeds are dispersed by wind. Reproduction is primarily by seed, although plants may spread by stoloniferous stems, creating large colonies. In winter, stems may be found entangled in small shrubs with remnants of old seed pods still attached.

Habitat:

Dense populations occur in waste places, along roadsides, in fields, along wood edges, in woods, and in open, disturbed areas. It typically grows in soils that are moist but not saturated. Prolific growth has been observed in open to partially shaded areas with alkaline soils; this could indicate an adaptation to certain soil and sun conditions.



Black swallowwort (photo by John A. Lynch, courtesy of the New England Wild Flower Society)

Distribution:

Black swallowwort is a native of southwestern Europe and was most likely introduced to North America around 1900. The Josselyn Botanical Society has reported its appearance in four Maine counties: Cumberland, Lincoln, Sagadahoc and York. National reports list it as being found from Maine to Michigan to Nebraska and also California.

Control:

Mechanical Control: Digging up the root crowns is effective but relatively destructive and the whole crown must be removed. Pulling the plants by hand generally leads to resprouting but can prevent seed production, especially if repeated during the

growing season. A less effective method is pod picking, which also limits seed production, but does little damage to the existing population. Mowing is best for preventing seed production. Mow frequently (one to two visits per season) just as the pods are beginning to form.

Chemical Control: Apply a 1% solution of a triclopyr-based herbicide at an application rate of 2.25-19 L/ha (1-8 quarts per acre). The use of a triclopyr-based herbicide is especially desirable in grassy areas. Repeated herbicide applications will most likely be necessary in vigorous stands. It is best to spray early in the season before viable seeds are produced (prior to mid-July). Cut-stem applications are recommended for small infestations or if nearby desirable vegetation will be adversely affected. Burning and grazing do not appear to be affective. Use herbicides responsibly and follow manufacturer's directions. Contact the Maine Department of Agriculture for information on restrictions that apply to the use of herbicides and consult a licensed herbicide applicator before applying herbicides over large areas.

This fact sheet was researched and written by Kyle Fletcher, a Southern Maine Technical College student. Additional editing by Don Cameron, Maine Natural Areas Program.

References:

- Josselyn Botanical Society. 1995. *Checklist of the vascular plants of Maine*, 3rd revision. Maine Agricultural and Forest Experiment Station (Bulletin 844), Orono, ME.
- Hortus III: A concise dictionary of plants cultivated in the United States and Canada. 1976. Bailey, Liberty Hyde and Ethel Zoe, revised by staff of The Liberty Hyde Bailey Hortorium, Cornell University, Ithaca NY. MacMillan Publishing, NY.
- Morisawa, T.L. 1999. Element Stewardship Abstract for *Vincetoxicum nigrum* (L.) Moench. Wildland Weeds Management and Research - The Nature Conservancy, Arlington, VA.
- Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown and Company, Boston-Toronto.
- Peterson, R.T. and M. McKenney. 1968. *Peterson's Field Guide, Wildflowers*. Houghton Mifflin Company, Boston, New York.
- Uva, N. and DiTomaso. 1997. *Weeds of the Northeast*. Comstock Publishing Associates, Cornell University.

For more information or for a more extensive list of references on invasive species contact:
Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



This fact sheet was prepared by the Maine Natural Areas Program, #93 State House Station, Augusta, ME, 04333-0093 and was funded through a grant from the Maine Outdoor Heritage Fund.

MAINE INVASIVE PLANT FACT SHEET

Asiatic Bittersweet

Celastrus orbiculata

(Staff-tree Family)

Description:

Asiatic bittersweet is a deciduous vine which climbs by means of twining about a support. The branches are round, hairless, light to dark brown, and have noticeable lenticels. The outer surface of its roots is characteristically bright orange. Leaves are alternate in arrangement and variable in shape. They are typically oval with a pointed tip and range from 1 to 5 inches in length. Flowers are small, greenish-yellow, and grow in clusters from the axils of the leaves. The fruits are pea-sized capsules which change in color from green to bright yellow as they mature. When the fruit is ripe the capsule splits open revealing a bright red berry within. It has been recorded to grow to heights in excess of 50 feet in the south. Asiatic bittersweet closely resembles our native American bittersweet (*Celastrus scandens*). The two can be distinguished by examining the locations of the flowering clusters or fruits on the stems. American bittersweet's flowers and fruits are always found occurring in terminal clusters, while Asiatic bittersweet's flowers are found occurring in the leaf axils. For accurate identification contact a natural resource professional.

Habitat:

Asiatic bittersweet can grow in a variety of habitats ranging from floodplain forests to dry rocky slopes. It has an affinity for forest edges where it has the greatest opportunity to twine around and grow over other plants while receiving lots of light. It is commonly found along fence rows, roadsides, powerlines, and in abandoned fields. It is also successful in open woods, including tree plantations. It is dispersed by birds who eat the bright red fruits in winter. It is also dispersed by humans who use dry fruiting stems in flower arrangements, and then dispose of them on compost and brush piles.



Asiatic bittersweet (*Celastrus orbiculata*)

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

Threats to Native Habitats:

Asiatic bittersweet poses a serious threat to other species and to whole habitats due to its aggressive habit of twining around and growing over other vegetation. This plant has a high reproductive rate, long range dispersal mechanisms, and the ability to root sucker. The vines can strangle tree and shrub stems. All types of plants, even entire plant communities, can be over-topped and shaded out by the vine's rapid growth. Nearly pure stands of this vine are sometimes found in affected areas. Recently it has been discovered colonizing sand dunes in Connecticut and Rhode Island.

Distribution:

Asiatic bittersweet is native to east Asia. It is thought to have been introduced to eastern North America in the mid 1800's for use as an ornamental. In some states it has been planted for highway

Distribution:

landscaping and for wildlife food and cover. It has escaped into the wild in the majority of the states where it is cultivated. In Maine, Asiatic bittersweet has been documented in five counties. It probably occurs in more, but has been under collected due to a general lack of interest in weedy species.

Control:

Small patches can be hand pulled. Care should be taken to remove the entire root to prevent resprouting. Low patches have been successfully removed by cutting the vine and treating the regrowth with a triclopyr herbicide. Control is more successful in taller patches when cut stems are immediately painted with triclopyr or glyphosate. This plant has a substantial seedbank, and complete eradication may depend on repeating control methods for several years.

References:

- Checklist of the Vascular Plants of Maine, Third Revision.* Josselyn Botanical Society of Maine. Maine Agricultural and Forest Experiment Station, Orono, ME. 1995.
- Element Stewardship Abstract for Celastrus orbiculata.* Dreyer, G.D. The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. 1987. Natural Heritage Databases. Arlington, VA.
- Invasive Exotic Fact Sheet: Asiatic Bittersweet.* The Nature Conservancy of Vermont. Montpelier, VT. 1998.
- Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* Gleason, H.A. and Cronquist, A. New York Botanical Garden, New York. 910 pp. 1991.
-

For more information or for a more extensive list of references on invasive species contact:

Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



MAINE INVASIVE PLANT FACT SHEET

Japanese Knotweed / Mexican Bamboo

Fallopia japonica

Synonym: *Polygonum cuspidatum*

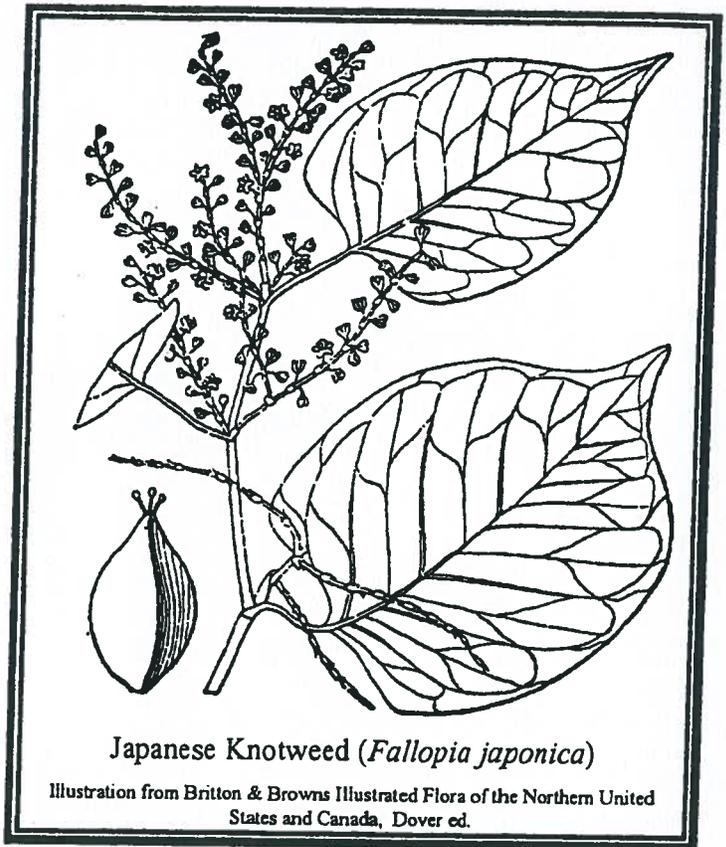
(Smartweed Family)

Description:

Japanese knotweed is a fast growing easily recognized herbaceous perennial that grows from three to nine feet in height and forms large thickets where it colonizes. The leaves are two to six inches long and broadly oval with somewhat squared bases and pointed tips. It is sometimes referred to as Mexican bamboo because of its large hollow stems. It forms tiny greenish white flowers that grow in linear clusters along the stem. Flowers bloom from August to September and form shiny black-brown three-sided seeds. In autumn, the leaves fall from the stout stems and the chestnut brown stems may remain standing for most of the winter, giving the false impression that the plant is woody. Reproduction is primarily vegetative with new shoots developing off of extensive rhizomes. The plant most likely reaches new sites by transport of rhizome fragments. This plant may be confused with giant knotweed (*Fallopia sachalinensis*) which has a similar growth form, but is generally taller and has leaves with rounded leaf bases. Giant knotweed is also a non-native species with its origins in Asia. Consult a wildflower field guide or contact a natural resource professional for accurate identification.

Habitat:

This plant is most commonly found in moist open habitats such as riverbanks, river islands, disturbed wetlands, along road margins, and in areas with disturbed soils. Many colonies are escaped relicts of historical plantings and are located in or near towns or cities. Colonization of more natural habitats is facilitated by disturbance such as that caused by the scouring action of ice or high waters in rivers and streams.



Japanese Knotweed (*Fallopia japonica*)

Illustration from Britton & Browns Illustrated Flora of the Northern United States and Canada, Dover ed.

Threats to Native Habitats:

Japanese knotweed is a robust perennial herb that emerges early in the spring and forms dense thickets up to nine feet in height. Thickets may be so dense that virtually all other plant species are shaded out. Large colonies frequently exist as monocultures, reducing the diversity of plant species and significantly altering natural habitat. Reproduction from rhizomes, even small fragments, enables the plant to be easily transferred to new sites by flowing water and in soil used as fill. Unchecked, this plant can colonize extensively in riparian areas. Once established, it is difficult to remove.

Distribution:

Japanese knotweed is native to eastern Asia. It was brought to North America most likely for ornamental plantings in the late nineteenth century.

Distribution:

It has since spread into the wild over a large range which extends from Nova Scotia and Newfoundland south to North Carolina. In Maine, Japanese knotweed is documented in every county except Piscataquis and Hancock.

Control:

The best method of control is to prevent it from becoming established. It should be removed as soon as possible if it is found colonizing an area. Once well established, it can be eliminated by repeatedly cutting the stalks. Three or more cuttings in a single growing season can offset growth of the rhizomes. An alternative is to cut it down repeatedly and apply glyphosate to the remaining part of the plant. Digging up the roots is not suggested because digging can lead to root fragments that can repopulate the area.

References:

- Checklist of the Vascular Plants of Maine, Third Revision.* Josselyn Botanical Society of Maine. Maine Agricultural and Forest Experiment Station, Orono, ME. 1995.
- Element Stewardship Abstract for Polygonum cuspidatum.* Seiger, L. The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. 1991. Natural Heritage Databases. Arlington, VA.
- Invasive Exotic Fact Sheet: Japanese Knotweed.* The Nature Conservancy of Vermont. Montpelier, VT. 1998.
- Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* Gleason, H.A. and Cronquist, A. New York Botanical Garden, New York. 910 pp. 1991.

For more information or for a more extensive list of references on invasive species contact:

Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



This fact sheet was prepared by the Maine Natural Areas Program, #93 State House Station, Augusta, ME, 04333-0093 and was funded through a grant from the Maine Outdoor Heritage Fund.

MAINE INVASIVE PLANT FACT SHEET

Japanese Honeysuckle

Lonicera japonica

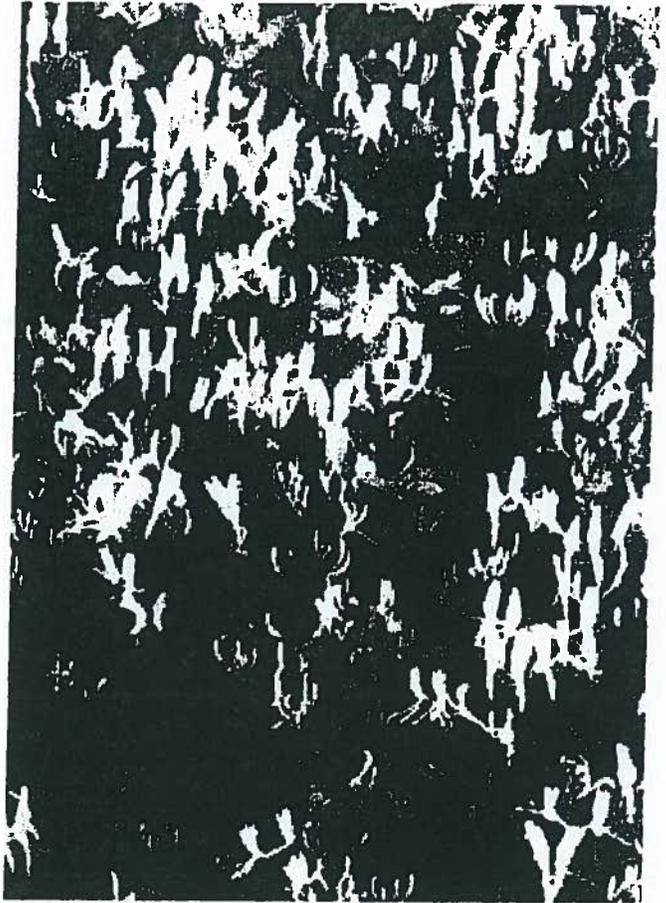
(Honeysuckle Family)

Threats to Native Habitats:

Japanese honeysuckle is most aggressive in partially shaded to open upland areas, such as forest edges, canopy gaps, and stream corridors. It is most damaging where there is other vegetation to climb over. Thick growth of Japanese honeysuckle blocks sunlight and gradually smothers other plants. Native shrubs and small trees can also be killed or stunted by girdling when honeysuckle vines wrap tightly around the stems, preventing water from moving through the plants. Japanese honeysuckle is most obvious when climbing high up and over plants along edges, but it also creeps along the ground in shadier areas where growth is moderated by low light levels. When disturbances occur causing the canopy to open, Japanese honeysuckle responds with dense growth.

Description:

Japanese honeysuckle is a trailing woody vine that may grow as much as 30 feet in length. Young stems are typically covered with fine hairs, older stems become hollow and have brown bark that peels off in shreds. Leaves are opposite, oval shaped, occasionally lobed, and about 1 to 2 inches long. Leaves may be evergreen to semi-evergreen depending on the severity of the winters where the plants are growing. Flowers are tubular or trumpet shaped, creamy white to pink, and turn yellow with age. They occur in pairs from between the leaves, are fragrant, and bloom through most of the summer. Fruits are small, black berries with few seeds that mature in early autumn. Japanese honeysuckle is distinguished from Maine's two rare native vine honeysuckles (*Lonicera dioica* & *L. sempervirens*) by the leaves at the tip of the vine. On Japanese honeysuckle these leaves are separate, and on our native species they are fused or united forming a single leaf surrounding the stem.



Japanese Honeysuckle (photo by John M. Randall, The Nature Conservancy)

Habitat:

Japanese honeysuckle colonizes disturbed areas including roadsides, open banks, old fields, forest edges, and managed forests. It is tolerant of a wide variety of soil conditions and is especially aggressive in disturbed bottomlands and floodplains. It invades native plant communities after natural or human disturbances such as wind throw, insect outbreaks, road building, and logging.

Distribution:

Japanese honeysuckle was originally introduced to North America in the 1800's as a horticultural ground cover. It is native to eastern Asia. It is currently found in most states in the south and central eastern parts of the U.S. As of 2003, this

plant has been reported from only one island location in Maine. Severe winter temperatures may limit the spread of this species in northern latitudes.

Control:

Several effective mechanical and chemical methods of control are available. Selection of a control approach is determined by the extent of the infestation and available resources.

Manual and mechanical. For small patches, hand pulling of vines and root systems may be effective. A hoe can be used to help free root systems. Hand pulling is most effective on root systems when the soil is moist. Repeated removal may be necessary to prevent re-establishment.

Chemical. Herbicide may be applied by spray to leaves or in higher concentrations to stems. Both glyphosate and triclopyr herbicides have been used effectively on Japanese honeysuckle. Following product directions, apply a 2.5% mixture of a glyphosate based herbicide to leaves any time between spring and fall. Repeat applications may be needed. Treatment in the fall may help avoid impacting desirable native plants. Cut stems can be treated with 25% glyphosate or triclopyr mixture any time of year as long as the ground is not frozen. Use herbicides responsibly and follow manufacturer's directions. Contact the Maine Department of Agriculture for information on restrictions that apply to the use of herbicides and consult a licensed herbicide applicator before applying herbicides over large areas.

References:

- Smith, C.L. 1998 *Exotic Plant Guidelines*, Department of Environmental and Natural Resources, Division of Parks and Recreation, Raleigh, North Carolina.
- Bravo, M.A. Fact Sheet for *Lonicera japonica* Thunb. Plant Conservation Alliance, Alien Plant Working Group Web site (Accessed May 2003).
- Josselyn Botanical Society. 1995. *Checklist of the vascular plants of Maine*, 3rd revision. Maine Agricultural and Forest Experiment Station (Bulletin 844), Orono, ME.
- Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, Second Edition. New York Botanical Garden, New York.

For more information or for a more extensive list of references on invasive species contact:

Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



This fact sheet was prepared by the Maine Natural Areas Program, #93 State House Station, Augusta, ME, 04333-0093 and was funded through a grant from the Maine Outdoor Heritage Fund.

MAINE INVASIVE PLANT FACT SHEET

Shrubby Honeysuckles

Tartarian Honeysuckle

Morrow Honeysuckle

Belle's Honeysuckle

Lonicera spp.

(Honeysuckle Family)

Description:

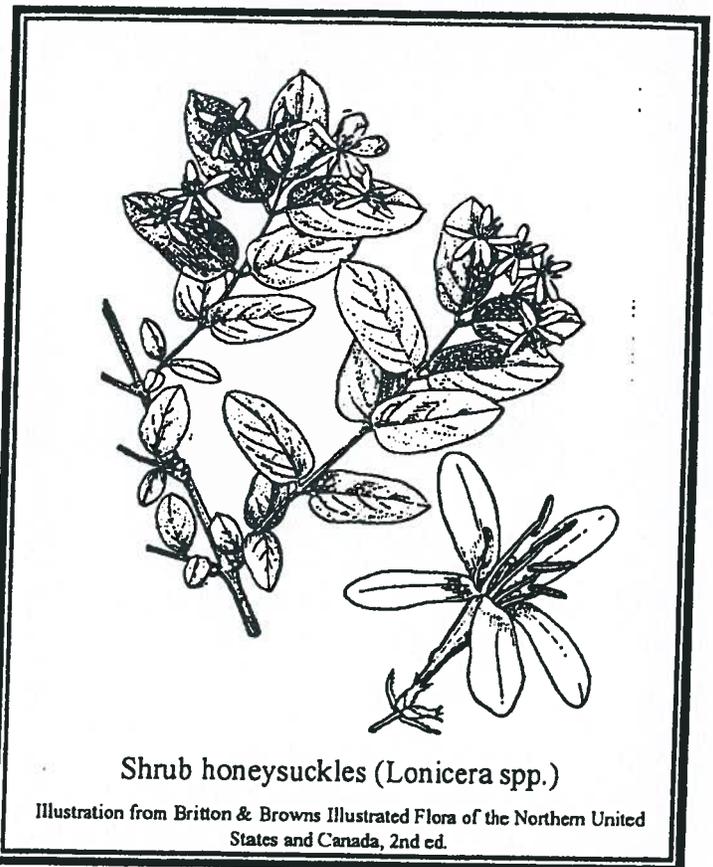
Bush honeysuckles are upright deciduous shrubs that grow from a few to 16 feet in height. The branches are widely spreading, with the older ones being hollow. The oval to oblong leaves are from 1 to 2 ½ inches long and are arranged in pairs on the stem. The flowers are tubular and occur in pairs. The fruit is a many seeded red, orange, or yellow berry. Tartarian honeysuckle has hairless leaves and flowers that are pink or white, and that do not turn yellow with age. Morrow honeysuckle has fuzzy or downy leaves and white flowers that turn yellow with age. Hybrid honeysuckle is a cross between Tartarian and Morrow honeysuckle and generally has features common to both but is capable of growing substantially taller. Care should be taken not to mistake the common native fly-honeysuckle (*Lonicera canadensis*) for these non-natives. The native fly-honeysuckle can be distinguished from non-natives by its pith. The native honeysuckle has solid pith; non-native honeysuckles have hollow pith (cut stem lengthwise to see).

Habitat:

Bush honeysuckles can be aggressive colonizers of abandoned agricultural fields, hedgerows, and edges of forests and wetlands, but they can also be found in forests, especially where there has been disturbance and the soils are limey. They prefer open locations but can tolerate moderate shade and can grow in soils ranging from moist to very dry.

Threats to Native Habitats:

Shrub honeysuckles can rapidly invade and degrade native plant communities. They form a dense layer that shades the ground interfering with the growth



of many native woody and herbaceous species including rare plants. The ground under a honeysuckle thicket is often void of other vegetation. Shrub honeysuckles leaf out earlier than native species and they retain their leaves longer into the fall, giving them a competitive edge. Their success on high pH, dry exposed substrates has made them a threat to some of the northeast's unique limestone plant communities. The fruit of these shrubs is eaten by common birds which help spread the seed into new locations and make the shrub even more difficult to control.

Distribution:

Tartarian honeysuckle is native to central and eastern Russia where it is found in a wide range of habitats and can tolerate desiccating winds, near drought conditions, and temperatures ranging from -50 to +110 degrees F. Morrow honeysuckle is native to Japan where it also is known from a wide

range of habitats and lives in a climate similar to the Atlantic coast of the U.S. Generally, Tartarian honeysuckle is found in dry exposed sites and Morrow honeysuckle is found in wetter sites. Each of the honeysuckles listed is highly invasive. Shrub honeysuckles are now naturalized (established and reproducing in the wild) throughout much of the northeastern United States. As recently as the 1980's they were promoted for their wildlife values, ornamental use, and for soil stabilization. In Maine, shrub honeysuckles have been documented in every county except Franklin and Piscataquis.

Control:

The best method of control is to prevent non-native shrubby honeysuckles from becoming established. These plants should be removed as soon as possible if they are found colonizing an area. Small infestations can be cleared by hand using a shovel or hoe, provided the entire root is removed. Larger colonies have been controlled by various combinations of repeated treatments of mechanical control, burning, or applying a glyphosate herbicide. If cutting is included as part of a treatment it should be done in early spring and in late summer or early fall. Cutting of plants results in resprouting, but is effective in temporarily reducing seed production. Seedlings are easily pulled. Treatment by prescribed burning is most effective if conducted during the growing season. Control methods may need to be repeated for three to five years to inhibit resprouting and to exhaust the seedbank.

References:

- Checklist of the Vascular Plants of Maine, Third Revision.* Josselyn Botanical Society of Maine. Maine Agricultural and Forest Experiment Station, Orono, ME. 1995.
- Element Stewardship Abstract for Lonicera spp.* Converse, C. K. The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. 1984. Natural Heritage Databases. Arlington, VA.
- Invasive Exotic Fact Sheet: Shrubby Honeysuckles.* The Nature Conservancy of Vermont. Montpelier, VT. 1998.
- Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* Gleason, H.A. and Cronquist, A. New York Botanical Garden, New York. 910 pp. 1991.

For more information or for a more extensive list of references on invasive species contact:

Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



MAINE INVASIVE PLANT FACT SHEET

Multiflora Rose, Rambler Rose

Rosa multiflora
(Rose Family)

Description:

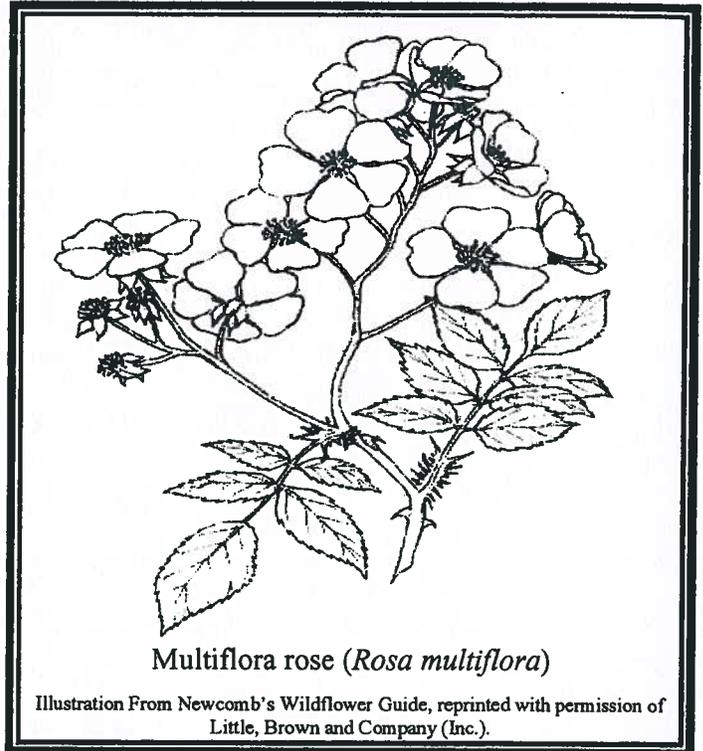
Multiflora rose is a robust perennial shrub with thorny arching stems. It has alternately arranged compound leaves mostly with 7 or 9 leaflets. It forms large clusters of fragrant white or pink flowers which bloom from June to July. Like other roses, it forms small red pulpy fruits called hips which may be eaten by birds. It reproduces from seeds or by rooting at the tip of arching stems that touch the ground. It can be distinguished from native roses by its long arching stems and numerous small white flowers or hips depending on the season. To verify identification of this plant contact a natural resources professional.

Habitat:

Multiflora rose prefers old fields, fence rows, powerlines, roadsides, and forest edges. In other parts of its range it is successful in the understory of hardwood forests. It tolerates both moist and relatively dry conditions.

Threats to Native Habitats:

Multiflora rose is an aggressive colonizer of open unplowed land, and is highly successful on forest edges. This prolific seed producer can create extremely dense, impenetrable thickets that crowd out other vegetation and inhibit regeneration of native plants. Associated vegetation of multiflora rose thickets is often limited to a few tree stems which have managed to overtop the rose before the thicket developed. Dense stands of multiflora rose can slow down forest regeneration. Where the species is abundant it can become a dominant component of a forest understory. Anyone who has attempted to traverse a thicket of this plant would have few kind words for it, as its interweaving, abundantly thorned branches snag on clothes and hair and can be quite painful. Large populations are sometimes associated with former plantings, but the plant has naturalized throughout



much of the United States and continues to be spread with the help of birds.

Distribution:

Multiflora rose is native to eastern Asia. It was brought to North America in the later part of the nineteenth century to be used in horticultural plantings. Since then it has been widely planted for a variety of reasons, including wildlife food and cover, erosion control, and as a living fence to border properties or pen livestock. Its use was historically advocated by the Soil Conservation Service and by some state conservation departments. Multiflora rose is now naturalized (established and reproducing in the wild) throughout much of the United States. In Maine, it is documented from Oxford, Waldo, and York Counties, but likely occurs in more.

Control:

The best method of controlling multiflora rose is to prevent it from becoming established in the first

Control:

place. It should be removed as soon as possible if it is found colonizing an area. Repeated mowing, at least six cuts per year near the ground for two or more years, can work to eliminate light infestations. In areas where thickets have formed it may be necessary to use a bulldozer to remove the plants. Coarse mechanical removal by bulldozer or otherwise must be followed by removal of root sprouts or new growth from the seedbank if re-infestation is to be prevented. The herbicides Glyphosate and Triclopyr are also effective. Use a 2% solution of Glyphosate or Triclopyr mixed with a 0.5% surfactant and thoroughly wet the leaves. To aid in the absorption of the herbicide apply when temperatures are greater than 65 degrees F. Herbicides can also be used in combination with mechanical treatments or as follow up to a burn. Consult a licensed herbicide applicator before applying herbicides over large areas.

References:

- Checklist of the Vascular Plants of Maine, Third Revision.* Josselyn Botanical Society of Maine. Maine Agricultural and Forest Experiment Station, Orono, ME. 1995.
- Element Stewardship Abstract for Rosa multiflora.* Eckardt, N. The Nature Conservancy in collaboration with the International Network of Natural Heritage Programs and Conservation Data Centers. 1987. Natural Heritage Databases. Arlington, VA.
- Exotic Plant Guidelines,* Smith, C.L. Department of Environmental and Natural Resources, Division of Parks and Recreation, Raleigh, North Carolina. 1998.
- Illustration From *NEWCOMB'S WILDFLOWER GUIDE* by Lawrence Newcomb. Copyright © 1977 by Lawrence Newcomb; Illustration © 1977 by Little, Brown and Company (Inc.). By permission of Little, Brown and Company.
- Manual of Vascular Plants of Northeastern United States and Adjacent Canada.* Gleason, H.A. and Cronquist, A. New York Botanical Garden, New York. 910 pp. 1991.
-

For more information or for a more extensive list of references on invasive species contact:
Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(207-287-8044)



