

National Aeronautics and Space Administration

Goddard Space Flight Center/Wallops Flight Facility

Wallops Island

Phragmites Control Plan

2014

National Aeronautics and Space Administration

Wallops Flight Facility

Wallops Island, Virginia



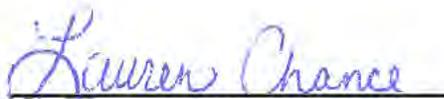
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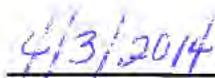
Wallops Island, Virginia

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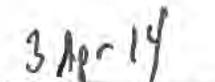


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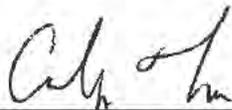


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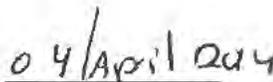


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1. INTRODUCTION

Wallops Flight Facility (WFF) is a NASA Goddard Space Flight Center field installation located in Accomack County on the Eastern Shore of Virginia. The facility consists of three distinct landmasses - the Main Base, Wallops Mainland, and Wallops Island, totaling nearly 6,500 acres. It is the oldest active launch range in the continental United States and the only range completely under NASA management. For over 65 years, WFF has flown thousands of research and space operations vehicles to obtain information on the characteristics of airplanes, rockets, and spacecraft, to increase the knowledge of the Earth's upper atmosphere and the near space environment, and to support defense and NASA missions. The flight programs and projects currently supported by WFF include sounding rockets, scientific balloons, manned and unmanned experimental aircraft, orbital tracking, next-generation launch vehicle development, expendable launch vehicles, and small and mid-size orbital spacecraft. To meet the safety and technical requirements of its various missions, many of WFF's primary launch support facilities reside on Wallops Island which is located directly adjacent to the Atlantic Ocean.

As in other coastal environments on the Delmarva Peninsula, Wallops Island has been impacted by invasive species. Invasive species are any species that are not native to a given ecosystem and whose introduction causes, or is likely to cause, economic or environmental harm, and/or harm to human health (Executive Order [EO] 13112 on Invasive Species, 1999). Because of their ability to alter natural ecosystems and diminish the abundance or survival of native species, invasive species are recognized as a threat to biodiversity and in some instances, to native species survival. It is estimated that over 40 percent of the species protected by the Endangered Species Act are at risk primarily because of nonnative, invasive species (Pimentel et al. 2005). The control of invasive species is a primary management concern of federal agencies because of the potential impacts invasive species have on environmental stability and the degradation they can cause to the natural environment.

Although a variety of nonnative species occur at WFF, some pose a greater threat to biodiversity and NASA's assets than others, and not all are problematic and warrant control. Therefore, assessing the extent of damage caused by the presence of invasive species and prioritizing management activities are important steps to ensure the greatest environmental and safety benefits and the success of the invasive species control program. The primary considerations for prioritizing actions are: the potential impact of invasive species to the NASA mission; the severity of threat to natural ecosystems and rare, threatened, and endangered species; and the feasibility of control with limited resources. Though the primary goal of this control plan is to protect NASA's launch infrastructure assets, it will also protect marsh ecosystems and native plant and animal species from invasive species consistent with EO 13112.

A Natural Heritage Survey of north Wallops Island was conducted in the summer and fall of 2011 by the Natural Heritage Division of the Virginia Department of Conservation and Recreation (VDCR). The survey found two invasives, *Phragmites australis* (Common Reed, Phragmites, Phrag) and *Carex kobomugi* (Japanese Sedge), in the north Wallops Island area (VDCR, 2012). In addition to both of these invasive species, *Rosa multiflora* (multiflora rose), *Lonicera japonica* (Japanese honeysuckle), and *Prunus x incamp* (ornamental cherry) have been identified throughout the Island as well during earlier field survey efforts (VDCR, 2011; NASA, 2008).

Phragmites is an opportunistic grass that propagates best at sites whose soils have been disturbed. Wallops Island has experienced more soil disturbance than any of the neighboring islands during its years as a federal property and, according to the VDCR survey, it has more Phragmites-infested acreage than any other coastal island in Virginia (VDCR, 2011). The last surveys of Phragmites coverage on Wallops Island were performed in 2008 and ranged from 302 acres (VDCR, 2011) to 687 acres (NASA, 2008). The differences in these surveys could be attributed to time of year for aerial mapping, interpretation of aerial photography, and methodology of ground truthing. Phragmites is the invasive species of concern that will be addressed in this control plan. Annual monitoring will be conducted for other invasive species and appropriate control actions will be taken as necessary.

The larger Expendable Launch Vehicles (ELVs) recently launched from WFF introduce a level of complexity to the Phragmites problem at WFF. Launches of the liquid-fueled Antares and solid-fueled Minotaur rockets have occasionally resulted in brush fires in the Phragmites stands in the vicinity of the launch pads (Figure 1). The Phragmites, especially the dead shoots left standing after the previous growing season, ignites readily and flames spread rapidly through the densely-packed, dry vegetation. The height of the plants contributes to this spread, as breezes quickly fan elevated sparks to new areas.



Figure 1: Phragmites Fires Post-Antares A-1 Demo Launch (WFF Camera Z-40)

The risk of Phragmites-fueled wildfires presents hazards to flight-related infrastructure, fragile marsh ecosystems, wildlife, property owned by WFF and its neighbors, and, most importantly, human life. The purpose of this control plan is to reduce and then eliminate the hazard posed by Phragmites stands on Wallops Island with the highest priority being those in the vicinity of the launch area (Figure 2). Later phases of the control plan will address the Phragmites stands on other portions of Wallops Island as these plants provide the potential seed and rhizome base to recolonize Phrag-free areas. Figure 3 shows an aerial map of Phragmites-infested portions of Wallops Island that would be candidates for additional control efforts.

2. BACKGROUND

2.1. Action Area

Wallops Island runs southwest to northeast and is approximately 6.5 miles long and 2 miles wide at its maximum breadth. This maximum width occurs in the north end of the island and the island tapers until it is only a few hundred meters wide at its southern tip. Though most of the Phragmites stands occur on the northern portion of the island, about 20 acres of the plant exists on the southern portion, which coincides with the location of the launch range.

2.2. Species Description

Phragmites is a tall (up to 15 feet) perennial grass with creeping rhizomes that may make a dense vegetative mat. In the United States and other countries, Phragmites is generally recognized as an invasive species; sometimes guilty of altering the structure of local ecosystems and rendering them a monoculture. Thick rhizomal growth and the accumulation of litter from aerial shoots prevent other species from becoming established. These monocultures decrease the value of wetlands as habitat for wildlife (Chambers et al., 1999).

Rhizomes generate roots and stalks at regularly spaced nodes. An individual plant can multiply into a large stand through its rhizomes. Rhizomes may exceed 60 feet in length, grow more than 6 feet per year and readily grow into new plants when fragmented. In addition to facilitating reproduction, Phragmites rhizomes can penetrate the soil to a depth of more than 6 feet. This allows the plant to reach low-lying ground water and tolerate a variety of conditions, including dry upland sites and wetlands with water depths exceeding 2 feet. Phragmites experiences the majority of its vegetative growth during the summer months of June and July. Flowering and seed production occur during August and early September. In autumn months, food is transported to the rhizomes and seeds are shed. The plant remains dormant through the winter months and seeds germinate from April to late May (USFWS, 2007).

Phragmites is an opportunistic species, taking advantage of the disturbances to the local vegetative community caused by disruptions of the natural state, such as those caused by fire or earth-moving activities (summarized in Bart et al., 2006).



Figure 2: Phragmites High Priority Area

Wallops Island



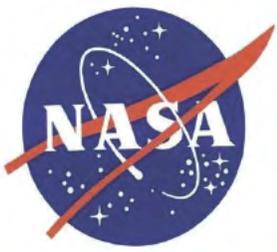


Figure 3: Phragmites Infestation

Wallops Island



3. IMPLEMENTATION OF CONTROLS

A combination of control methods will be employed to eliminate the Phragmites stands on Wallops Island and preventing the spread of the plants. Implementation of any one of these methods, by itself, will be ineffective in controlling the plant. This will be a continuous project, requiring consecutive years of monitoring and retreatment to ensure that the plant does not reestablish itself, especially within the areas of launch operations. The control methods include aerial spraying, hand spraying, controlled burning, and mowing along with requirements for operating heavy equipment in Phragmites infested areas.

3.1. Aerial Spraying

Because of the large acreages to be treated, and since much of the Phragmites is situated in wetlands that cannot be entered by mechanical equipment, aerial spraying is the most effective way of delivering herbicide to the target areas. Spraying will employ an Imazapyr¹-based herbicide, which has been found to be more effective at lower concentrations on Phragmites than other commonly used herbicides (Cheshier et al., 2012; Mozdzer et al., 2008). This type of herbicide can be applied to green foliage from June until the first killing frost. Though Mozdzer et al. (2008) noted a slightly greater efficacy when applying imazapyr early in the growing season (e.g., June), Virginia DCR (2011) recommends that the herbicide be applied during the late summer to early fall (August-September) to reduce the potential for unintended adverse effects on non-target plant species. As such, efforts will be made to conduct all spraying during the recommended timeframe; however the actual timing of each year's activities will be dictated by aerial sprayer availability and the WFF range operational schedule.

Conditions of use are:

- a. Aerial sprayers must hold a current pesticide applicator's license issued by the Commonwealth of Virginia.
- b. Aerial sprayers must meet the Aircraft Office (Code 830) requirements for pilots flying in WFF airspace.
- c. The spatial extent of all areas sprayed shall be recorded by a Global Positioning System unit onboard the spraying aircraft.
- d. Spraying will only be conducted at times after which the chicks of marsh and beach nesting birds have fledged.
- e. Aerial sprayers shall also meet operational parameters set by WFF.
- f. Appropriate informational notices shall be disseminated to WFF employees at least 48 hours prior to scheduled spraying.

¹ Imazapyr is a U.S. Environmental Protection Agency-approved non-selective broad-spectrum herbicide marketed under various trade names including *Chopper*, *Arsenal*, *Stalker*, and *Assault*. It was first registered for use in the U.S. in 1984.

3.2. Hand Spraying

Hand spraying operations may be employed to treat small stands of Phragmites or stands in locations inaccessible to aerial spraying (e.g., close to structures, underneath the Pad 0-A ramp, or in small patches surrounded by non-Phragmites plants).

3.3. Controlled Burning

Fire, either caused accidentally by launch operations or purposely as a management tool is ineffective as a control method unless accompanied by other strategies (van der Toorn and Mook, 1982; Thompson and Shay, 1985). Accordingly, the treated acreage will be subjected to a series of controlled burns only after the herbicide has been applied. The purpose of these burns is twofold: (1) the elimination of the potential fuel load for accidental fires set by launch operations and (2) stands of plants that survived the previous annual herbicide application become more visible and easily managed. Controlled burns will be conducted by the WFF Fire Department and will not be performed outside of meteorological conditions set by the Fire Captain.

In general, winter burning alone provides little Phragmites control and under some circumstances can increase densities of spring Phragmites crops (Cross and Fleming, 1989). Similarly, spring burns have been shown to increase Phragmites shoot densities, perhaps due to a reduction in ground litter (van der Toorn and Mook, 1982; Thompson and Shay, 1985). Therefore, to maximize the potential additive control benefits of burning, all practicable attempts will be made to perform burns late in the growing season (i.e., late summer-fall) as recommended by Cross and Fleming (1989).

Each year's specific burn dates will be decided by a team consisting of representatives from the Range and Mission Management Office (RMMO; Code 840), the Fire Department (Code 803), and the Environmental Office (Code 250). In addition to considering meteorological conditions and maximizing control effectiveness, burns will be scheduled according to staff availability and scheduled launch range operations.

3.4. Mowing

Small infestations may be controlled by mowing, hand pulling, grubbing with a hoe, or by using a shrub-pulling device. However, such methods are not effective in the long-term, require more repeat treatments as compared to spraying (Derr, 2008), and may cause soil disturbance, which can encourage reinvasion. Therefore, a representative of the Environmental Office will ensure that:

- a. Mowing does not occur within wetlands or that marsh mats are used to support equipment working in the wetlands.
- b. If mowing occurs within wetlands, only Phragmites is disturbed.
- c. Root systems are not disturbed within wetlands.

- d. Equipment, especially tires or treads is thoroughly cleaned of rhizomes prior to leaving the site.

To increase the efficacy of mowing or grubbing, these control methods should be followed with aerial or hand spraying, and/or controlled burn.

3.5. Operation of Heavy Equipment in Phrag-infested Areas

Phragmites seeds and rhizomes can be carried in the tire treads and tracks of heavy equipment and vehicles from one area and infest another area. To prevent the accidental introduction of Phragmites to new areas during construction or maintenance activities on Wallops Island, all tracked equipment involved in earth work will be inspected and cleaned to remove any rhizomes and seeds prior to arrival on-site. If tracked equipment is used in earth work where Phragmites is known to exist, this portion of the earthwork will be conducted last, or the equipment will be cleaned prior to use on any portion of the site that is known to be free of Phragmites.

Construction equipment will be cleaned by using physical means and hand tools, such as brushes, brooms, rakes, or shovels, on all track and bucket/blade components to adequately remove all visible dirt and plant debris. If water is used, the water/slurry shall be contained so as to restrict introduction of Phragmites rhizomes and seeds into the project site as well as to prevent off-site introduction during surplus material disposal.

3.6. Monitoring

Each summer, the Environmental Office will monitor the managed areas utilizing an aerial survey and subsequent ground-truthing. Surveys will be used to determine target areas for that year's control efforts. An annual report summarizing the results of the year's efforts will be prepared and disseminated to cognizant Wallops organizations and resource agencies (e.g., Virginia DCR).

4. ROLES AND RESPONSIBILITIES

RMMO/Code 840 – Contracts for and schedules aerial sprayer operations and other Phragmites control operations. Approves areas proposed by Environmental Office for spraying and burning. Approves and funds controlled burning and spraying operations.

Aircraft Office/Code 830 – Approves aircraft and pilots operating within WFF airspace. Approves aerial spraying plans.

Fire Department/Code 803 – Establishes GO/NO-GO conditions for conducting controlled burn operations. Upon consultation with Environmental Office and RMMO, conducts controlled burn operations.

Environmental Office/Code 250 – Conducts annual surveys for Phragmites. Targets areas for annual control operations. With RMMO, approves control operations. Conducts annual Control Plan review, proposes alternate control if appropriate, and submits reviews to other organizations for approval. Prepares and distributes annual management report. Coordinates with resource agencies, as necessary. Coordinates with RMMO Test Director.

Protective Services Division/Code 240 - Establishes roadblocks during aerial spraying.

Office of Public Affairs/Code 130.4 – Releases notices to employees regarding aerial spraying schedule, duration, and locations.

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