National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

June 13, 2012

Reply to Attn of: 250.W

Natural Heritage Program
Ms. Rene Hypes
Project Review Manager
Virginia Department of Conservation and Recreation
217 Governor Street, 3rd Floor
Richmond, VA 23219

Subject: Proposed NASA Wallops Flight Facility (WFF) Unmanned Aerial Systems (UAS) Airstrip

RE: Teleconference NASA and Virginia Department of Conservation and Recreation (DCR) dtd. 3/29/2012

During our March 29, 2012, meeting, NASA agreed to provide DCR a plan to accomplish the following:

1. Set aside areas for the research, study, and possible preservation;
2. Protect the remaining Maritime Dune Woodland community, post-construction;
3. Assess the feasibility of pivoting the UAS airstrip to minimize impacts to the Maritime Dune Woodland community;
4. Assess the feasibility of constructing a retaining wall along the Maritime Dune Woodland to protect it from construction;
5. Maintain an open portion of the road east of the UAS airstrip to promote growth of *E. anomalum*; and
6. Prepare an Invasive Species Management Plan.

This letter report serves as WFF's Rare Species and Community Action Plan for Northern Wallops Island. NASA hereby commits to the following measures.

1. Set Aside Areas for Further Research, Study, and Possible Preservation

WFF is establishing ecosystem study areas on Wallops Island. While WFF policy prohibits the establishment of preservation areas, these ecosystem study areas will be added to WFF's Master Planning documents with prohibitions against future development. All proposed construction and projects would be required to be compliant with the WFF Master Planning process and to avoid ecosystem study areas. Additionally, establishment and maintenance of ecosystem study areas on north Wallops Island shall be made an objective of the Protected Areas and Protected Species Priority of the WFF Environmental Management System (EMS). Status will be reviewed quarterly and will presented annually to both the EMS Project Team and at the annual EMS Review for WFF Senior Management.

Attached is a draft map of north Wallops Island from a planning tool currently under development in our Facilities Management Branch (Enclosure 1). Once finalized, this map will be adopted into WFF's Master Planning process. Each constraining layer (i.e., munitions and explosives of concern, culturally sensitive areas, piping plover nesting area, hazard arcs, and environmental restoration areas) has been added to the layers for the ecosystem study area. The darker the orange on the map, the more overlapping constraints are imposed on development in an area; therefore, Facility planners examining this map can quickly assess construction suitability of a proposed site. Layers for wetland areas were not incorporated into this draft as they were too extensive to map; however, they will be incorporated into the final version for the Master Planning process. Given the plethora of constraints on north Wallops Island, it is apparent that this section is undesirable for future development.

NASA will partner with DCR, the Marine Science Consortium, and other researchers to promote and encourage further research and study of the *E. anomolum* habitat, the Maritime Dune Woodland community, and the dune systems along northern Wallops Island.

2. Protect the Remaining Maritime Dune Woodland Community Post UAS Airstrip Construction

In addition to Action 1 above, the remaining Maritime Dune Woodland areas on north Wallops Island will be posted with appropriate signage prohibiting unauthorized access.

3. Assess Feasibility of Pivoting the Airstrip to Minimize Impacts

Using ESRI® ArcGIS®, WFF undertook a desktop exercise of sliding the airstrip to the north (Enclosure 2), to the west (Enclosures 3 and 4), and to the south (Enclosure 5), as well as two orientations pivoting the airstrip counterclockwise around a central point (Enclosures 6 and 7) and one rotating the airstrip clockwise around a central point (Enclosure 8). Additionally, in

consultation with the Virginia Department of Environmental Quality, the U.S. Environmental Protection Agency, and the U.S. Army Corps of Engineers, WFF has relocated the staging pad (Enclosure 9). Table 1 compares the findings of those exercises with the orientation of the original proposed action described in the December 2011, Draft North Wallops Island UAS Airstrip Environmental Assessment. Findings are expressed in the change in impacted acreage with respect to the originally proposed UAS airstrip.

Table 1: Changes in Resource Impacts from Airstrip Reorientations in ArcGIS®

Orientation	Δ Wetland Impacts (acres)	Δ *E. anomalum* Impacts (acres)	Δ Maritime Dune Woodland Impacts (acres)	Δ Impact to Rev. Earth Works (acres)
Proposed Action[a]	*2.47*	*1.37*	*2.28*	*0.00*
Parallel North	+7.16	-1.37	-2.28	+0.42
Contiguous West	+4.33	-1.37	-2.28	0.00
West, 500 feet	+0.30	-0.48	-1.16	0.00
Parallel South	+6.89	-1.37	-2.28	0.00
Counterclockwise 1	+2.41	-1.32	-1.98	0.00
Counterclockwise 2	+4.39	-1.35	-2.24	0.00
Clockwise	+2.34	-1.09	-1.63	0.00
Relocated Pad	-0.19	0.00	0.00	0.00

[a]As proposed in the December 2011, Draft North Wallops Island UAS Airstrip Environmental Assessment

As the Enclosures and Table 1 demonstrate, it is possible to almost completely eliminate the impact of the UAS Airstrip on *E. anomalum* and on the Maritime Dune Woodland community. However, each reorientation came at the expense of greater impacts to wetlands. And, while the original proposal had avoided all impacts to Palustrine forested and Estuarine emergent wetlands, each rotational orientation would impact both of these communities. For example, in the case of the 500 foot westerly shift, 0.30 acres of additional wetland would be impacted beyond the original proposal; however, this impact includes 0.84 acres of Estuarine emergent wetland. Estuarine wetlands exhibit some of the highest primary productivity habitat in the world and provide nursery habitat for numerous fish species. Construction and drainage of 500 feet of airstrip in an Estuarine wetland has the potential to negatively directly impact Essential Fish Habitat in the area. Moreover, in 4 VAC 20-390-10 *et seq*., the requirements state that tidal wetlands must be preserved onsite as much as possible and that "all mitigative actions, including alternate siting, which would eliminate or minimize wetlands loss or disturbance must be incorporated in the proposal." As only relocation of the staging pad would reduce wetland impacts from the original proposal, only that alternative configuration meets the requirements of this regulation. Finally construction and operation of the airstrip in an estuarine wetland would pose significant engineering and operational cost and challenges.

4. Assess the Feasibility of Constructing a Retaining Wall Along the Maritime Dune Woodland

UAS would be controlled by the operator via a truck mounted mobile command center or a hand-held control switch, depending on the type of UAS being operated. Operators would be required to maintain a clear line of sight for UAS take-offs and landings. To ensure that operators can maintain a clear line of site to the UAS, vegetation alongside the length (out to 75 feet on each side of the centerline) of the airstrip would be cleared. This clear line of site would need to be maintained along the entire length of the airstrip, thereby rendering a retaining wall ineffective in protecting the Maritime Dune Woodland, as the trees beyond the wall that intrude into the clear space would still need to be removed.

5. Maintain an Open Portion of the Road East of the UAS Airstrip to Promote Growth of *E. anomalum*

Florida thoroughwort (*Eupatorium anomalum*) is found along both edges of the unpaved road that extends south-eastward along the footprint of the proposed UAS airstrip and beyond. This road is currently unmaintained and plant overgrowth is threatening to strangle out individuals of the *E. anomalum*. WFF will keep this road open in those portions of roadway beyond the UAS airstrip where the plant occurs by mowing the road edges early in the season to reduce the growth of woody species and the common reed (*Phragmites australis). E. anomalum* clusters will be identified and periodically monitored by DCR as funding support from WFF to DCR allows.

6. Prepare Invasive Species Management Plan

An Invasive Species Management Plan is provided with this letter report (Enclosure 10).

We would like to discuss this proposed Plan with you next week, at your earliest convenience. Please contact either myself at (757) 824-1127 or Joel.T.Mitchell@nasa.gov or Shari Silbert at (757) 824-2327 or Shari.A.Silbert@nasa.gov.

Sincerely,

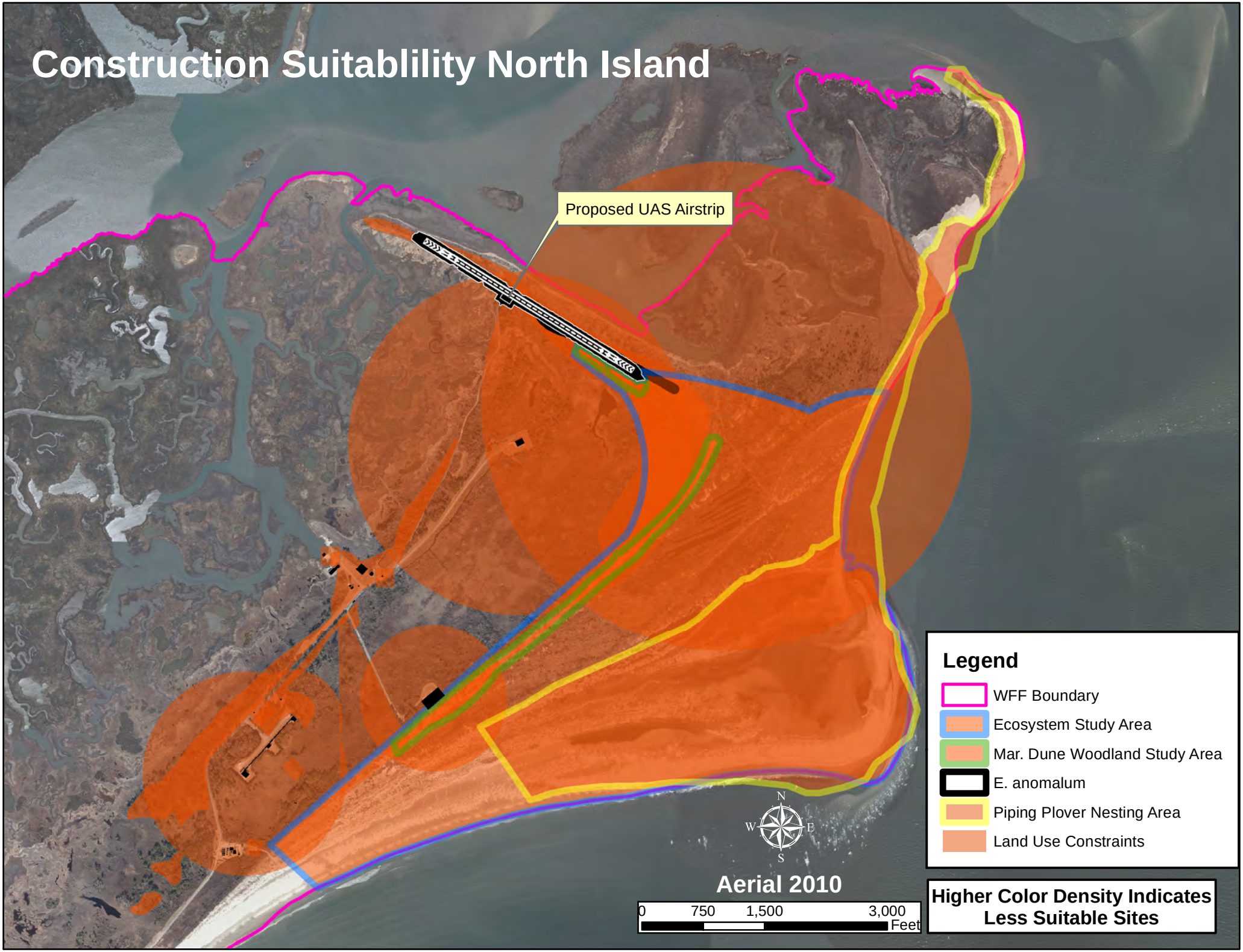
Joel Mitchell

Joel T. Mitchell
Natural Resources Program Manager

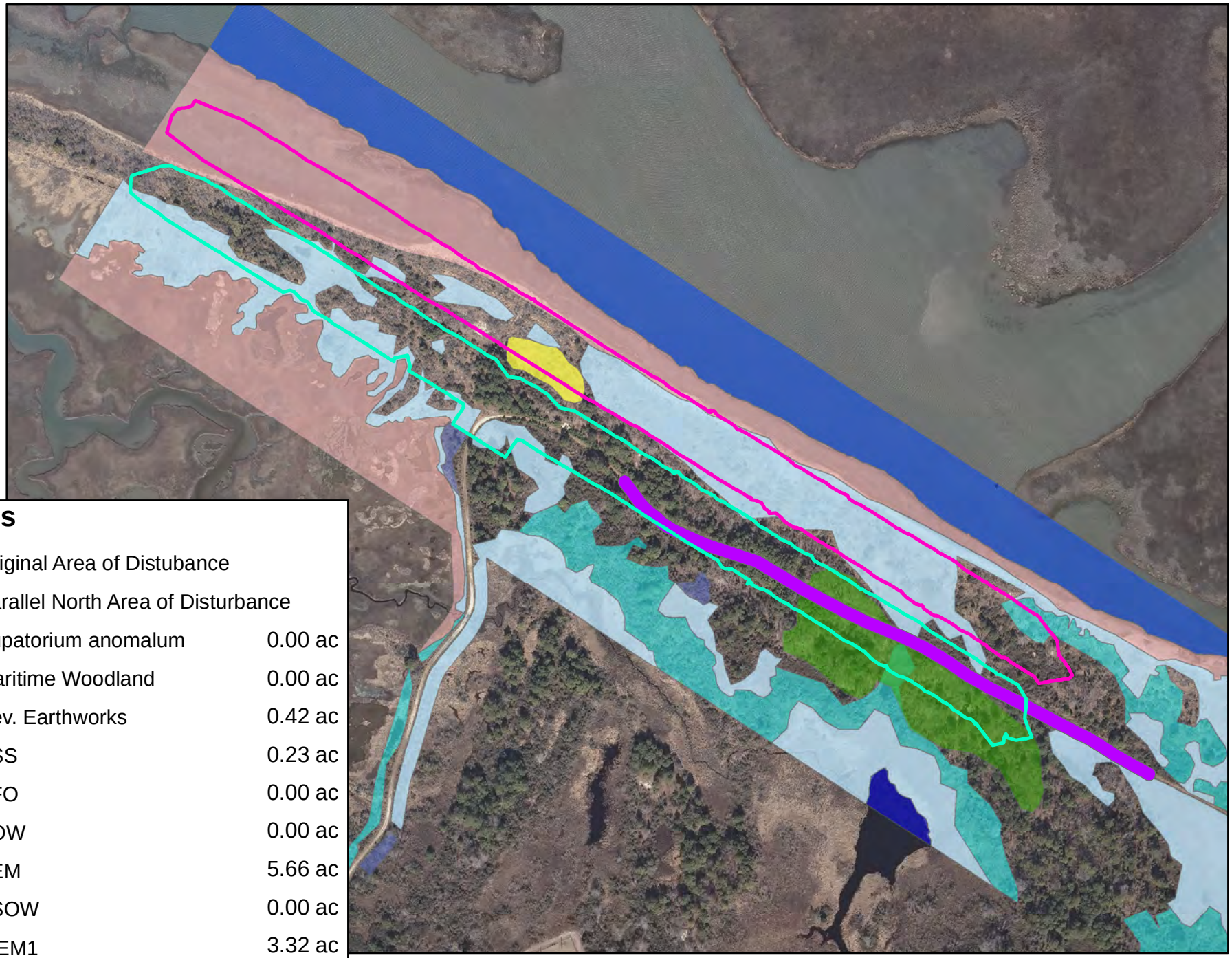
10 Enclosures

cc:
228/Mr. P. Bull
250/Mr. E. Connell
250/Ms. C. Turner
802/Mr. M. Hitch

Construction Suitablility North Island



UAS Airstrip Natural Resources Impacts
Parallel North Alternative

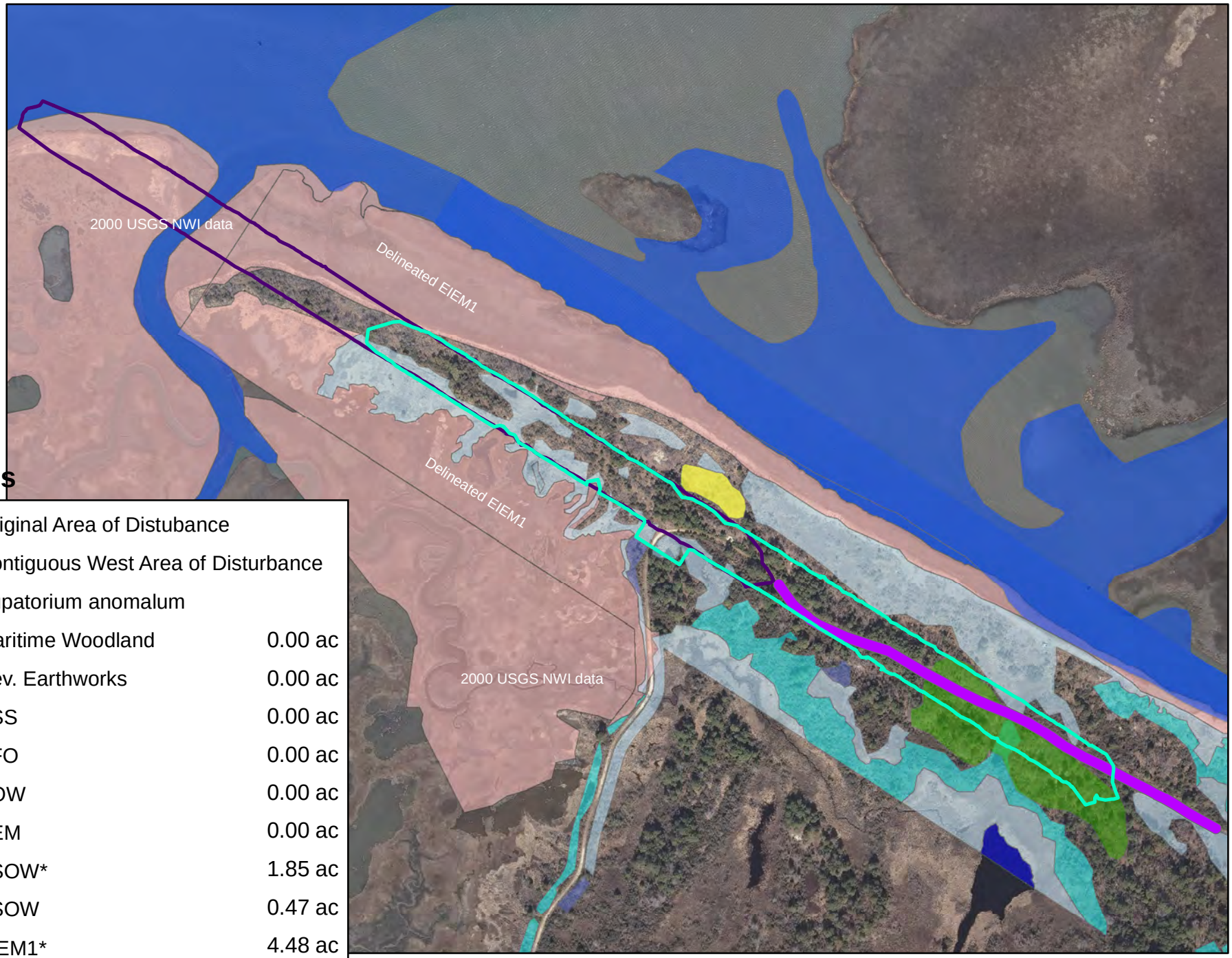


Impacts

Original Area of Distubance	
Parallel North Area of Disturbance	
Eupatorium anomalum	0.00 ac
Maritime Woodland	0.00 ac
Rev. Earthworks	0.42 ac
PSS	0.23 ac
PFO	0.00 ac
POW	0.00 ac
PEM	5.66 ac
ESOW	0.00 ac
EIEM1	3.32 ac
Total Wetland Disturbance:	**9.63 ac**

0 125 250 500 750 1,000 1,250 Feet

UAS Airstrip Natural Resources Impacts
Contiguous West Alternative



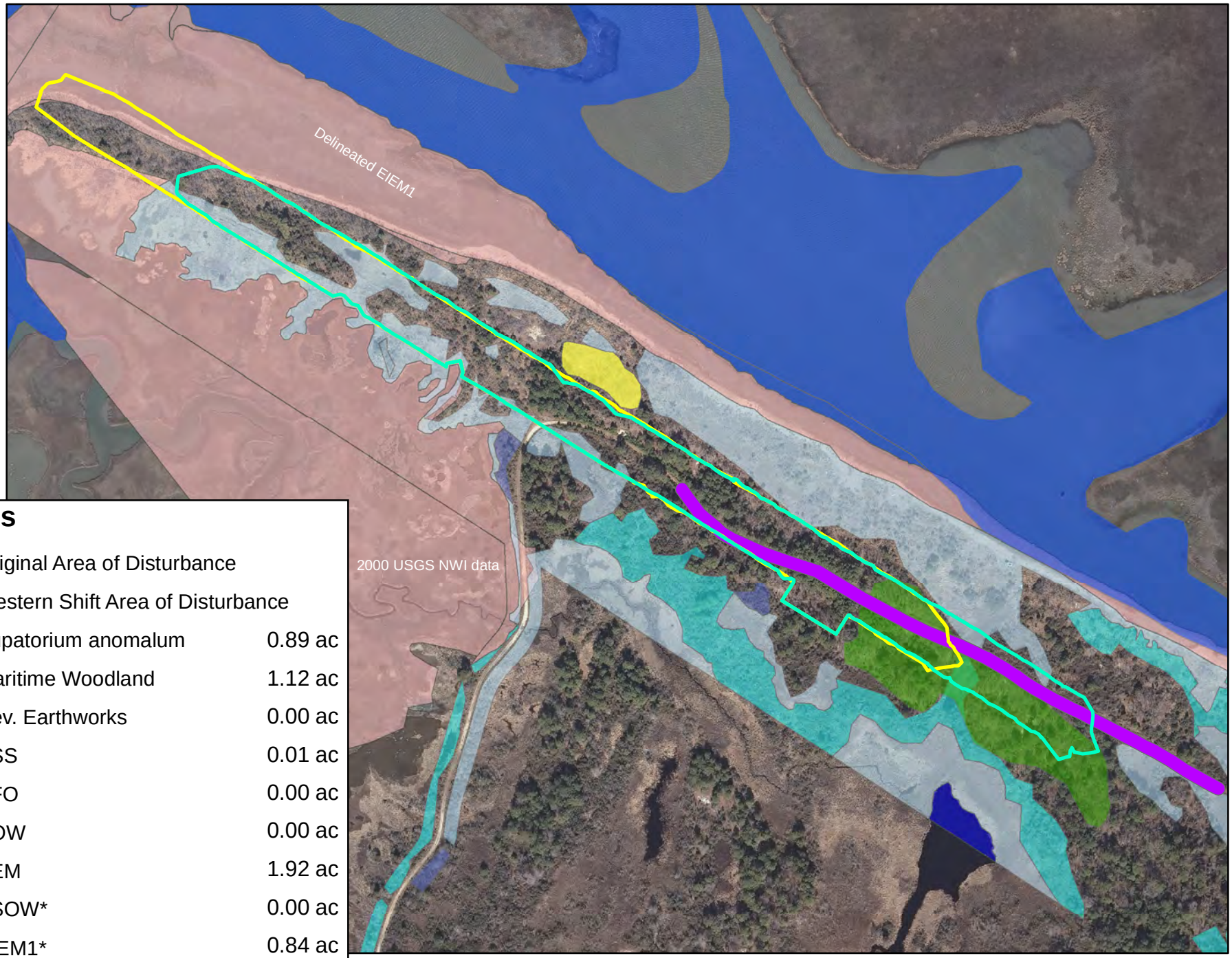
Impacts

Original Area of Distubance	
Contiguous West Area of Disturbance	
Eupatorium anomalum	
Maritime Woodland	0.00 ac
Rev. Earthworks	0.00 ac
PSS	0.00 ac
PFO	0.00 ac
POW	0.00 ac
PEM	0.00 ac
ESOW*	1.85 ac
ESOW	0.47 ac
EIEM1*	4.48 ac
Total Wetland Disturbance:	**6.80 ac**

*Data partially from 2000 USGS NWI

0 150 300 600 900 1,200 1,500 Feet

UAS Airstrip Natural Resources Impacts
Western Shift Alternative



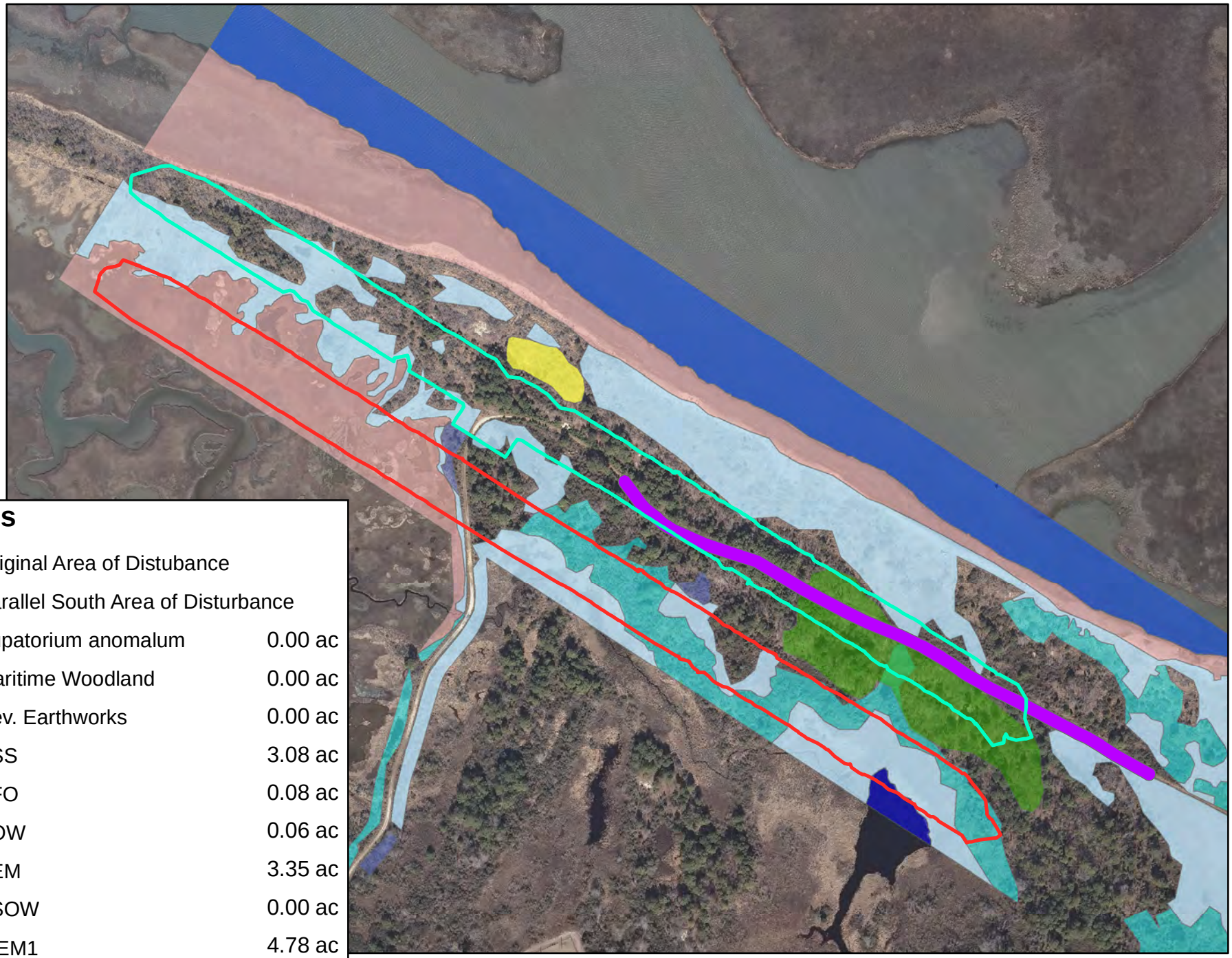
Impacts

Original Area of Disturbance	
Western Shift Area of Disturbance	
Eupatorium anomalum	0.89 ac
Maritime Woodland	1.12 ac
Rev. Earthworks	0.00 ac
PSS	0.01 ac
PFO	0.00 ac
POW	0.00 ac
PEM	1.92 ac
ESOW*	0.00 ac
EIEM1*	0.84 ac
Total Wetland Disturbance:	**2.77 ac**

*Data partially from 2000 USGS NWI

0 125 250 500 750 1,000 1,250 Feet

UAS Airstrip Natural Resources Impacts
Parallel South Alternative

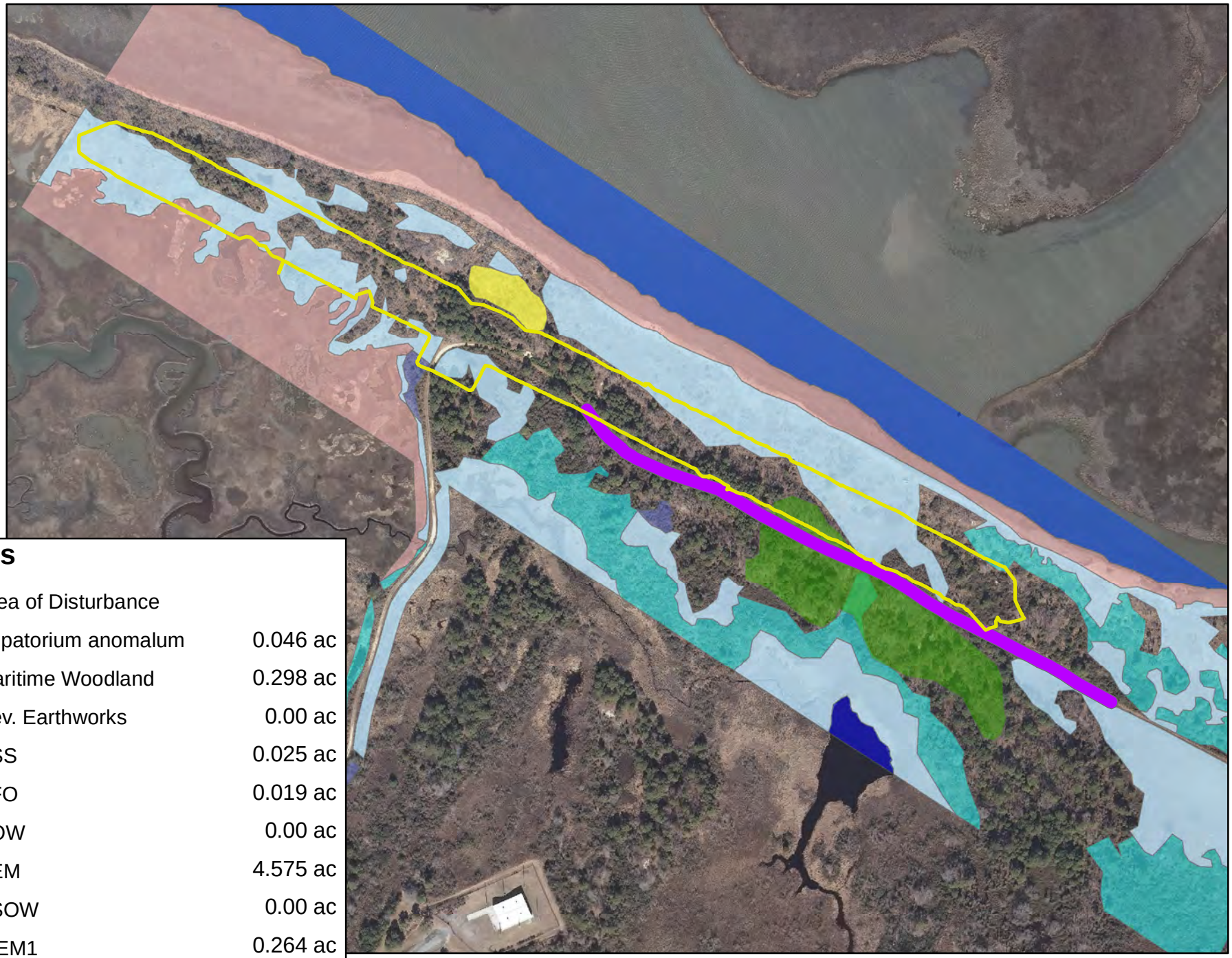


Impacts

Original Area of Distubance	
Parallel South Area of Disturbance	
Eupatorium anomalum	0.00 ac
Maritime Woodland	0.00 ac
Rev. Earthworks	0.00 ac
PSS	3.08 ac
PFO	0.08 ac
POW	0.06 ac
PEM	3.35 ac
ESOW	0.00 ac
EIEM1	4.78 ac
Total Wetland Disturbance:	**11.35 ac**

0 125 250 500 750 1,000 1,250 Feet

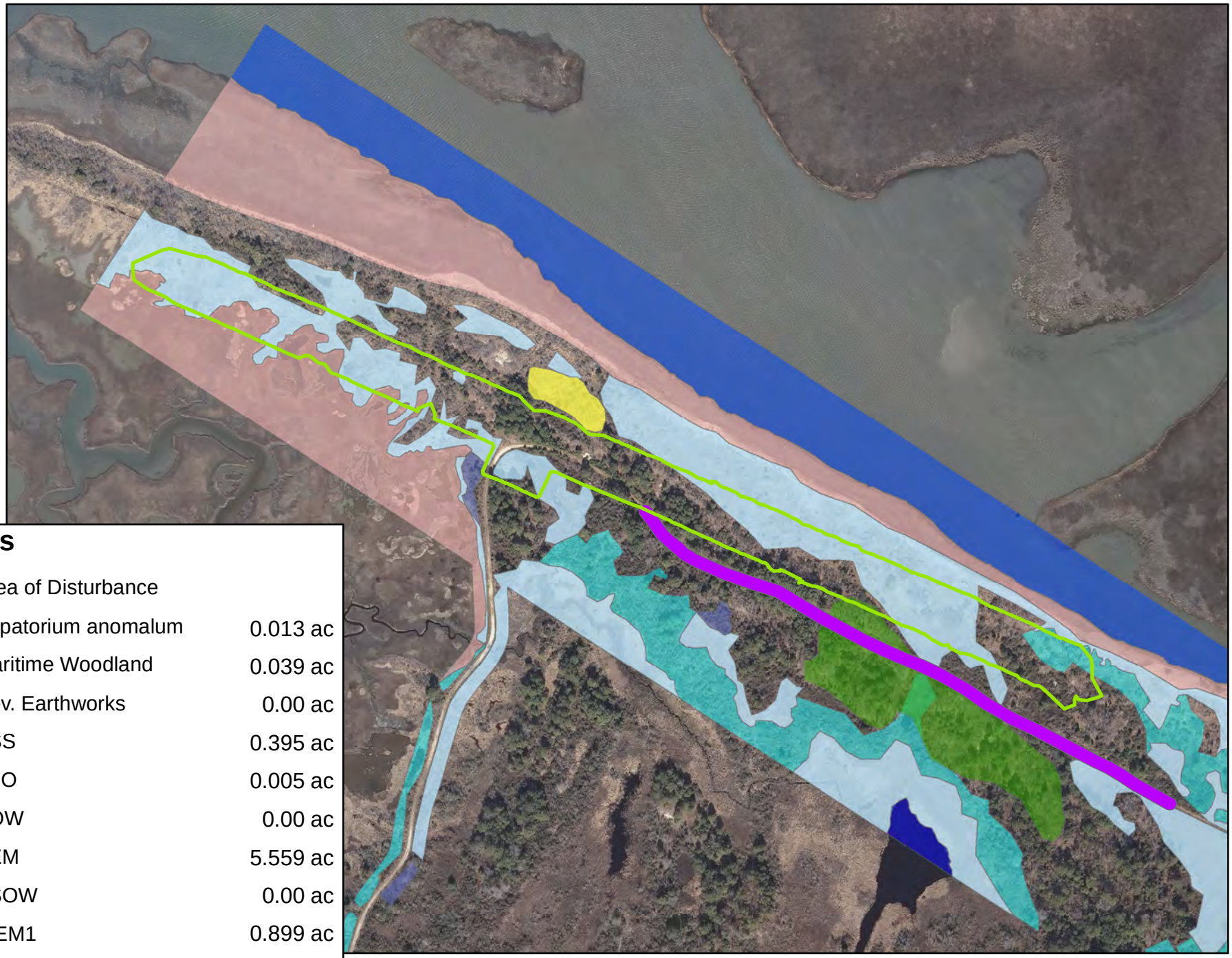
UAS Airstrip Natural Resources
Counterclockwise Rotation 1



Impacts

Area of Disturbance	
Eupatorium anomalum	0.046 ac
Maritime Woodland	0.298 ac
Rev. Earthworks	0.00 ac
PSS	0.025 ac
PFO	0.019 ac
POW	0.00 ac
PEM	4.575 ac
ESOW	0.00 ac
EIEM1	0.264 ac
Total Wetland Disturbance:	**4.883 ac**

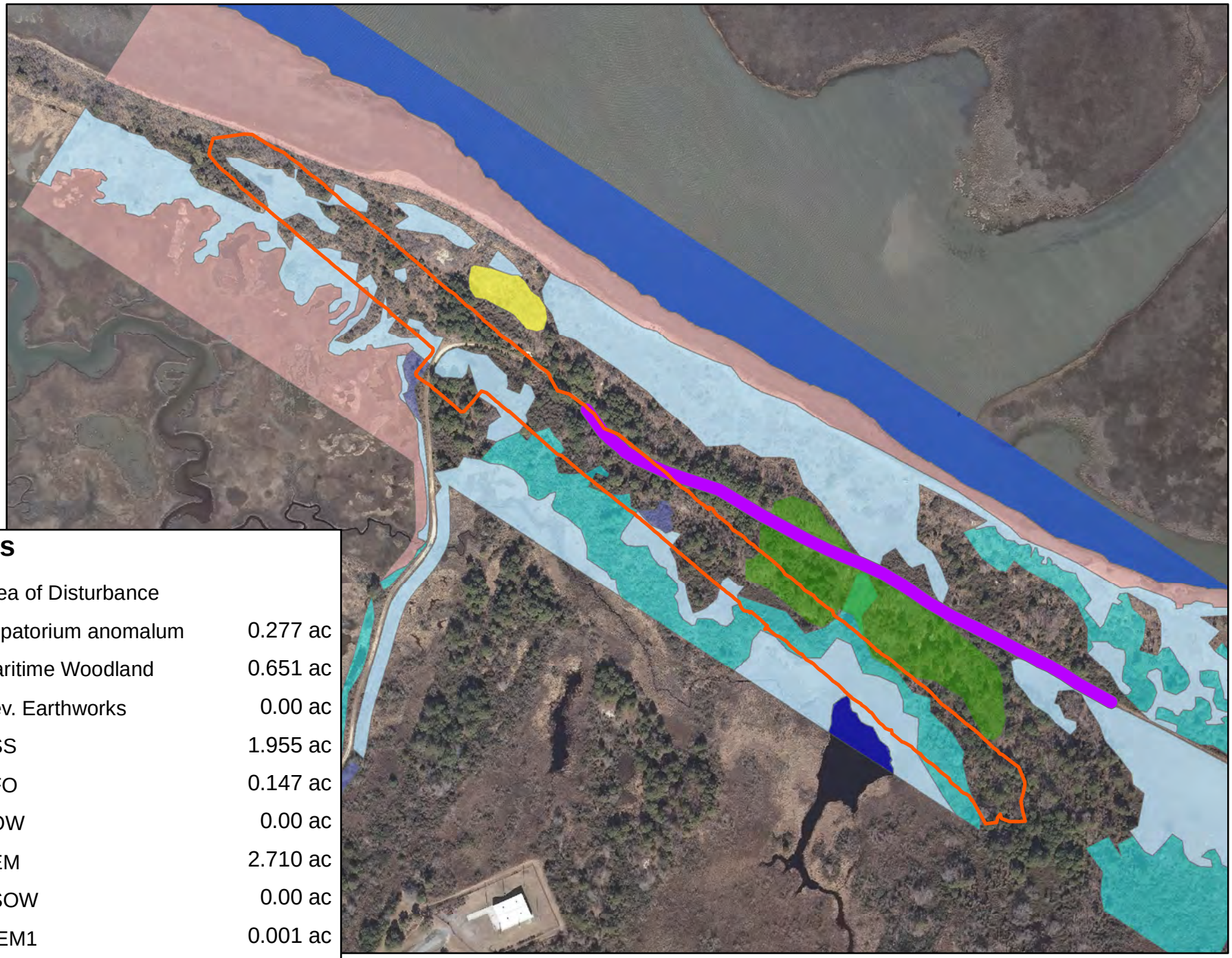
UAS Airstrip Natural Resources
Counterclockwise Rotation 2



Impacts

Area of Disturbance	
Eupatorium anomalum	0.013 ac
Maritime Woodland	0.039 ac
Rev. Earthworks	0.00 ac
PSS	0.395 ac
PFO	0.005 ac
POW	0.00 ac
PEM	5.559 ac
ESOW	0.00 ac
EIEM1	0.899 ac
Total Wetland Disturbance:	**6.858 ac**

UAS Airstrip Natural Resources
Clockwise Rotation

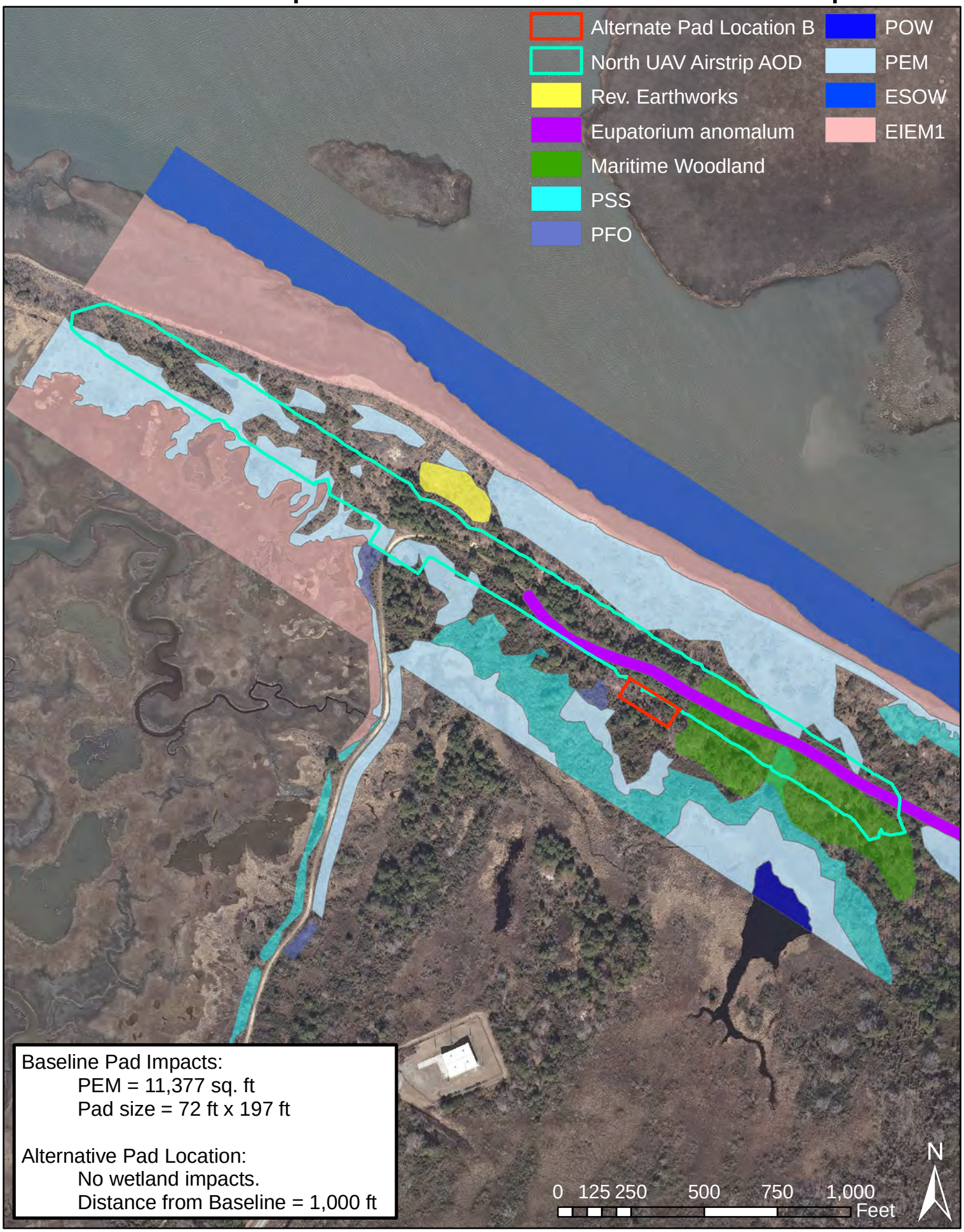


Impacts

Area of Disturbance	
Eupatorium anomalum	0.277 ac
Maritime Woodland	0.651 ac
Rev. Earthworks	0.00 ac
PSS	1.955 ac
PFO	0.147 ac
POW	0.00 ac
PEM	2.710 ac
ESOW	0.00 ac
EIEM1	0.001 ac
Total Wetland Disturbance:	**4.813 ac**

0 125 250 500 750 1,000 1,250 Feet

UAS Airstrip Alternative Pad Location Map



Invasive Species Management Plan

for

North Wallops Island UAS Airstrip

National Aeronautics and Space Administration

Goddard Space Flight Center

Wallops Flight Facility

Wallops Island, Virginia

June 2012

Invasive Species Management Plan for Unmanned Aerial Systems (UAS) Airstrip
June 2012

Introduction

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 (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 (Pimentha et al. 2005).

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 (DCR). The survey found two invasives, Phragmites (*Phragmites australis*) and Japanese Sedge (*Carex kobomugi*), in the north Wallops Island area (DCR, 2012). Phragmites is the predominant invasive species of concern and will be addressed in this plan. Annual monitoring will be conducted for other invasive species and appropriate control actions will be taken as necessary.

Species Description

Phragmites is a tall (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 the aerial shoots prevent other species from becoming established. These monocultures decrease the value wetlands as habitat for wildlife.

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 September and October, food is transported to the rhizomes and seeds are shed in autumn months. The plant remains dormant through the winter months and the 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. Construction of an UAS airstrip on north Wallops Island is likely to create conditions conducive to Phragmites colonization.

Establishment of Phragmites stands along the footprint of the UAS airstrip cannot be tolerated for operational as well as ecological reasons. The presence of the tall stems in the clear zones along the edges of the runway would impede pilot lines of sight, while the stiff stems would be hazardous to the fragile airframes of the UAS should they lose control and veer from the airstrip. It is therefore necessary to prevent the establishment of new Phragmites stands in the UAS airstrip footprint and, to the extent practical, reduce those stands already extant in the vicinity.

Implementation of Controls (Adapted from Norris, et.al., 2002)

Restricted Construction Equipment Access - To prevent the accidental introduction of Phragmites during construction or maintenance activities, 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 on a portion of a project 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.

Cleaning Methods for Construction Equipment - Construction equipment shall 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.

Post Construction/UAS Airstrip Operations Control - Cleared areas surrounding the UAS airstrip will be mowed periodically to prevent colonization of new stands of Phragmites in this area. The purpose of the mowing is threefold: to maintain a low, safe surface for UAS that accidentally veer from the airstrip, to help maintain a line of site for the UAS pilots, and to prevent growth of young shoots of Phragmites.

Mowing will occur during summer months of June, July, and early August when most of the food reserves are in the aerial portion of the plant. Mowing will cease in mid-August. Small stands of Phragmites in the immediate vicinity of the UAS airstrip will be hand- sprayed with a Glyphosate- type herbicide during the post-tasseling stage (early September) when nutrients are being transported back to rhizomes so that the herbicides will translocate to the rhizome system as well. Alternatively, an Imazapyr-type herbicide may be applied from June until the first hard

frost. Care will be taken to ensure that other herbaceous species are not sprayed indiscriminately; spraying will not occur when winds exceed five miles per hour.

Results of implementing this Invasive Species Management Plan will be evaluated yearly, and this Plan will be revised as needed to adapt control techniques to the special characteristics and environmental conditions of this area. WFF will consult with Virginia DCR on adaptive management strategies for Phragmites control.

Selective Control of Phragmites Outside the UAS Airstrip Clear Zones - In its 2011 reinventory of the north Wallops Island area, DCR discovered the presence of Florida thoroughwort (*Eupatorium anomalum*). This plants species is known to have only one other occurrence in Virginia and the Wallops Island population is the northernmost example of the species. On Wallops Island, the species is found along the both edges of the unpaved road that extends south-eastward along the footprint of the proposed UAS airstrip and beyond. WFF will keep this road open in those portions of roadway beyond the UAS airstrip where the plant occurs by mowing the road edges early in the season to reduce the growth of woody species and the Phragmites. Should Phragmites still threaten *E. anomalum* clusters, the Phragmites will hand cut to a height below the first leaf and an herbicide will be applied to the stems by hand (URI-CELS, 2012.) *E. anomalum* clusters will be identified and periodically monitored by DCR as funding support from WFF to DCR allows.

References

Norris, L., Perry, J.E., and Havens, K.J. (2002). *A Summary of Methods for Controlling Phragmites australis.* Technical Report No.02-2. Wetlands Program, School of Marine Science, Virginia Institute of Marine Science.

Olson, B.E. (2007) *Phragmites Control Plan.* U.S. Fish and Wildlife Service. http://www.fws.gov/bearriver/Phragmites_Control_Plan.pdf (date accessed June, 2012).

URI-CELS Outreach Center. *Common Reed (Phragmites australis) Control Fact Sheet.* http://www.uri.edu/cels/ceoc/documents/commonReed.pdf (date accessed June, 2012).

Van Alstine, N.E., Fleming, G.P., Patterson, K.D., and Hobson, C.S. (2012). A 2011 Reinventory of the Natural Heritage Resources in the North Wallops Island Conservation Site, Wallops Flight Facility, Virginia. Natural Heritage Tech. Report. 12-03. Division of Natural Heritage, Virginia Department of Conservation and Recreation.