

2003 FLORAL SURVEY

at

FORT MONROE



Gaillardia pulchella

Prepared by:
Susan Lingenfelter, Ed Crawford, Mike Drummond, John McCloskey
U.S. Fish and Wildlife Service
Virginia Field Office



Introduction

A survey of the flora found at Fort Monroe was conducted to provide the Department of the Army with a follow-up survey to the 1998 "Biological Diversity Survey of the Flora and Fauna of Fort Monroe and Bethel Reservoir." Surveys were conducted three times per year, when plants typically flower or seed, generally September 2002, April-May 2003, and July 2003. Three hundred and eighty species of plants were identified in this survey. Trees in all of the managed areas at the Fort were mapped and linked with herbaceous data in each location. A GIS data layer of the plant survey results is provided as a CD attachment to the report and is accompanied by the hardcopy printout of the results of the survey by location. A summary of all of the plant species identified at the Fort is also attached.

Plant Survey Methods

During the first sampling period (September 2002), a stratified-random design was utilized to identify flora in natural areas at the Fort. Natural areas on the Fort consist primarily of areas along Dog Beach. At Dog Beach, a north to south baseline was established along the strand line running the length of Dog Beach. From this original baseline, east to west transects were established which ran from the strand line of the beach to the salt marsh on the western border of Dog Beach. Circular plots (3 m²) were located along each transect and all saplings, shrubs, woody vines and herbaceous vegetation within the plots were identified to species when possible.

In addition to Dog Beach, several managed areas with infrequent or no maintenance (i.e., shoreline areas, batteries, jetties) where vegetation is allowed to grow, were also surveyed for herbaceous and woody vegetation. Instead of surveying along transects, these areas were walked through in a systematic manner and all plant species were identified.

In addition to the initial survey in September 2002, natural and managed areas at the Fort were re-surveyed during May 2003 in order to identify spring ephemerals that would not be present in the fall. During this sampling period, all vegetative communities were walked through in a systematic manner and any species in flower not identified during the Fall 2002 survey were collected for identification.

Natural and managed areas at the Fort were re-surveyed again in July through September 2003 utilizing the aforementioned methods in order to identify any new species in flower. During this sampling period, the marsh islands located within Mill Creek were also surveyed. These marsh areas were bisected on foot and all herbaceous and woody plants encountered were identified to species.

In addition to these natural and managed areas, plants in other parts of the Fort around buildings were identified. These areas were surveyed by separating the Fort into individual polygons, using yards, sidewalks, and roads as boundaries. All plant species within each polygon was identified to species when possible. Plants identified included woody trees, shrubs and vines,

and perennial herbaceous plants. Annual and/or potted plant material was not included in this survey, since these plants die each year and may not be replaced.

GIS Methods

Aerials (MrSid format) and planimetric data layers provided to us by the Army served as the base map for the project. Using printouts from the planimetric data, field personnel established the individual polygons to be linked to plant survey data. ESRI's ArcGIS 8.3 software was used to screen digitize the field maps, creating a polygon data layer (*Plant_Survey*). This layer's attributes table contains an index field (*Poly_ID*) which links the polygon to a Microsoft Excel table containing the plant survey data. Another data layer (*Trees*) was created by screen digitizing the locations where possible, and species identification was determined in the field. In areas where canopy cover was too dense to ascertain individual tree locations, trees were clustered and mapped as a polygon that represented a general location for these trees (data layer: *Tree_Cluster*).

Management Recommendations

General

There are several areas in the northern part of the Fort near Dog Beach where there is an opportunity to restore native habitat while at the same time reducing maintenance costs for the Fort. This can be accomplished by reducing the amount of grass currently being mowed and allowing native vegetation to re-establish. In some areas this would be as easy as extending the no-mow zone. For example, there is a fairly large area of dune vegetation (*Spartina patens*) that is being mowed behind the northern end of the boardwalk. If mowing in the area was stopped, the dune vegetation would quickly become re-established. Because of the sandy, low nutrient soil in this part of the Fort, other areas behind the boardwalk also offer opportunities for re-establishment of dune vegetation, which is better adapted to these conditions than turf species. Based on other areas at Dog Beach where mowing was reduced, these areas should be monitored to ensure that invasive species do not invade the site once mowing is stopped.

Native species should be used for landscaping on the Fort when possible. If the appropriate native species are chosen, they are well adapted to the conditions present on the Fort. Using native species should reduce replacement costs in the long-term since they should be better adapted to local conditions and survive better during extreme weather conditions (i.e., drought, storms), and provide much greater habitat value to native wildlife. If certain native species are used, the Fort can significantly improve the benefits to native wildlife, without detracting from the appearance of the landscape. The Service can continue to review planting lists and provide recommendations on plant species that will provide significant benefit to the local wildlife. Non-native species generally provide little wildlife value, and those that do provide wildlife benefit

tend to be invasive. If non-native species are used, use only species that are non-invasive, to reduce the likelihood that they will spread into the natural areas on the Fort. When planting in or near natural areas (i.e, Dog Beach, shoreline areas) only native species should be used.

Invasive Species at Fort Monroe

Several exotic and invasive species were identified during vegetation sampling at Fort Monroe. Japanese honeysuckle (*Lonicera japonica*) is currently the most ubiquitous of the invasive species at Fort Monroe and is found in almost all natural areas throughout the Fort. This highly aggressive woody vine is pervasive in some areas of the Fort (Dog Beach, Incinerator Lane, RV Park, Shoreline adjacent to Heliport and on Battery Parrott). If left unchecked, this species will completely overwhelm native desirable vegetation. In order to control and/or eradicate Japanese honeysuckle within these areas, the use of a broad spectrum herbicide such as Round-Up[®], Rodeo[®], or Arsenal[®] is recommended. Because Japanese honeysuckle is an evergreen vine, treatment can be done throughout the year, however, treatment in late winter (i.e., February and March) will reduce impacts to desirable deciduous and herbaceous vegetation. Additional applications of herbicides may be required coupled with monitoring for new growth.

Other woody species of concern are white mulberry (*Morus alba*) and fragrant honeysuckle (*Lonicera fragrantissima*). Both species are locally abundant within the natural areas adjacent to Mill Creek in Dog Beach. Several large individuals of white mulberry are also scattered throughout the Fort. These individuals appear to have been planted, and may have been the original source of plants that colonized Dog Beach. Within the Dog Beach area, it is recommended that both species be removed by hand. One approach would be to cut the multiple stems of the fragrant honeysuckle and the trunks of white mulberry and simply leave them in place. The best time to perform this initial cutting would be in mid-summer once plants are fully leafed out, but before fruit set. The downed woody material would increase micro-site heterogeneity, and contribute to the nutrient status and carbon aggradation of these nutrient poor ecosystems. After the trees and shrubs have been cut down, monitoring the stumps for re-sprouting is recommended. Treatment of the stump with a broad spectrum herbicide immediately after cutting should reduce the sprouting vigor of these plants. Any re-sprouting that occurs can be controlled with the aforementioned herbicides in early fall. Additional treatment the following summer may also be needed to ensure complete control.

The invasive species that poses the greatest ecological threat to extant vegetative communities at Fort Monroe is the Common Reed (*Phragmites australis*). Several large monotypic stands are located at the high-marsh/upland interface within Dog Beach. Based on ocular field reconnaissance, it is estimated that between three to five acres of *Phragmites* exist along the marsh, including areas within the scrub/shrub woodland habitat which are currently being invaded. Currently, *Phragmites* can be found at the fence line demarcating the northern terminus of the Fort within Dog Beach all the way down the Mill Creek shoreline (heading south) to the playground behind the picnic shelter. Eradication of *Phragmites* will be difficult. The larger monotypic stands along the marsh/upland interface may require controlled burning followed by aerial spraying of Rodeo[®]. In areas where *Phragmites* is encroaching into the scrub/shrub woodland habitat, several backpack applications of herbicide may be required. Regardless of

approach, vigilant monitoring of the treated stands will be necessary to determine efficacy of the treatments and re-application of herbicides if needed.

Because there are several nearby stands of *Phragmites* located within Mill Creek providing a steady source of rhizomes or seeds, complete eradication of *Phragmites* may prove to be very difficult. A monitoring program should be initiated with the primary objectives of controlling extant *Phragmites* populations and preventing further encroachment of *Phragmites* into other susceptible areas (i.e. Dog Beach and natural shorelines).

There is currently a large grove of saltcedar (*Tamarix ramosissima*) along the shoreline on the east side of the main entrance near Buildings 172 and 197. Mixed with this grove of saltcedar at the western end are several stems of tree-of-heaven (*Ailanthus altissima*), a very aggressive non-native tree species, with a high potential to invade other areas of the Fort. Saltcedar is also considered an invasive species, as evidenced by its presence at Dog Beach. Both of these species should be controlled by cutting to the ground and treating the stump with a broad spectrum herbicide. Re-treatment following resprouting may also be needed to completely control.

Several other invasive species are also present at Dog Beach, but do not currently present as much of an ecological threat as the species discussed above. These species include common dayflower (*Commelina communis*), Johnsongrass (*Sorghum halepense*), bull thistle (*Cirsium vulgare*), Chinese bushclover (*Lespedeza cuneata*), multiflora rose (*Rosa multiflora*), privet (*Ligustrum* sp.) and saltcedar (*Tamarix ramosissima*). Some of these species (Johnsongrass, multiflora rose, privet, and saltcedar) have the potential to spread and become more invasive in these natural areas. Therefore, these species should be controlled before they become more widespread.

Several plants considered to be invasive species have been planted historically in the maintained parts of the Fort. These large plants can represent a significant source of plants to natural areas on the Fort. Removal of the more invasive species from the Fort will help reduce the opportunities for these species to colonize areas in Dog Beach and other natural areas. The species of particular concern include: white mulberry (*Morus alba*), paper mulberry (*Broussonetia papyrifera*), thorny olive (*Elaeagnus pungens*), privet (*Ligustrum* sp.), saltcedar (*Tamarix ramosissima*), mimosa (*Albizia julibrissin*) and winter creeper (*Euonymus fortunei*).

Several plants considered to be invasive species have been or are currently used for landscaping purposes at the Fort. While these species currently do not appear to be colonizing natural areas on the Fort, they have the potential to colonize these areas if planted near or adjacent to these areas. These species include: English ivy (*Hedera helix*), burning bush (*Euonymus alatus*), sawtooth oak (*Quercus acutissima*), Norway maple (*Acer platanoides*), Japanese black pine (*Pinus thunbergiana*), Japanese barberry (*Berberis thunbergii*), and Japanese meadowsweet (*Spiraea japonica*). Their use as landscape plants should be limited, particularly when planting areas near natural or managed areas. When these species do occur near natural areas, they

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should be closely monitored to ensure that they do not invade adjacent areas. Native alternatives to these species should be used in future plantings.

Future work

On September 18, 2003, Hurricane Isabel caused significant flooding and tree destruction at Fort Monroe. The tidal surge that brought flooding to the Fort exposed the vegetation to salt water,

causing further damage. As a result of the extensive damage, and efforts to remedy the damage, as many as 200 trees and shrubs were removed. Much of the damage caused by the hurricane will not be realized until the spring when leaf-out occurs. This may result in more trees and shrubs being removed from the Fort. Storm-related damage has significantly changed what is contained in this survey. The Service would like to work with Fort Monroe in the coming year to do a follow-up floral survey to account for how the flora at the Fort has changed since the hurricane. Re-surveying the Fort would not only provide a more accurate representation of flora post Hurricane Isabel, but would also allow for the quantification of damage.

The Service would also like to continue to provide technical assistance to Fort Monroe in their efforts to control and monitor for invasive species, plant native species that are adapted to conditions at the Fort and can provide wildlife benefit, and updating and providing additional information on the plants currently on the Fort.

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