APPENDIX E –

ESSENTIAL FISH HABITAT

CONSULTATION

From:	Miller, Shari A. (WFF-2500) <shari.a.miller@nasa.gov>
Sent:	Wednesday, November 10, 2021 12:05 PM
To:	Karen.Greene@noaa.gov
Cc:	Nate Overby; Finio, Alan (MARAD); brian.c.denson@usace.army.mil; Brian Hopper (Brian.D.Hopper@noaa.gov); Finch, Kimberly (GSFC-2500); Meyer, T J (WFF-2500); David O'Brien (david.l.obrien@noaa.gov); Levine, Lori M. (GSFC-2500)
Subject:	Project Review Request, Wallops Island Northern Development, NASA WFF
Attachments:	NASA WFF_NorthDevelop - NOAA_EFH Consult Ltr_111021.pdf

Dear Ms. Greene:

The National Aeronautics and Space Administration (NASA) Wallops Flight Facility (WFF) and the Virginia Commercial Space Flight Authority (VCSFA, VA Space) propose to construct a pier for barge access and berthing and to dredge a vessel approach channel connecting to the Chincoteague Inlet Federal Channel. NASA is the lead agency for the National Environmental Policy Act (NEPA) process and for this Essential Fish Habitat (EFH) consultation. As the Department of Transportation's Maritime Administration (MARAD) and the U.S. Army Corps of Engineers (USACE) are serving as Cooperating Agencies on this project, this consultation also serves to fulfil their requirements.

Based on the attached EFH assessment, NASA has determined that the effects of the Proposed Action on EFH would not be substantial. I certify that we have used the best scientific and commercial data available to complete this assessment and request your concurrence with this determination. If you have any questions or require additional information, please contact me at Shari.A.Miller@nasa.gov or (757) 824-2327.

Thank you.

Shari A. Miller

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"Remember there's no such thing as a small act of kindness. Every act creates a ripple with no logical end." —Scott Adams

National Aeronautics and Space Administration

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

Reply to Attn of: 250.W

November 10, 2021

Ms. Karen Greene
Mid-Atlantic Field Office Supervisor and EFH Coordinator
Greater Atlantic Regional Fisheries Office
NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

Subject: Project Review Request, Wallops Island Northern Development, NASA Wallops Flight Facility, Accomack County, Virginia

Dear Ms. Greene:

The National Aeronautics and Space Administration (NASA) Wallops Flight Facility (WFF) and the Virginia Commercial Space Flight Authority (VCSFA, VA Space) propose to construct a pier for barge access and berthing and to dredge a vessel approach channel connecting to the Chincoteague Inlet Federal Channel (**Figures 1 and 2**). NASA is the lead agency for the National Environmental Policy Act (NEPA) process and for this Essential Fish Habitat (EFH) consultation. As the Department of Transportation's Maritime Administration (MARAD) and the U.S. Army Corps of Engineers (USACE) are serving as Cooperating Agencies on this project, this consultation also serves to fulfil their requirements.

NASA is preparing an Environmental Assessment (EA) in compliance with NEPA to analyze the potential effects of the proposed action on the environment. The EA will be tiered from the May 2019 *NASA WFF Site-Wide Programmatic Environmental Impact Statement* (PEIS), in which NASA evaluated the environmental consequences of constructing and operating new facilities and infrastructure at WFF.

The purpose of this letter is to provide information about the proposed project and to request your concurrence with our determination regarding potential effects on EFH. NASA has evaluated the potential for the project to adversely affect EFH in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA). NASA used the Greater Atlantic Regional Fisheries Office EFH Assessment Worksheet to evaluate potentially affected EFH, and we are submitting our evaluation and findings for your review. The EFH Assessment Worksheet is provided in **Attachment 1**. We have determined that the impact of the Proposed Action on EFH would not be substantial and request an abbreviated EFH consultation.

Background

The goal of the MARAD Marine Highway Program is to expand the use of America's navigable waterways; to develop and increase marine highway service options; and to facilitate their further integration into the current U.S. surface transportation system, especially where water-based transport is the most efficient, effective, and sustainable option (MARAD 2019a). The M-95 Marine Highway Corridor includes the Atlantic Ocean coastal waters; Atlantic Intracoastal Waterway; and connecting commercial navigation channels, ports, and harbors spanning 15 states including Virginia. The proposed Wallops Island M-95 Intermodal Barge Service project has the potential to support the growth of existing operations at WFF, enhance science, technology, engineering, and math (STEM) research opportunities, and spur high-tech/high-paying jobs in a predominantly rural area (MARAD 2019b).

VCSFA was created in 1995 by the General Assembly of the Commonwealth of Virginia to promote the development of the commercial space flight industry, economic development, aerospace research, and STEM education throughout the Commonwealth. In 1997, the VCSFA entered into a Reimbursable Space Act Agreement with NASA, which permitted the use of land on Wallops Island for launch pads. VCSFA also applied for and was granted a Federal Aviation Administration (FAA) license for launches to orbital trajectories. This led to the establishment of the Mid-Atlantic Regional Spaceport (MARS) which is owned and operated by VCSFA.

Development of a port and operations area to support the activities of NASA, WFF tenants, and MARS at the north end of Wallops Island was evaluated at a programmatic level of detail in the 2019 *Final Site-wide PEIS* (NASA 2019). NASA has several long-term tenants and customers that use the WFF research airport and Wallops Island launch range, its facilities, and airspace.

Description of the Proposed Action

Under the Proposed Action, the MARS Port, including a 1,305-ft fixed pier and turning basin, would be constructed adjacent to the UAS airstrip located at the north end of Wallops Island (**Figures 1 and 2**). The MARS Port would provide a port and operations area along with associated capabilities for VCSFA, NASA WFF, and other customers. The MARS Port would also serve as a new intermodal facility as part of the MARAD M-95 Marine Highway Corridor. Infrastructure (new upland facilities and improvements to the existing access road, airstrip, and utilities) would likewise be constructed or installed as part of the Proposed Action. Access road improvements would include widening of an existing culvert. Although shown for completeness in **Figure 2**, upland activities that would not affect essential fish habitat are not discussed further.

The Proposed Action would also include the dredging of a new and existing channel to enhance the vessel approach to the pier (**Figure 3**). The vessel approach channel, which interfaces with two Federal waterways, the Chincoteague Inlet Channel and the Chincoteague Inlet to Bogues Bay connecting waters would initially be used by a variety of shallow-draft, manned and unmanned vessels. Ultimately, the proposed channel would have a length of approximately 12,800 ft, a width of 100 ft, and a final depth of 12 ft below mean lower low water (MLLW). Components of the Proposed Action are further described below.

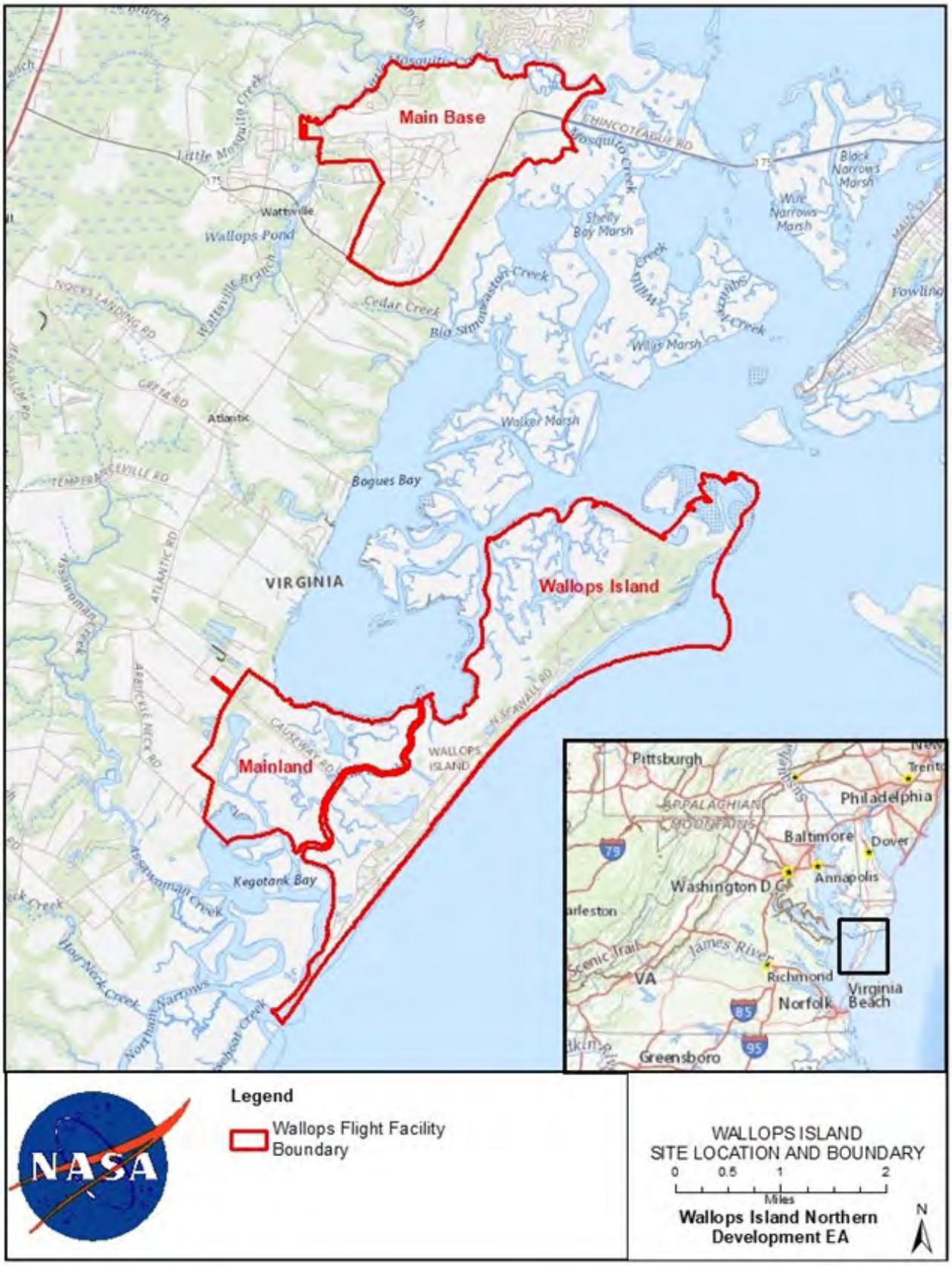

Figure 1. NASA WFF Location

Figure 2. Proposed MARS Port and Infrastructure Components

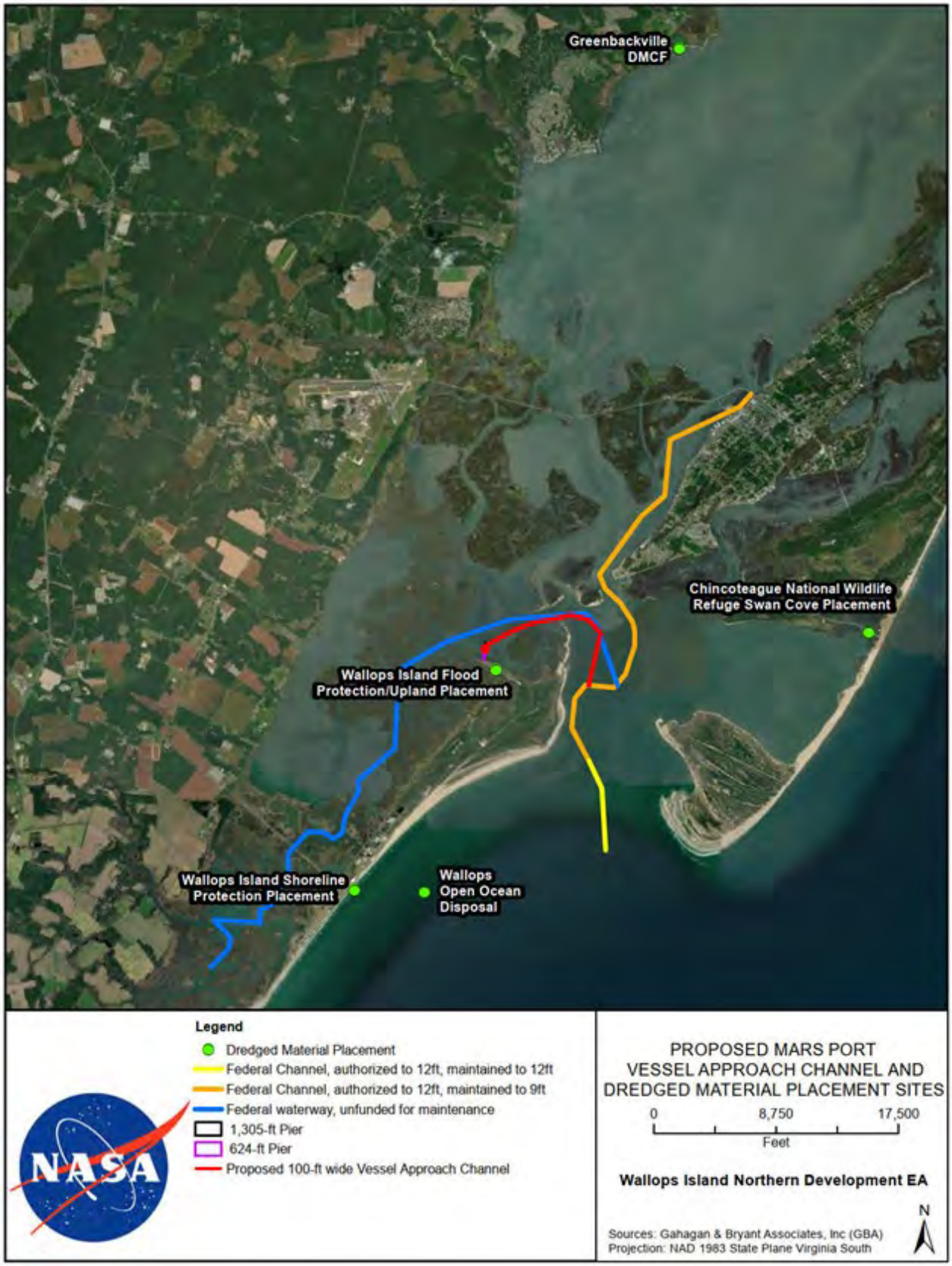

Figure 3. Proposed MARS Port Vessel Approach Channel and Dredged Material Placement Sites

Proposed Action In-Water Components

The MARS Port, including a 1,305-ft fixed pier and turning basin would be constructed on (and within the vicinity of) the UAS Airstrip located at the north end of Wallops Island. The MARS Port would provide a port and operations area along with associated capabilities for MARS, NASA WFF, and other customers. The MARS Port would also serve as a new part of the MARAD M-95 Marine Highway Corridor. Upland infrastructure (new facilities and improvements to the existing access road, airstrip, and utilities) would likewise be constructed and installed as part of the Proposed Action.

The Proposed Action would also include the dredging of an existing channel for enhanced vessel approach purposes. The vessel approach channel, which would interface with both the Chincoteague Inlet Federal Channel and the Bogues Bay connecting waterways, would be used by a variety of manned and unmanned vessels. It would be approximately 12,800 ft long, 100 ft wide, and would have a final depth of 12 ft below MLLW.

Construction of the Proposed Action would be carried out in three phases:

- **Phase 1** would be construction of a 624-ft fixed pier, a 200-ft-radius turning basin 9 ft deep below MLLW and dredging of the vessel approach channel to a final depth of 5 ft to 9 ft below MLLW (red outline in **Figure 4**). The area dredged would total approximately 34 ac. Additionally, a 130-ft long segment of the existing paved UAS Airstrip access road would be widened from 15 ft to 30 ft in conjunction with the widening of the culvert over which the road crosses a headwater drainage channel to Cow Gut.
- **Phase 2** would be construction of a 676-ft extension of the fixed pier to a total length of 1,305 ft and dredging of a 200-ft-radius turning basin (located at the end of the pier extension; shaded pink on **Figure 4**) to a final depth of 9 ft below MLLW. The area dredged would total approximately 4 ac.
- **Phase 3** of construction would be additional dredging of the turning basin and vessel approach channel to a final depth of 12 ft below MLLW, specifically the portion of the channel from the Phase 2 turning basin to where it meets the Chincoteague Inlet Federal Channel (shaded blue on **Figure 4**). The previously dredged area that would be dredged again to increase its depth would total approximately 33 ac.

The portion of the channel shown in pink on **Figure 4**, which connects the vessel approach channel to the Phase 2 turning basin, is naturally deeper than 9 feet below MLLW and, therefore, would not require any dredging during Phase 2. The estimated timeline for construction of the Proposed Action would have Phase 1 beginning in 2022 and being completed by 2024, with subsequent phases occurring approximately 1 to 2 years after completion of the prior phase. Additional information about the proposed piers and other port components is provided in Chapter 2 of the Draft EA.

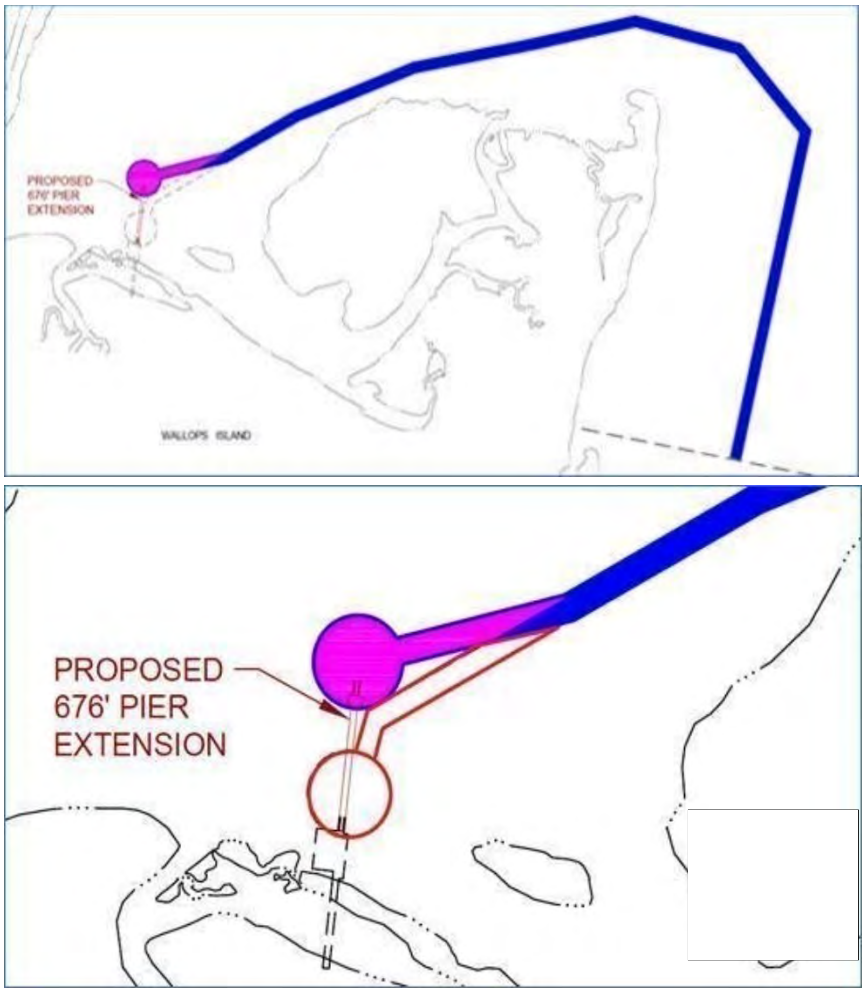

Figure 4. Diagram of Proposed Phased Construction

A variety of shallow-draft (2- to 4-ft), manned and unmanned vessels would be serviced by the port. The major navigational service would be a tug and barge configuration of an approximately 150-ft by 40-ft deck barge propelled by a tugboat requiring approximately 8 ft of draft. The vessel approach channel would intersect with the Chincoteague Inlet Federal Channel and the Bogues Bay connecting waterways (**Figure 3**). The proposed width of the approach channel, approximately 100 ft, is consistent with the dimensions of the Federal Channel. Estimated dredging volumes for the vessel approach channel and turning basin are provided in **Table 1**.

Table 1. Estimated Dredging Volumes

	Phase 1	**Phase 2**	**Phase 3**
Channel depth (depth below MLLW)	9 ft	9 ft	12 ft
Channel length	12,800 ft	11,800 ft	11,800 ft
Channel dredging volume	15,100 yd^3	0	34,600 yd^3
Turning basin dredging volume	40,500 yd^3	800 yd^3	3,200 yd^3
Total volume per phase	55,600 yd^3	800 yd^3	37,800 yd^3
		Total Volume (Phases 1–3):	**94,200 yd^3**

yd^3 = cubic yards

Five potential sites for the placement of dredged material are summarized in **Table 2** and shown on **Figure 3**. Currently, it is estimated that between 56,000 CY and 57,000 CY of material would be dredged during the initial dredging event. VCSFA intends to utilize Option 1, the Wallops Open Ocean Dredge Material Placement Area, as the initial dredge material placement site. When compared to Options 2 through 5, Option 1 is the most economical solution as it offers the lowest estimated mobilization costs, as well as the lowest unit costs for dredging, transport, and placement. The Open Ocean site is also the fastest path towards construction as it is already permitted by the USACE and has capacity for the proposed initial dredge material. While the Greenbackville DMCF (Option 3) is also already permitted by the USACE, it is not anticipated to have available capacity to handle the initial projected volume of material due to its expected use by USACE. Lastly, the dredged material is expected to be of similar physical and chemical characteristics as the material currently dredged from the Chincoteague Channel by the USACE. Dredged material placed within the Wallops Island nearshore zone is required to have the same physical characteristics (90%+ sand) as the natural bottom and anything with a higher fine-grained content would not be suitable. Based on the geotechnical borings for the proposed project, the material is anticipated to be compromised of approximately 95% sand and, therefore, would be suitable for the Open Ocean site.

For future maintenance dredging events, the Project may use Option 2, Wallops Island Flood Protection/Upland Placement. Keeping this as an option allows for future beneficial re-use of the dredge material on Wallops Island to provide resiliency to the MARS UAS Airfield. The cost of this option is higher as it would require additional studies, design, and construction to contain and shape the pumped discharge. Option 2 may also have impacts to the wetlands north of the UAS Airfield. Further analysis would be required for this impact and depending on the results, thin layer deposition or the use of geotubes could be required to hold the material. Lastly, the UAS Airfield is currently not permitted for material placement; the permitting process would require a longer timeframe than Option 1. If selected for placement during future maintenance dredging events, designs, impact analysis, and permitting would be required and would be performed at that time.

Table 2. Potential Dredged Material Placement Sites							
Option	**Site**	**Description**	**Sail Distance from Basin[1]**	**Pipe Distance from Basin[2]**	**Sail Distance from Channel**	**Pipeline Distance from Channel**	**Description**
1	Wallops Open Ocean Dredge Material Placement Area	Open water placement site, closer than Lewis Creek or Norfolk Ocean disposal sites	6.1 mi	--	4.4 mi	--	This area is located just offshore of Wallops Island with a transportation distance of the dredged material of approximately 4 nautical mi. Open water placement options typically present the lowest cost dredging option and allows for the widest array of dredging equipment ranging from clamshell dredges to barge mounted excavators supplying dump barges or specially modified deck barges that are towed by tugboats to the dredged material placement site. Open water placement locations are controlled by the USACE and a CWA Section 404 permit would be required for the use of this site
2	Wallops Island Flood Protection/ Upland Placement	Reuse of material for flood mitigation through upland placement at site identified by NASA	--	2,800 ft	--	12,040 ft	This option involves the beneficial reuse of material for flood mitigation through upland placement in low lying areas on Wallops Island. For example, there are low lying areas in the vicinity of the culvert crossing the main access road to the UAS airstrip. This option was evaluated based on having a cutter suction dredge pump the material into this area. This option would also require development of containment measures for the dredged material in the form of containment dikes and the channeling of the effluent and its return into Bogues Bay. This effluent is the water that is used in the dredging process to transport the dredged material in slurry form to the placement location. Other alternatives could include thin layer placement for marsh enhancement in marsh areas a similar distance to the dredging location, or the use of geotubes, or synthetic membranes, for containing the dredged material.

Table 2. Potential Dredged Material Placement Sites							
Option	**Site**	**Description**	**Sail Distance from Basin[1]**	**Pipe Distance from Basin[2]**	**Sail Distance from Channel**	**Pipeline Distance from Channel**	**Description**
3	Greenbackville Dredged Material Containment Facility (DMCF)	Upland DMCF run by USACE, requires both navigation of Chincoteague Channel and pumping on location	11.3 mi	--	9.5 mi	650 ft	The third dredged material placement option identified is the use of the upland Dredged Material Containment Facility (DMCF) owned and managed by the USACE. The USACE places material dredged from the upper reaches of the Chincoteague Channel into this DMCF. This option, which would require the USACE to first verify capacity and permit use of this site, would utilize a mechanical dredge to load the dredged material removed from the approach channel into barges. These barges would then be towed approximately 10 nautical mi to the DMCF. A specialized hydraulic unloader would be required to discharge the dredged material from the transport barges and pump the material into the DMCF. However, according to USACE, this site has limited capacity for material and may not be suitable.
4	Wallops Island Shoreline Protection Placement	Reuse of material for shoreline protection and beach repair	7.5 mi	--	6 mi	--	This option would involve the beneficial reuse of clean, compatible sand from the dredged material to repair and protect areas of the shoreline within the Launch Range area on Wallops Island. If dredged material is determined to be compatible with the current shoreline sand, the material would be placed along the seawall to protect the beach from tidal impacts or ocean overwash from coastal storms such as hurricanes and Nor'easters. This option would require using a mechanical dredge to load the dredged material removed from the approach channel into barges. These barges would then be towed approximately 6 nautical mi to the shoreline. A specialized hydraulic unloader would be required to discharge the dredged material from the transport barges and pump the material onto the placement areas.

Table 2. Potential Dredged Material Placement Sites

Option	Site	Description	Sail Distance from Basin[1]	Pipe Distance from Basin[2]	Sail Distance from Channel	Pipeline Distance from Channel	Description
5	Chincoteague National Wildlife Refuge Swan Cove Placement	Reuse of material for habitat restoration	-	9 km (5.6 mi)	-	6.9 km (4.3 mi)	This option would involve the beneficial reuse of the dredged material for the Swan Cove Pool Restoration Project located in the Chincoteague National Wildlife Refuge (NWR). If dredged material is determined to be compatible, it would be used by USFWS to create berms and enhance and/or restore currently degraded areas of the estuarine-salt marsh habitat that have been negatively impacted by an under sized culvert restricting sediment deposition and tidal flow. Although USFWS would prefer material with a high proportion of sand, they will also accept dredge material containing high organic matter content. This option was evaluated based on having a cutter suction dredge pump the material to this area. Once pumped, USFWS will assume responsibility for sediment placement and is in the process of securing appropriate permits.

[1] Sail distance = the length of the path via water required to reach the placement site from the centroid of dredging in the proposed turning basin or approach channel (statute miles)
[2] Pipe distance = the length of pipe required to reach the placement site from the centroid of dredging or from the anchorage for a vessel loaded with dredged material
DMCF = Dredged Material Containment Facility

Summary of Proposed Action Construction Activities

Construction of the Proposed Action would involve: (1) construction of the pier components that would make up the MARS Port, (2) dredging of the vessel approach channel, turning basin, and placement of dredged material, and (3) construction or improvement of the proposed onshore facilities and infrastructure.

The estimated timeframe for construction of the Proposed Action would have Phase 1 beginning in 2022 and being completed by 2024, with subsequent phases occurring approximately 1 to 2 years after completion of the prior phase. It is assumed that construction of all proposed onshore project components and infrastructure would be completed during Phase 1 (although the North Island Operations Center may be constructed later). With two crews (10 persons each), working 5 days per week (10-hour days), construction of the 624-ft long pier under Phase 1 would take approximately 12 months to complete and construction of the 676-ft long pier extension under Phase 2 (for a total pier length 1,305 ft) would take approximately 9.5 months to complete.

Phase 1 dredging activities (turning basin and channel) would take approximately 30 days to complete; Phase 2 dredging (turning basin) would take approximately 7 days, and Phase 3 dredging (turning basin and channel) would take 30 days. Work would be performed 24 hours a day, seven days a week with two crews each working 12-hour shifts.

Typical equipment used during construction would include crane barges, material barges, tugboat, vibratory pile hammer, diesel impact hammer, concrete truck, concrete pump truck, concrete vibrator, generator, welding machines, cutting torches, and various small tools.

Summary of Proposed Action Operational Activities

VCSFA/MARS currently has a facilities team that mows grass once per week, monitors for eagles twice per week during nesting season, periodically removes tree and weed growth, and inspects the infiltration trench and fencing around the Revolutionary War Earthworks. During summer months, a mosquito fogging service truck sprays the airfield once every 2 weeks. The pier structure would also require quarterly structural inspections.

Potential usage of the MARS Port facility during its operation is provided in **Table 3**.

Table 3. Potential MARS Port Operations/Facility Usage

Potential Facility Usage	Vessel Type	Quantity Assumptions	Total Barge / Vessel Trips	Phase Associated with Usage
Medium Class ELV 1st stage (core) and 2nd stage	Shallow Draft Deck Barge & Inland Pushboat	3 launches per year; Each comes w/ ~4-6 truckloads of parts and equipment plus 2 heavy haulers	3	1

Table 3. Potential MARS Port Operations/Facility Usage				
Potential Facility Usage	**Vessel Type**	**Quantity Assumptions**	**Total Barge / Vessel Trips**	**Phase Associated with Usage**
Venture Class ELV	Shallow Draft Deck Barge & Inland Pushboat	Potential for 12 launches per year; 3 trucks per launch	12	1
Venture Class 2 ELV	Shallow Draft Deck Barge & Inland Pushboat	9 launches per year; 1 truck per stage, 3-5 trucks for equipment	9	1
Venture Class Heavy ELV	Deck Barge & 1000-1200 HP Tugboat	3 launches per year, 3 first stage cores per launch w/ 1 truck each plus 3-5 trucks for equipment	3	2
Minotaur Class	Deck barge & 1000-1200 HP tugboat	4 launches per year, 3 stage/cores per launch w/ 1 truck each; 3-5 additional trucks for equipment	4	2
Recovery effort	Shallow-draft deck barge & inland push boat	1 per launch	12	1
Autonomous Surface Vehicle (ASV)	Trailered vessel	1 deployment per month; each deployment has 5-10 vehicles included	12	1
Autonomous Underwater Vehicle (AUV)	Trailered vessel	1 deployment every other month; each deployment has 5-10 vehicles included	6	1
Miscellaneous usage	Shallow-draft vessel	1 deployment every other month	6	2
Research usage	Small research vessel	1 deployment every 4 months; each deployment has 5-10 vehicles included	3	2
Other government research & testing	Trailered vessel	1 deployment every other month	12	2
Other Site-wide PEIS construction/expansion	Deck barge & ocean tug	2 large/oversized deliveries per year	1	2
Commodity delivery	Deck barge & ocean tug	16 total barges	16	3
Total Barge / Vessel Trips			**99**	

EFH Assessment

The MSA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," and it requires federal agencies to consult with NOAA Fisheries when proposing activities that may adversely affect EFH. To facilitate consultation, NOAA Fisheries provides an online mapping tool (the EFH Mapper) that can be queried to identify designated EFH species and life stages potentially occurring near the proposed project area (NOAA Fisheries 2020a). Information provided by the EFH Mapper for the action area is included in **Attachment 2**. The Proposed Action includes the construction of a pier and dredging of channels and turning basins in open tidal waters off the north end of Wallops Island. The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). For this project, the action area includes the north end of Wallops Island surrounding the UAS airstrip including the surrounding waters from Chincoteague Inlet to the east and north to Bogues Bay to the west – the offshore areas potentially affected by pier construction, dredging of channels and turning basins, placement of dredged sediment, and vessels transiting between the proposed pier and the existing Chincoteague Inlet Federal Channel.

The Proposed Action area is geographically coincident with EFH for one or more life stages of 11 federally-managed fish species. These species and life stages are listed in **Table 4**.

Table 4. Species and Life Stages with Designated EFH in Waters of the Action Area

Species	Eggs	Larvae/ Neonates[1]	Juveniles	Adults
Atlantic butterfish (*Peprilus triacanthus*)			X	X
Atlantic herring (*Clupea harengus*)				X
Black sea bass (*Centropristis striata)*			X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Clearnose skate (*Raja eglanteria*)			X	X
Sand tiger shark (*Carcharias taurus*)[2]		X	X	X
Sandbar shark (*Charcharinus plumbeus*)[2]		X	X	
Smoothhound shark complex – Atlantic stock (*Mustelus canis*)[2]		X	X	X
Summer flounder (*Paralicthys dentatus*)			X	X
Windowpane flounder (*Scophthalmus aquosus)*				X
Winter skate (*Leucoraja ocellata*)			X	X

Notes:
1. An "X" indicates that EFH has been designated within the project area for that species and life stage.
2. The three shark species bear live young (neonates) and thus, do not have a free-swimming larval stage.

Source: NOAA Fisheries (2020a)

The offshore habitats within the action area include tidal marsh communities and the estuarine surface waters of Chincoteague Inlet, Bogues Bay, Ballast Narrows, and other waterways. The nearest beds of submerged aquatic vegetation are approximately 3 miles north of the project area. Waters in the project area contain public and private harvesting areas for shellfish (oysters and clams). These aquaculture areas are mapped in **Figure 5**.

Figure 5. Aquaculture Areas Near Wallops Island

The benthic invertebrate community of the Project Area may be an important EFH component that provides a food source for managed fish species. A benthic macroinvertebrate survey was performed in July 2020 to characterize the existing community in a portion of the Project Area at the north end of Wallops Island. Sediment samples were collected at six locations along an east-west transect through the area where the proposed pier would be constructed. These locations were considered to be representative of the area that includes the pier and the areas to be dredged for the turning basins and western end of the approach channel. The benthic samples were collected from subtidal areas at locations ranging from approximately 130 ft to 930 ft offshore of the tidal marsh.

The majority of organisms in the benthic samples were polychaete worms, which were the dominant taxonomic group and composed 55 percent of the identified individuals. Polychaetes are highly opportunistic and have the ability to rapidly recolonize disturbed areas. The next most abundant taxa were bivalve molluscs (26 percent of identified individuals), followed by amphipods. These organisms live in and on the bottom sediment, where they consume bacteria and detritus in the sediment and can be prey for higher-trophic-level predators. The overall abundance and diversity of these organisms were low, which is typical for estuarine and anthropogenically disturbed environments. The majority of the polychaetes identified were small, threadlike species, and although they composed approximately 40 percent of the individual organisms counted, they made up only a small percentage of the overall biomass in the samples. Therefore, they are unlikely to be a substantial component of the diet of bottom-feeding fish (AECOM 2021).

More than one-third (39%) of the identified organisms from the six samples consisted of two opportunistic polychaete taxa that are well documented as being typically found in areas of anthropogenic disturbance, have high tolerance to dredging and disposal, are some of the first species to recolonize areas following anoxic events, and are able to repopulate habitats that experience extreme fluctuations in conditions. The six samples collected had a hydrogen sulfide odor that suggested the sediments were either anoxic or hypoxic at the time they were sampled. Hypoxia is not uncommon in intertidal and shallow subtidal estuaries along the eastern U.S. coastline due to high levels of organic content in the sediment as a consequence of excess nitrogen from decaying salt marsh peat material and possibly anthropogenic sources. The benthic infaunal community of the Project Area was low in abundance of organisms and diversity of taxa. The community was dominated by opportunistic species that can rapidly recolonize disturbed habitat from surrounding habitats (AECOM 2021).

In accordance with the EFH Final Rule published in the *Federal Register* on 17 January 2002, federal agencies may incorporate an EFH assessment into documents prepared for another purpose, such as an EA, provided the EFH assessment is clearly identified as a separate and distinct section of the document. The information presented in this letter is based on the analysis provided in the EFH Assessment Worksheet (NOAA Fisheries 2020b) prepared for this consultation (**Attachment 1)**. The four primary elements of the EFH assessment are summarized below:

1. A description of the Proposed Action.

   Provided above; a more detailed description will be provided in the EA concurrently being prepared for the Proposed Action by NASA in compliance with NEPA.

2. An analysis of the potential adverse effects of the Proposed Action on EFH and the managed species.

   Briefly summarized in the EFH Assessment Worksheet (**Attachment 1**) and discussed in more detail below:

   A 1,305-ft fixed pier would be constructed in the northwest portion of the Project Area. It would extend from salt marsh/intertidal habitat through subtidal habitat and into estuarine habitat. A turning basin would be constructed around the pier, impacting estuarine habitat. A vessel approach channel approximately 12,800 ft long and 100 ft wide would be dredged to a final depth of 12 ft below MLLW in estuarine habitat.

   The salt marsh and estuarine habitat within the footprint of the pilings supporting the pier would be permanently converted. These habitats beneath the pier would be shaded, inhibiting plant growth. The submerged structure of the pier would provide substrate for colonization by invertebrates and shelter and foraging habitat for fish. Pier construction and channel/basin dredging could result in temporary, localized impacts from increased noise, turbidity, and sedimentation.

   The benthic community and associated EFH in the vicinity of the proposed pier and dredging would be disturbed. The area of marsh and open water bottom beneath the pier would be approximately 1 acre (ac) in Phase 1 and 1.5 ac in Phase 3. The areas to be dredged, including turning basins and channels, would be approximately 34 ac in Phase 1, 4 ac in Phase 2, and 33 ac in Phase 3. In Phase 3, previously dredged areas would be re-dredged to increase their depth. Thus, the maximum area of bottom to be directly removed by dredging through all phases of the Proposed Action would be approximately 34 ac, and the total area affected by both the pier and dredging would be approximately 35.5 ac. Maintenance dredging of the basin and channel would be repeated periodically as necessary to maintain the required depth and is expected to be infrequent and of short duration.

   Dredging impacts to fish and benthic invertebrate prey would occur from direct entrainment (being captured by the dredge bucket). Eggs, larval stages, and sessile or sedentary prey species typically are most susceptible to entrainment. Entrainment rates tend to be low but are typically found to be more problematic in cutter/suction dredging, due to its continuous nature, than in clamshell bucket dredging.

   Pile driving and dredging during construction of the Proposed Action and maintenance dredging during operation of the pier facility would resuspend sediment in the water column and produce turbidity due to suspended particles and subsequent sedimentation. Generally, high levels of suspended solids and long exposure times produce the greatest

mortality. Decreased visibility from increased turbidity could lead to increased predation risk for some species and could impact species that rely on phytoplankton and filter feeding by damaging feeding structures or reducing feeding efficiency (Erftemeijer and Lewis 2006). Temporary turbidity and sedimentation effects from dredging along the channel and basin may impact nearby privately leased oyster beds (aquaculture).

The re-suspension of anoxic sediments can also reduce dissolved oxygen content in the immediate vicinity of the dredging operation, with deeper areas typically having lower dissolved oxygen than surface areas (LaSalle et al. 1991). This impact is generally short-lived due to mixing. Relatively immobile fish larvae or benthic invertebrate prey could be adversely impacted if extended periods of low dissolved oxygen occur.

Adverse impacts on shellfish from turbidity and sedimentation are unlikely, as the dredging activity would be short in duration and would not cover a large area of shellfish habitat. Additionally, increases in turbidity from dredging are generally similar to those that occur during strong storm events; thus, estuarine organisms have adapted to a wide range of turbidities.

It is expected that there would be a temporary impact on benthic invertebrate prey within the area of pile driving and dredging activities as a result of turbidity and sediment deposition, including anoxic sediments. As discussed above, the benthic infaunal community of the Project Area is low in abundance of organisms and diversity of taxa. The community is dominated by opportunistic species, mainly polychaete worms, that can rapidly recolonize disturbed habitat (AECOM 2021). Therefore, it is anticipated that this area would be recolonized within a short period of time after completion of the project. Additionally, conditions would return to a pre-disturbance state once particles disperse in the water column and/or settle to the bottom. Any effects on water quality from construction activities or increases in turbidity would be highly localized and temporary. Because the disturbance of benthic habitat would affect a relatively small amount of the Project Area and given the temporary nature of the disturbance, the Proposed Action is expected to result in negligible reductions in benthic invertebrate populations that may be prey for managed fish species (NOAA Fisheries 2020c).

In addition, turbidity control measures, such as turbidity curtains (also referred to as sediment curtains) could be implemented to prevent suspended sediments from exceeding water quality standards. The use of turbidity curtains around the pier construction area and the basin and access channel dredging areas would reduce or eliminate the potential impacts from sediments that may be released at the point of construction. Frequent monitoring would be performed during construction to ensure the effectiveness of suspended sediment containment. Thus, the areas of EFH that would be affected by turbidity from the Proposed Action would be minimal in comparison to the extensive surrounding areas, and effects on EFH that may occur in the Project Area would be of short duration.

Portions of the EFH surrounding Ballast Narrows could be disturbed by the movement and anchoring of barges. Barges would be positioned, and barge anchors deployed in such a manner as to avoid disturbance to oyster beds to the maximum extent practicable. Disturbance of the subaqueous bottom would not affect the long-term viability of the benthic community or associated EFH in those areas.

Accidental spills of fuel, oil, hydraulic fluid, or other potentially hazardous substances would be prevented or minimized through the contractor's adherence to spill prevention and control measures, as specified in WFF's Integrated Contingency Plan and the project-specific Spill Prevention, Control, and Countermeasure Plan.

Ambient noise levels would increase near construction and dredging locations. Some fish and invertebrate prey may be directly affected through their avoidance of noise. Abundance of prey species may also be altered temporarily within the Project Area as prey species migrate away from the construction and dredging activities. Noise effects on aquatic species would be temporary and would occur during limited periods while the equipment is being operated. However, impacts would be temporary and confined to EFH in the immediate vicinity of activities in Ballast Narrows and Chincoteague Inlet.

A small area of EFH would be affected by a proposed improvement to a road. A 130-ft segment of the existing paved access road for the UAS Airstrip would be widened from 15 ft to 30 ft and, in conjunction, the culvert over which the road crosses a drainage channel to Cow Gut would be widened (lengthened). The diameter of the culvert would remain the same. Extending the culvert would not interfere with fish passage within this headwater drainage and would have a negligible impact on EFH.

3. Conclusions regarding the effects of the Proposed Action on EFH.

   Provided in the EFH Assessment Worksheet (**Attachment 1**) and briefly summarized as follows: NASA has determined that potential adverse effects on EFH from the Proposed Action would be minimal and temporary. The overall determination is that adverse effects on EFH would not be substantial.

4. Proposed mitigation measures.

   - In accordance with wetland permitting requirements, wetland mitigation may be required to compensate for impacts to tidal marsh within the footprint of the proposed pier.
   - NASA would implement BMPs, described above and in the EFH Assessment Worksheet (**Attachment 1**), to minimize temporary adverse effects, which are briefly summarized as follows:
     - Impacts from sedimentation and erosion would be prevented or minimized through BMPs, which could include turbidity curtains, silt fence, and/or other approved measures to control erosion, turbidity, and sedimentation.
     - Revegetation of areas in the salt marsh using onsite excavated plant material disturbed

by construction or materials staging, in accordance with NASA WFF vegetation management policies, would further minimize potential adverse effects on EFH.

Conclusions

Based on this assessment, NASA has determined that the effects of the Proposed Action on EFH would not be substantial. I certify that we have used the best scientific and commercial data available to complete this assessment and request your concurrence with this determination.

If you have any questions or require additional information, please contact me at Shari.A.Miller@nasa.gov or (757) 824-2327.

Sincerely,

Shari A. Miller

Shari A. Miller
Center NEPA Manager and
Environmental Planning Lead

Enclosures:
Attachment 1: EFH Assessment Worksheet
Attachment 2: EFH Mapper query results

cc:
250/Ms. K. Finch
250/Mr. T. Meyer
MARAD/Mr. A. Finio
NMFS/Mr. D. O'Brien
NMFS/Mr. B. Hopper
USACE/Mr. B. Denson
VCSFA/Mr. N. Overby

Literature Cited

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ATTACHMENT 1: EFH WORKSHEET

NOAA Fisheries Greater Atlantic Regional Fisheries Office
Essential Fish Habitat (EFH) Assessment & Fish and Wildlife Coordination Act (FWCA) Worksheet

This worksheet is your essential fish habitat (EFH) assessment. It provides us with the information necessary to assess the effects of your action on EFH under the Magnuson Stevens Fishery Conservation and Management Act and on NOAA trust resources under the Fish and Wildlife Coordination Act (FWCA). Consultation is not required if:

1. there is no adverse effect on EFH or NOAA trust resources (see page 10 for more info).
2. no EFH is designated and no trust resources may be present at the project site.

Instructions

Federal agencies or their non-federal designated lead agency should email the completed worksheet and necessary attachments to nmfs.gar.efh.consultation@noaa.gov. Include the public notice (if applicable) or project application and project plans showing:

- location map of the project site with area of impact.
- existing and proposed conditions.
- all waters of the U.S. on the project site with mean low water (MLW), mean high water (MHW), high tide line (HTL), and water depths clearly marked.
- sensitive habitats mapped, including special aquatic sites (submerged aquatic vegetation, saltmarsh, mudflats, riffles and pools, coral reefs, and sanctuaries and refuges), hard bottom or natural rocky habitat areas, and shellfish beds.
- site photographs, if available.

We will provide our EFH conservation recommendations and recommendations under the FWCA, as appropriate, within 30 days of receipt of a complete EFH assessment (60 days if an expanded consultation is necessary). Please submit complete information to minimize delays in completing the consultation.

This worksheet provides us with the information required[1] in an EFH assessment:

1. A description of the proposed action.
2. An analysis of the potential adverse effects on EFH and the federally managed species.
3. The federal agency's conclusions regarding the effects of the action on EFH.
4. Proposed mitigation, if applicable.

Your analysis **should focus on impacts that reduce the quality and/or quantity of the habitat or result in conversion to a different habitat type** for all life stages of species with designated EFH within the action area.

Use the information on the HCD website and NOAA's EFH Mapper to complete this worksheet. If you have questions, please contact the appropriate HCD staff member to assist you.

[1] The EFH consultation process is guided by the requirements of our EFH regulation at 50 CFR 600.905.

EFH ASSESSMENT WORKSHEET

General Project Information

Date Submitted:

Project/Application Number:

Project Name: Wallops Island Northern Development

Project Sponsor/Applicant: National Aeronautics and Space Administration (NASA)

Federal Action Agency (if state agency acting as delegated):

Fast-41 or One Federal Decision Project: ☐ Yes ☑ No

Action Agency Contact Name:

Contact Phone: Contact Email:

Latitude: 37.89 Longitude: -75.44

Address, City/Town, State:

NASA Wallops Flight Facility, Accomack County, Virginia

Body of Water: Ballast Narrows near Chincoteague Inlet

Project Purpose:

To construct and operate a port facility to increase safety and reduce costs, traffic, congestion, and air emissions.

Project Description:

The Proposed Action at the Wallops Island Northern Development is the construction of a port: a pier, and an operation area to provide barge access and berthing for offload of large launch vehicle components and related equipment for NASA and the Mid-Atlantic Regional Spaceport (MARS). A vessel approach channel (mostly existing channels) and turning basin would be dredged. The project would be executed in three phases. Construction of a 624-ft long pier under Phase 1 would take approximately 12 months and construction of a 676-ft long pier extension under Phase 2 (for a total pier length 1,305 ft) would take approximately 9.5 months. Phase 1 dredging activities (turning basin and channel) would take approximately 30 days; Phase 2 dredging (turning basin) would take approximately 7 days, and Phase 3 dredging (turning basin and channel) would take 30 days. Work would be performed 24 hours a day, seven days a week with two crews each working 12-hours.

Anticipated Duration of In-Water Work or Start/End Dates:

Phase 1 in 2021-2023 and approx. 1-2 years between it and Phases 2 and 3

Habitat Description

EFH includes the biological, chemical, and physical components of the habitat. This includes the substrate and associated biological resources (e.g., benthic organisms, submerged aquatic vegetation, shellfish beds, salt marsh wetlands), the water column, and prey species.

Is the project in designated EFH[2]? ☑ Yes ☐ No

Is the project in designated HAPC[2]? ☐ Yes ☑ No

Is this coordination under FWCA only? ☐ Yes ☑ No

Total area of impact to EFH (indicate sq ft or acres): 1,669,077 sq ft

Total area of impact to HAPC (indicate sq ft or acres): N/A

Current water depths: ~1-9 ft Salinity: ~20-30 ppt Water temperature range: ~6-30 C

Sediment characteristics[3]: Silt and sand

What habitat types are in or adjacent to the project area and will they be permanently impacted? Select all that apply. Indicate if impacts will be temporary, if site will be restored, or if permanent conversion of habitat will occur. A project may occur in overlapping habitat types.

	Habitat Type	**Total impact (sq ft/acres)**	**Impacts are temporary**	**Restored to pre-existing conditions**	**Permanent conversion of all or part of habitat**
☐	Marine				
☑	Estuarine	1,669,077/38			X
☐	Riverine (tidal)				
☐	Riverine (non-tidal)				
☑	Intertidal	14,341/0.33			X
☑	Subtidal	1,654,736/38			X
☐	Water column				
☑	Salt marsh/ Wetland (tidal)	221,720/5.1			X
☐	Wetland (non-tidal)				

[2] Use the tables on pages 7-9 to list species with designated EFH or the type of designated HAPC present.
[3] The level of detail is dependent on your project – e.g., a grain size analysis may be necessary for dredging.

	Habitat Type	Total impact (sq ft/acres)	Impacts are temporary	Restored to pre-existing conditions	Permanent conversion of all or part of habitat
☐	Rocky/hard bottom[4]:				
☐	Sand				
☐	Shellfish beds or oyster reefs				
☐	Mudflats				
☐	Submerged aquatic vegetation (SAV)[5], macroalgae, epifauna				
☐	Diadromous fish (migratory or spawning habitat)				

Indicate type(s) of rocky/hard bottom habitat (pebble, cobble, boulder, bedrock outcrop/ledge) and species of SAV:

N/A

Project Effects

Select all that apply	Project Type/Category
☑	Hatchery or Aquaculture
☐	Agriculture
☐	Forestry
☐	Military (e.g., acoustic testing, training exercises)
☐	Mining (e.g., sand, gravel)
☐	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, beach renourishment, mitigation bank/ILF creation)

[4] Indicate type(s). The type(s) of rocky habitat will help you determine if the area is cod HAPC.
[5] Indicate species. Provide a copy of the SAV report and survey conducted at the site, if applicable.

Select all that apply	Project Type/Category
☑	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port)
☐	Energy development/use
☐	Water quality (e.g., TMDL, wastewater, sediment remediation)
☑	Dredging/excavation and disposal
☑	Piers, ramps, floats, and other structures
☐	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
☐	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
☐	Other

Select all that apply	Potential Stressors Caused by the Activity	Select all that apply and if temporary or permanent		Habitat alterations caused by the activity
		Temp	Perm	
☑	Underwater noise			
☑	Water quality/turbidity/ contaminant release	☐	☑	Water depth change
☑	Vessel traffic/barge grounding	☐	☐	Tidal flow change
☐	Impingement/entrainment[6]	☐	☐	Fill
☐	Prevent fish passage/spawning	☐	☑	Habitat type conversion
☑	Benthic community disturbance	☐	☐	Other:
☐	Impacts to prey species	☐	☐	Other:

[6] Entrainment is the voluntary or involuntary movement of aquatic organisms from a water body into a surface diversion or through, under, or around screens and results in the loss of the organisms from the population. Impingement is the involuntary contact and entrapment of aquatic organisms on the surface of intake screens caused when the approach velocity exceeds the swimming capability of the organism.

Details: project impacts and mitigation

The level of detail that you provide should be commensurate with the magnitude of impacts associated with the proposed project. Attach supplemental information if necessary.

Describe how the project would impact each of the habitat types selected above. Include temporary and permanent impact descriptions and direct and indirect impacts.

A 1,305-ft fixed pier would be constructed in the northeast portion of the Project Area. It would extend from salt marsh/intertidal habitat, through subtidal habitat and into estuarine habitat. A turning basin would be constructed around the pier impacting estuarine habitat. A vessel approach channel approximately 12,800 ft long and 100 ft wide would be dredged to a final depth of 12 ft below mean lower low water in estuarine habitat. The salt marsh and estuarine habitat within the footprint of the pilings supporting the pier would be permanently converted. These habitats beneath the pier would be shaded, inhibiting plant growth. The submerged structure of the pier would provide substrate for colonization by invertebrates and shelter and foraging habitat for fish.

What specific measures will be used to avoid impacts, including project design, turbidity controls, acoustic controls, and time of year restrictions? If impacts cannot be avoided, why not?

NASA will use a combination of BMPs, including temporary access matting, turbidity curtains, and soft-start procedures with bubble curtains during pile driving.

What specific measures will be used to minimize impacts?

NASA will use a combination of BMPs, including temporary access matting, turbidity curtains, and soft-start procedures with bubble curtains during pile driving.

Is compensatory mitigation proposed? ☑ Yes ☐ No

If no, why not? If yes, describe plans for mitigation and how this will offset impacts to EFH. Include a conceptual compensatory mitigation and monitoring plan, if applicable.

In accordance with NASA WFF vegetation management policies, vegetation would be re-established in areas of temporary impact. In accordance with wetland permitting requirements, wetland mitigation may be required for impacts to tidal marsh.

Federal Action Agency's EFH determination (select one)	
☐	There is no adverse effect[7] on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA-only request.
☑	The adverse effect[7] on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
☐	The adverse effect[7] on EFH is substantial. This is a request for an expanded EFH consultation. We will provide more detailed information, including an alternatives analysis and NEPA document, if applicable.

EFH and HAPC designations[8]

Use the EFH mapper to determine if EFH may be present in the project area and enter all species and lifestages that have designated EFH. Optionally, you may review the EFH text descriptions linked to each species in the EFH mapper and use them to determine if the described habitat is present. We recommend this for larger projects to help you determine what your impacts are.

Species	EFH is designated/mapped for:				Habitat present based on text description (optional)
	EFH: eggs	EFH: larvae	EFH: juvenile	EFH: adults/ spawning adults	
Atlantic butterfish (Peprilus triacanthus)	☐	☐	☑	☑	☐
Atlantic herring (Clupea harengus)	☐	☐	☐	☑	☐
Black sea bass (Centropristis striata)	☐	☐	☑	☑	☐
Bluefish (Pomatomus saltatrix)	☐	☐	☑	☑	☐

[7] An **adverse effect** is any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

[8] Within the Greater Atlantic Region, EFH has been designated by the New England, Mid-Atlantic, and South Atlantic Fisheries Management Councils and NOAA Fisheries.

Species	EFH is designated/mapped for:				Habitat present based on text description (optional)
	EFH: eggs	EFH: larvae	EFH: juvenile	EFH: adults/ spawning adults	
Clearnose skate (Raja eglanteria)	☐	☐	✓	✓	☐
Sand tiger shark (Carcharias taurus)	☐	✓	✓	✓	☐
Sandbar shark (Charcharinus plumbeus)	☐	✓	✓	☐	☐
Smoothhound shark complex - Atlantic stock (Mustelus canis)	☐	✓	✓	✓	☐
Summer flounder (Paralicthys dentatus)	☐	☐	✓	✓	☐
Windowpane flounder (Scophthalmus aguosus)	☐	☐	☐	✓	☐
Winter skate (Leucoraia ocellata)	☐	☐	✓	✓	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
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	☐	☐	☐	☐	☐

HAPCs

Select all that are in your action area.

☐	Summer flounder: SAV[9]	☐	Alvin & Atlantis Canyons
☐	Sandbar shark	☐	Baltimore Canyon
☐	Sand Tiger Shark (Delaware Bay)	☐	Bear Seamount
☐	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)	☐	Heezen Canyon
☐	Inshore 20m Juvenile Cod	☐	Hudson Canyon
☐	Great South Channel Juvenile Cod	☐	Hydrographer Canyon
☐	Northern Edge Juvenile Cod	☐	Jeffreys & Stellwagen
☐	Lydonia Canyon	☐	Lydonia, Gilbert & Oceanographer Canyons
☐	Norfolk Canyon (Mid-Atlantic)	☐	Norfolk Canyon (New England)
☐	Oceanographer Canyon	☐	Retriever Seamount
☐	Veatch Canyon (Mid-Atlantic)	☐	Toms, Middle Toms & Hendrickson Canyons
☐	Veatch Canyon (New England)	☐	Washington Canyon
☐	Cashes Ledge	☐	Wilmington Canyon

[9] Summer flounder HAPC is defined as all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH. In locations where native species have been eliminated from an area, then exotic species are included. Use local information to determine the locations of HAPC.

More information

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) mandates that federal agencies conduct an essential fish habitat (EFH) consultation with NOAA Fisheries on any actions they authorize, fund, or undertake that may adversely affect EFH. An **adverse effect** is any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

We designed this worksheet to help you to prepare EFH assessments. It is important to remember that an adverse effect determination is a trigger to consult with us. It does not mean that a project cannot proceed as proposed, or that project modifications are necessary. It means that the effects of the proposed action on EFH must be evaluated to determine if there are ways to avoid, minimize, or offset adverse effects.

This worksheet should be used as your EFH assessment or as a guide to develop your EFH assessment. At a minimum, you should include all the information required to complete this worksheet in your EFH assessment. The level of detail that you provide should be commensurate with the magnitude of impacts associated with the proposed project. If your answers in the worksheet and supplemental information you attach do not fully evaluate the adverse effects to EFH, we may request additional information to complete the consultation.

You may need to prepare an expanded EFH assessment for more complex projects to fully characterize the effects of the project and the avoidance and minimization of impacts to EFH. While the EFH assessment worksheet may be used for larger projects, the format may not be sufficient to incorporate the extent of detail required, and a separate EFH assessment may be developed. However, regardless of format, you should include an analysis as outlined in this worksheet for an expanded EFH assessment, along with any additional necessary information. This additional information includes:

- the results of on-site inspections to evaluate the habitat and site-specific effects.
- the views of recognized experts on the habitat or the species that may be affected.
- a review of pertinent literature and related information.
- an analysis of alternatives that could avoid or minimize the adverse effects on EFH.

Please contact our Greater Atlantic Regional Fisheries Office, Protected Resources Division regarding potential impacts to marine mammals or threatened and endangered species.

Useful Links
National Wetland Inventory Maps
https://www.fws.gov/wetlands/
EPA's National Estuary Program (NEP)
https://www.epa.gov/nep/local-estuary-programs
Northeast Regional Ocean Council (NROC) Data Portal
https://www.northeastoceandata.org/
Mid-Atlantic Regional Council on the Ocean (MARCO) Data Portal
http://portal.midatlanticocean.org/

Resources by State

Maine
Maine Office of GIS Data Catalog
https://geolibrary-maine.opendata.arcgis.com/datasets#data
Town shellfish information including shellfish conservation area maps
https://www.maine.gov/dmr/shellfish-sanitation-management/programs/municipal/ordinances/towninfo.html
State of Maine Shellfish Sanitation and Management
https://www.maine.gov/dmr/shellfish-sanitation-management/index.html
Eelgrass maps
https://www.maine.gov/dmr/science-research/species/eelgrass/index.html
Casco Bay Estuary Partnership
https://www.cascobayestuary.org/
Maine GIS Stream Habitat Viewer
https://www.arcgis.com/home/item.html?id=5869c2d20f0b4c3a9742bdd8abef42cb

New Hampshire
NH's Statewide GIS Clearinghouse, NH GRANIT
http://www.granit.unh.edu/
NH Coastal Viewer
http://www.granit.unh.edu/nhcoastalviewer/
State of NH Shellfish Program
https://www.des.nh.gov/organization/divisions/water/wmb/shellfish/

Massachusetts
MA Shellfish Sanitation and Management Program
https://www.mass.gov/shellfish-sanitation-and-management
MassGIS Data, Including Eelgrass Maps
http://maps.massgis.state.ma.us/map_ol/oliver.php
MA DMF Recommended TOY Restrictions Document
https://www.mass.gov/files/documents/2016/08/ry/tr-47.pdf
Massachusetts Bays National Estuary Program
https://www.mass.gov/orgs/massachusetts-bays-national-estuary-program
Buzzards Bay National Estuary Program
http://buzzardsbay.org/
Massachusetts Division of Marine Fisheries

https://www.mass.gov/orgs/division-of-marine-fisheries
Massachusetts Office of Coastal Zone Management
https://www.mass.gov/orgs/massachusetts-office-of-coastal-zone-management

Rhode Island
RI Shellfish and Aquaculture
http://www.dem.ri.gov/programs/fish-wildlife/marine-fisheries/shellfish-aquaculture.php
RI Shellfish Management Plan
http://www.shellfishri.com/
Eelgrass Maps
http://edc.maps.arcgis.com/apps/View/index.html?appid=db52bb689c1e44259c06e11fd24895f8
RI GIS Data
http://ridemgis.maps.arcgis.com/apps/webappviewer/index.html?id=87e104c8adb449eb9f905e5f18020de5
Narragansett Bay Estuary Program
http://nbep.org/
Rhode Island Division of Marine Fisheries
http://www.dem.ri.gov/programs/fish-wildlife/marine-fisheries/index.php
Rhode Island Coastal Resources Management Council
http://www.crmc.ri.gov/

Connecticut
CT Bureau of Aquaculture
https://www.ct.gov/doag/cwp/view.asp?a=3768&q=451508&doagNav=
CT GIS Resources
https://www.ct.gov/deep/cwp/view.asp?a=2698&q=323342&deepNav_GID=1707
Natural Shellfish Beds in CT
https://cteco.uconn.edu/viewer/index.html?viewer=aquaculture
Eelgrass Maps
https://www.fws.gov/northeast/ecologicalservices/pdf/wetlands/2012_CT_Eelgrass_Final_Report_11_26_2013.pdf
Long Island Sound Study
http://longislandsoundstudy.net/
CT GIS Resources
http://cteco.maps.arcgis.com/home/index.html
CT DEEP Office of Long Island Sound Programs and Fisheries
https://www.ct.gov/deep/site/default.asp
CT River Watershed Council
https://www.ctriver.org/

New York
Eelgrass Report
http://www.dec.ny.gov/docs/fish_marine_pdf/finalseagrassreport.pdf
Peconic Estuary Program
https://www.peconicestuary.org/
NY/NJ Harbor Estuary
https://www.hudsonriver.org/estuary-program

New York GIS Clearinghouse
https://gis.ny.gov/

New Jersey
Submerged Aquatic Vegetation Mapping
http://www.crssa.rutgers.edu/projects/sav/
Barnegat Bay Partnership
https://www.barnegatbaypartnership.org/
NJ GeoWeb
https://www.nj.gov/dep/gis/geowebsplash.htm
NJ DEP Shellfish Maps
https://www.nj.gov/dep/landuse/shellfish.html

Pennsylvania
Delaware River Management Plan
https://www.fishandboat.com/Fish/Fisheries/DelawareRiver/Documents/delaware_river_plan_exec_draft.pdf
PA DEP Coastal Resources Management Program
https://www.dep.pa.gov/Business/Water/Compacts%20and%20Commissions/Coastal%20Resources%20Management%20Program/Pages/default.aspx
PA DEP GIS Mapping Tools
https://www.dep.pa.gov/DataandTools/Pages/GIS.aspx

Delaware
Partnership for the Delaware Estuary
http://www.delawareestuary.org/
Center for Delaware Inland Bays
http://www.inlandbays.org/
Delaware FirstMap
http://delaware.maps.arcgis.com/home/index.html

Maryland
Submerged Aquatic Vegetation Mapping
http://web.vims.edu/bio/sav/
MERLIN
http://dnrweb.dnr.state.md.us/MERLIN/
Maryland Coastal Bays Program
https://mdcoastalbays.org/

Virginia
Submerged Aquatic Vegetation mapping
http://www.mrc.virginia.gov/regulations/Guidance_for_SAV_beds_and_restoration_final_approved_by_Commission_7-22-17.pdf
VDGIF Time of Year Restrictions (TOYR) and Other Guidance
https://www.dgif.virginia.gov/wp-content/uploads/VDGIF-Time-of-Year-Restrictions-Table.pdf

ATTACHMENT 2: EFH MAPPER

EFH Data Notice: Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

Greater Atlantic Regional Office
Atlantic Highly Migratory Species Management Division

Query Results

Degrees, Minutes, Seconds: Latitude = 37º53'26" N, Longitude = 76º33'31" W
Decimal Degrees: Latitude = 37.89, Longitude = -75.44

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** W A R N I N G ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Show	Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
			Atlantic Herring	Adult	New England	Amendment 3 to the Atlantic Herring FMP
			Windowpane Flounder	Adult	New England	Amendment 14 to the Northeast Multispecies FMP
			Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
			Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
			Sandbar Shark	Juvenile Neonate	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
			Smoothhound Shark Complex (Atlantic Stock)	ALL	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
			Sand Tiger Shark	Neonate/Juvenile Adult	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
			Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
			Atlantic Butterfish	Adult Juvenile	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
			Summer Flounder	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
			Black Sea Bass	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

HAPCs

Show	Link	Data Caveats	HAPC Name	Management Council
			Summer Flounder (Mid Atlantic)	MAFMC

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.
****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**

Mid-Atlantic Council HAPCs,
No spatial data for summer flounder SAV HAPC.

EFH View Tool | Data Query Tool

location.

EFH

Show	Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FM
			Atlantic Herring	Adult	New England	Amend 3 to Atlan Herring
			Windowpane Flounder	Adult	New England	Amend 14 to North Multisp FM
			Winter Skate	Adult Juvenile	New England	Amend 2 to North Ska Comp FM
			Clearnose Skate	Adult Juvenile	New England	Amend 2 to North Ska Comp FM
			Sandbar Shark	Juvenile Neonate	Secretarial	Amend 10 to 200 Consoli HMS F EFH
			Smoothhound Shark Complex (Atlantic Stock)	ALL	Secretarial	Amend 10 to 200 Consoli HMS F EFH

Zoom: Extent: Location Query:

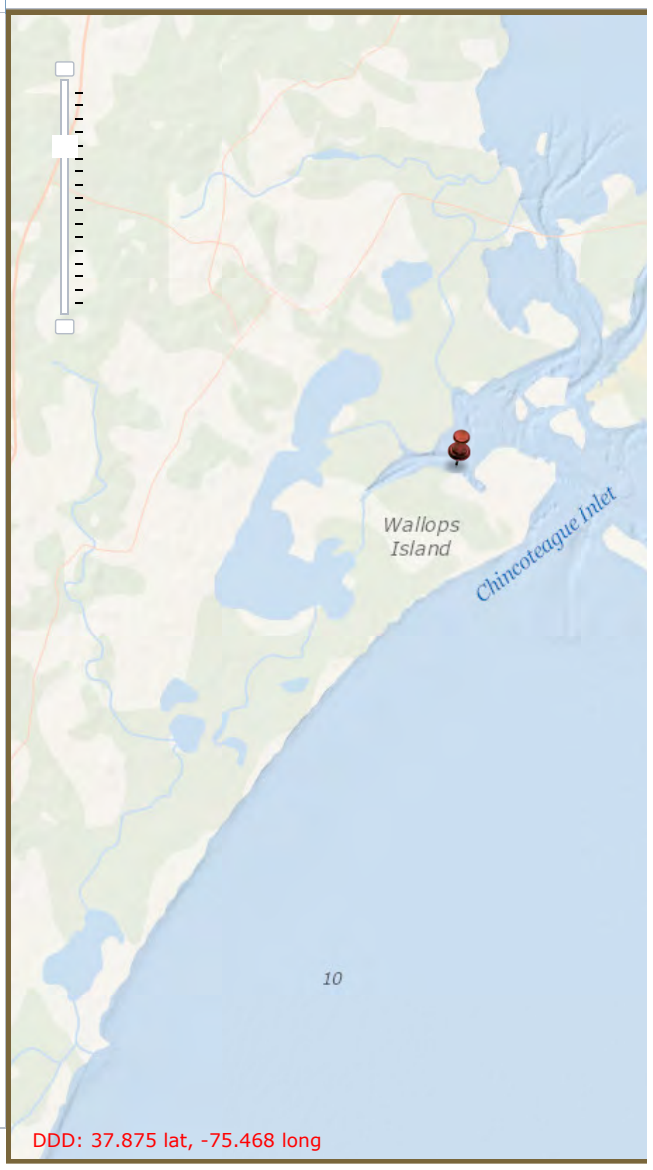
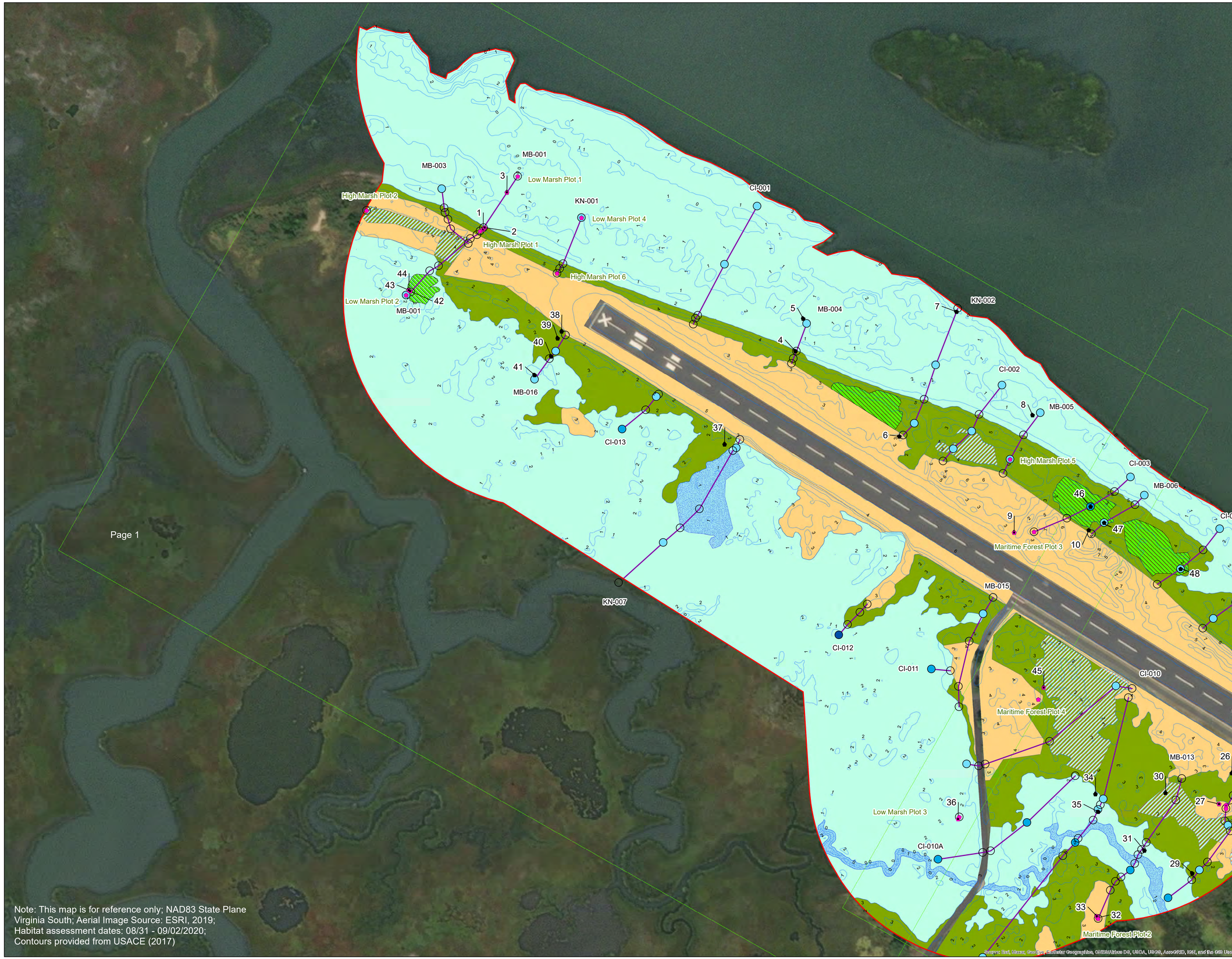


Figure 4

Laterallus jamaicensis jamaicenses (Eastern Black Rail) Habitat Map



Note: This map is for reference only; NAD83 State Plane Virginia South; Aerial Image Source: ESRI, 2019; Habitat assessment dates: 08/31 - 09/02/2020; Contours provided from USACE (2017)

Legend

- Study Area
- Upland and Maritime Forest
- High Marsh
- Low Marsh
- Surface Water
- Potential Eastern Black Rail Habitat
- Dense Phragmites australis
- Transect (MB-001)
- Contours, 1ft (USACE, 2017)

Data Points

- Photo Location (36)
- Vegetation Plot (Low Marsh Plot 1)
- Photo Location and Vegetation Plot

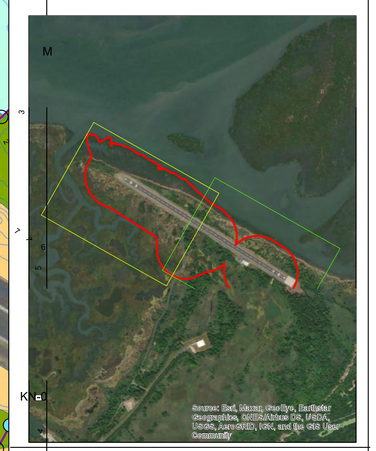
Water Level Class

- 0 (no inundation)
- 1 (ground level to below ankle)
- 2 (ankle to knee)
- 3 (knee to hip)

N

0 200 400

Feet



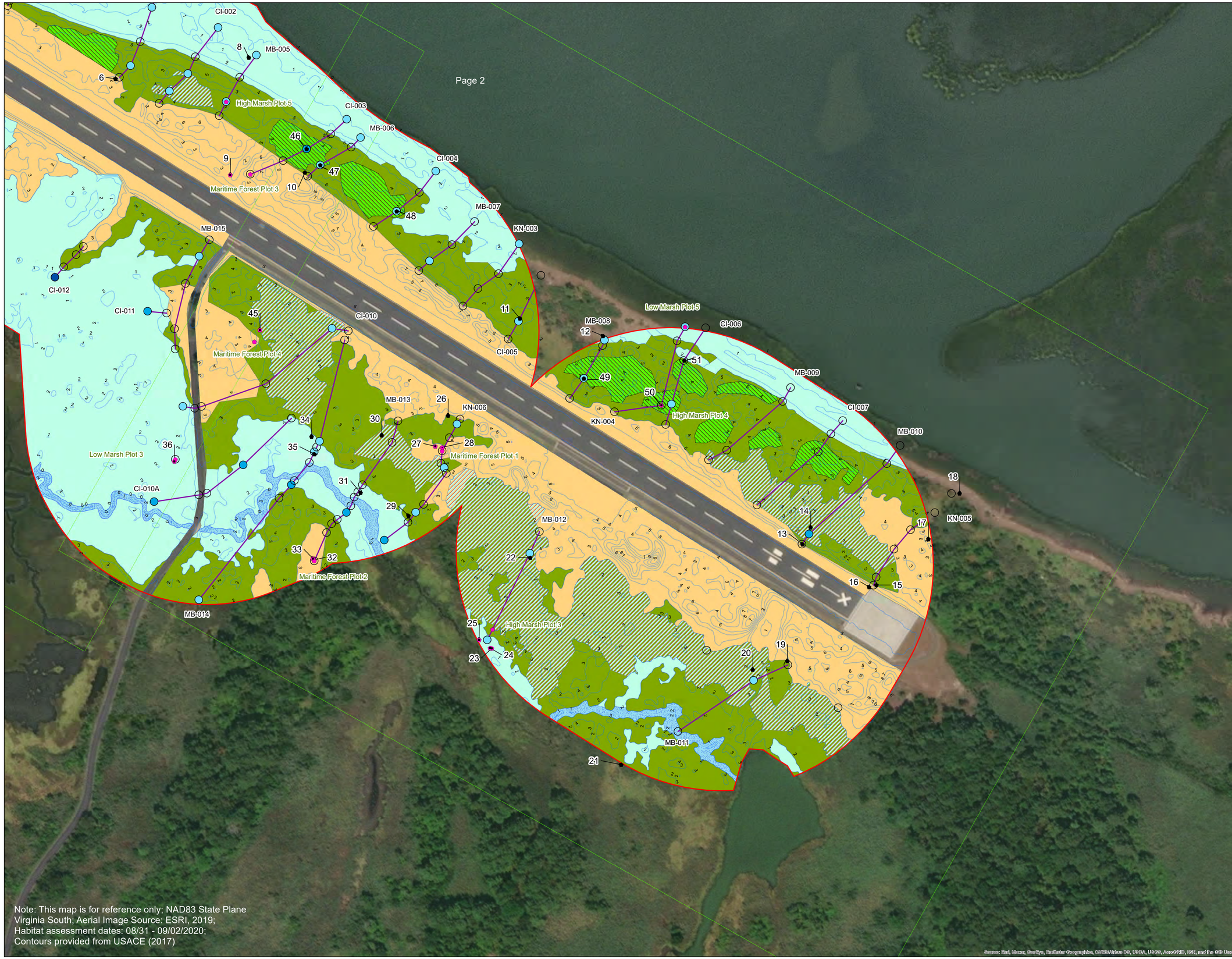
AECOM

National Aeronautics and Space Agency Wallops Flight Facility Accomack Co., Virginia

Date: 11/12/2020

Figure 4

Laterallus jamaicensis jamaicenses (Eastern Black Rail) Habitat Map



Legend

- Study Area
- Upland and Maritime Forest
- High Marsh
- Low Marsh
- Surface Water
- Potential Eastern Black Rail Habitat
- Dense Phragmites australis
- Transect (MB-001)
- Contours, 1ft (USACE, 2017)

Data Points

- Photo Location (36)
- Vegetation Plot (Low Marsh Plot 1)
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- 0 (no inundation)
- 1 (ground level to below ankle)
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N

0 200 400
Feet

AECOM

National Aeronautics and Space Agency
Wallops Flight Facility
Accomack Co., Virginia

Date: 11/12/2020

Appendix B:
Representative Photographs

Photo Type: Typical Vegetation	
Photo ID: 1	**Photo Date:** 8/31/2020
Water Level Class: 0	**Transect:** MB-001
Vegetation Plot: High Marsh Plot 1	
Lat/Long: 37.888191,-75.442321	
Description: Another view of the narrow vegetation coverage with an increase of high scrub (*B. halimifolia, I. frutescens*) densities. The vegetation continues to the western tip of the island and changes to a mono-culture of high density Phragmites.	

Photo Type: Typical Vegetation	
Photo ID: 2	**Photo Date:** 8/31/2020
Water Level Class: 0	**Transect:** MB-001
Vegetation Plot: High Marsh Plot 1	
Lat/Long: 37.888202,-75.442308	
Description: A narrow strip of high marsh vegetation in transect MB-001 between low marsh and maritime forest or scrub-shrub communi-ties.	

Photo Type: Vegetation Plot	
Photo ID: 3	**Photo Date:** 8/31/2020
Water Level Class: 0	**Transect:** MB-001
Vegetaation Plot: Low Marsh Plot 1	
Lat/Long: 37.888422,-75.442121	
Description: Monoculture of *Spartina alterniflora* in the low marsh along the northwestern tip of the island. Not suitable habitat due to increase of water levels above 6 cm deep and lack of high stem densities and dense canopy cover.	

Photo Type: Typical Water Level	
Photo ID: 4	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** MB-004
Vegetation Plot: N/A	
Lat/Long: 37.887351,-75.439841	
Description: The high tide rack line was prevalent along the southern edge of the island indicating that area experiences large tidal influences.	

Photo Type: Typical Water Level	
Photo ID: 5	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-004
Vegetation Plot: N/A	
Lat/Long: 37.887556,-75.439770	
Description: During low tide the low marsh along the northern shore line had a water level below 3 cm.	

Photo Type: Typical Vegetation	
Photo ID: 6	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-002
Vegetation Plot: N/A	
Lat/Long: 37.886786,-75.439027	
Description: This high marsh habitat in transect KN-002 exhibits dense vegetation with water lev-els at or above 3 cm during low tide. This would potentially be suitable habitat if water levels were below 3 cm during high tide for successful nesting habitat.	

Photo Type: Ecotone	
Photo ID: 7	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-002
Vegetation Plot: N/A	
Lat/Long: 37.887569,-75.438536	
Description: Open water on the northern boundary of the study area in transect KN-002.	

Photo Type: Typical Vegetation	
Photo ID: 8	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-005
Vegetation Plot: N/A	
Lat/Long: 37.886893,-75.437950	
Description: The low marsh in transect MB-005 was typified with *Spartina alterniflora* at the density shown.	

Photo Type: Typical Vegetation	
Photo ID: 9	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** CI-003
Vegetation Plot: Maritime Forest Plot 3	
Lat/Long: 37.886150,-75.438130	
Description: Upland vegetation in the maritime forest lack groundcover vegetation density. The vegetation coverage does not provide enough protection from predators and provide shelter from the elements.	

Photo Type: Ecotone	
Photo ID: 10	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** MB-006
Vegetation Plot: N/A	
Lat/Long: 37.886150,-75.437529	
Description: This maritime forest to high marsh eco-tone provides unsuitable habitat due to dense woody vine vegetation coverage. This does not provide adequate escape route and mobility from ground dwelling predators.	

Photo Type: Typical Water Level	
Photo ID: 11	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** CI-005
Vegetation Plot: N/A	
Lat/Long: 37.885174,-75.435838	
Description: This unsuitable high marsh habitat displayed water level above 6 cm during low tide. It was surrounded with a dense shrub ecotone to the low marsh.	

Photo Type: Typical Water Level	
Photo ID: 12	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-008
Vegetation Plot: N/A	
Lat/Long: 37.885046,-75.435175	
Description: This high tide rack line was observed on the northern bank of the island across from the existing hanger. This high tide rack was observed transecting into the high marsh and depositing into pockets in various locations. The topographic change that allows hightidal influences along this portion of the island contributes to the dense phragmites pockets with high water levels. Resulting in poor and unsuit-able habitat for nesting. This also indicates that this side of the island experiences high tide surges during storm events.	

Photo Type: Typical Vegetation	
Photo ID: 13	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** MB-010
Vegetation Plot: N/A	
Lat/Long: 37.883676,-75.433623	
Description: This high marsh area displayed unsuitable habitat due to the dense monoculture of *P. australis* with plenty of canopy cover-age. In addition, this low-lying pocket had a water level between 10 –38 cm during low tide.	

Photo Type: Typical Water Level	
Photo ID: 14	**Photo Date:** 9/1/2020
Water Level Class: 2	**Transect:** MB-010
Vegetation Plot: N/A	
Lat/Long: 37.883782,-75.433554	
Description: This area of high marsh had unsuitable habitat due to the thick vegetation of *P. australis* and undulated with water levels above 6 cm during low tide. This would not allow adequate mobility and successful nesting conditions.	

Photo Type: Typical Vegetation	
Photo ID: 15	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-005
Vegetation Plot: N/A	
Lat/Long: 37.883402,-75.433041	
Description: This high marsh habitat exhibits dense vegetation with water levels at or above 3 cm during low tide. This would potentially be suitable habitat if water levels were below 3 cm during high tide for successful nesting habitat.	

Photo Type: Dense Phragmites Sites	
Photo ID: 16	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-005
Vegetation Plot: N/A	
Lat/Long: 37.883391,-75.433099	
Description: High density areas of *P. australis* on the edge of the runway in transect KN-005.	

Photo Type: Ecotone	
Photo ID: 17	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-005
Vegetation Plot: N/A	
Lat/Long: 37.883683,-75.432611	
Description: This high tide rack line was observed on the northern bank of the island across from the existing hanger. This high tide rack was observed transecting into the high marsh and depositing into pockets in various locations. The topographic change that allows high tidal influences along this portion of the island contributes to the dense phragmites pockets with high water levels. Resulting in poor and unsuit-able habitat for nesting. This also indicates that this side of the island experiences high tide surges during storm events.	

Photo Type: Dense Phragmites Site	
Photo ID: 18	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-005
Vegetation Plot: N/A	
Lat/Long: 37.883969,-75.432347	
Description: High density area of *P. australis* in transect KN-005. Area not suitable for Eastern Black Rail habitat due to area not being adequate for escape routes from predators.	

Photo Type: Ecotone	
Photo ID: 19	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** MB-011
Vegetation Plot: N/A	
Lat/Long: 37.882935,-75.433777	
Description: This maritime forest to high marsh ecotone provides unsuitable habitat due to dense woody vine vegetation coverage. This does not provide adequate escape route and mobility from ground dwelling predators.	

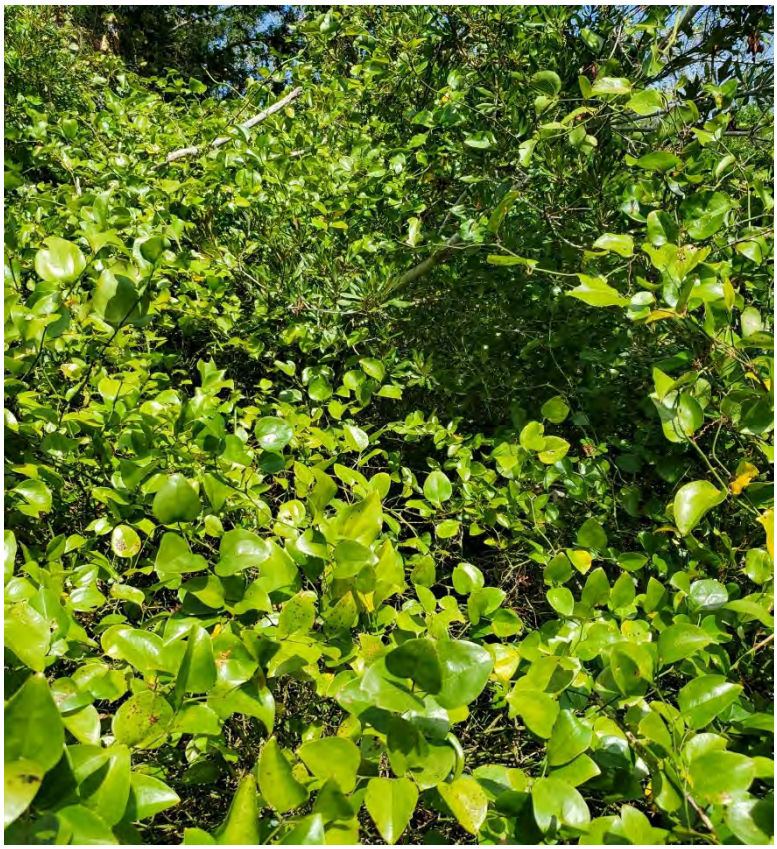

Photo Type: Typical Water Level	
Photo ID: 20	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-011
Vegetation Plot: N/A	
Lat/Long: 37.882888,-75.434057	
Description: Another high marsh area that displayed high water levels above 6 cm during low tide times, which is unsuitable for nesting habitat. This area is located behind the proposed parking area.	

Photo Type: Typical Vegetation	
Photo ID: 21	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-011
Vegetation Plot: N/A	
Lat/Long: 37.882309,-75.435140	
Description: High marsh habitat in transect MB-011 that is not Eastern Black Rail habitat due to the vegetation coverage not being fine-stemmed emergent vegetation.	

Photo Type: Typical Water Level	
Photo ID: 22	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-012
Vegetation Plot: N/A	
Lat/Long: 37.883647,-75.435818	
Description: High marsh habitat with dense *P. australis* and a surface water level too high for Eastern Black Rail habitat in transect MB-012.	

Photo Type: Vegetation Plot	
Photo ID: 23	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-012
Vegetation Plot: High Marsh Plot 3	
Lat/Long: 37.883078,-75.436150	
Description: This is a view of the southern portion of the study area in High Marsh Plot 3 looking toward North Seawall Road. This area was not suitable habitat due to the high water level greater than 6cm. This photo was taken at low tide where water levels reach above 76 cm.	

Photo Type: Vegetation Plot	
Photo ID: 24	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-012
Vegetation Plot: High Marsh Plot 3	
Lat/Long: 37.883080,-75.436163	
Description: View of High Marsh Plot 3 inundated with open water and densely vegetated with *P. austra-lis* along the southeastern side of the study area behind the existing hangar.	

Photo Type: Vegetation Plot	
Photo ID: 25	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-012
Vegetation Plot: High Marsh Plot 3	
Lat/Long: 37.883135,-75.436250	
Description: High Marsh Plot 3 was densely covered with salt marsh hay; however, only small sporadic vegetation mounds amongst the open water impoundments were available for nesting. This was unsuitable habitat due to minimum areas of low water levels below 3 cm to allow chicks to forage with-out becoming waterlogged during swim attempts.	

Photo Type: Typical Vegetation	
Photo ID: 26	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** KN-006
Vegetation Plot: N/A	
Lat/Long: 37.884572,-75.436441	
Description: The transition area from high marsh to low marsh with vegetation density being too high for Eastern Black Rail to maneu-ver in transect KN-005.	

Photo Type: Vegetation Plot	
Photo ID: 27	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** KN-006
Vegetation Plot: Maritime Forest Plot 1	
Lat/Long: 37.884377,-75.436552	
Description: Upland maritime forested area in Maritime Forest Plot 1 located adjacent to the hanger showing lack of ground level vegetation coverage.	

Photo Type: Vegetation Plot	
Photo ID: 28	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** KN-006
Vegetation Plot: Maritime Forest Plot 1	
Lat/Long: 37.884369,-75.436497	
Description: A photo of the Maritime Forest Plot 1 de-picted in Photo 27.	

Photo Type: Typical Vegetation	
Photo ID: 29	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** KN-006
Vegetation Plot: N/A	
Lat/Long: 37.883941,-75.436786	
Description: An upland to high marsh transition in transect KN-006 with a high density of *P. australis* excluding this area as potential habitat for Eastern Black Rail.	

Photo Type: Typical Vegetation	
Photo ID: 30	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-013
Vegetation Plot: N/A	
Lat/Long: 37.884458,-75.436980	
Description: High marsh habitat that consisted of *P. australis* cover too dense for Eastern Black Rail habitat in the south central portion of the study area in transect MB-013.	

Photo Type: Typical Water Level	
Photo ID: 31	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-013
Vegetation Plot: N/A	
Lat/Long: 37.884096,-75.437165	
Description: An example of low marsh habitat with water levels too high for Eastern Black Rail habitat in the south central portion of the study area in transect MB-013.	

Photo Type: Vegetation Plots	
Photo ID: 32	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-013
Vegetation Plot: Maritime Forest Plot 2	
Lat/Long: 37.883677,-75.437560	
Description: A photo of typical vegetation in Maritime Forest Plot 2.	

Photo Type: Vegetation Plot	
Photo ID: 33	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-013
Vegetation Plot: Maritime Forest Plot 2	
Lat/Long: 37.883687,-75.437565	
Description: Upland maritime forest vegetation coverage conditions at Maritime Forest Plot 2.	

Photo Type: Typical Water Level	
Photo ID: 34	**Photo Date:** 9/2/2020
Water Level Class: 1	**Transect:** MB-014
Vegetation Plot: N/A	
Lat/Long: 37.884465,-75.437545	
Description: High marsh habitat during low tide in transect MB-014. Water level not ideal for Eastern Black Rail habitat.	

Photo Type: Typical Water Level	
Photo ID: 35	**Photo Date:** 9/2/2020
Water Level Class: 1	**Transect:** MB-014
Vegetation Plot: N/A	
Lat/Long: 37.884352,-75.437526	
Description: Low marsh with water levels too high for Eastern Black Rail habitat in the south-west section of the study area in transect MB-014.	

Photo Type: Vegetation Plot	
Photo ID: 36	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** N/A
Vegetation Plot: Low Marsh Plot 3	
Lat/Long: 37.884336,-75.438655	
Description: This area at Low Marsh Plot 3 showed areas of impounded water during low tide. In addition, the lack of canopy cov-erage with little to no high marsh habitat along its border along North Seawall Road.	

Photo Type: Ecotone	
Photo ID: 37	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** KN-007
Vegetation Plot: N/A	
Lat/Long: 37.886772,-75.440436	
Description: Open water within the low marsh of tran-sect KN-007 in the southwestern portion of the study area.	

Photo Type: Typical Vegetation	
Photo ID: 38	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-016
Vegetation Plot: N/A	
Lat/Long: 37.887524,-75.441717	
Description: Maintained uplands on the northwestern edge of the runway at transect MB-013.	

Photo Type: Typical Water Level	
Photo ID: 39	**Photo Date:** 9/2/2020
Water Level Class: 1	**Transect:** MB-016
Vegetation Plot: N/A	
Lat/Long: 37.887482,-75.441750	
Description: High marsh habitat in transect MB-016 with stem density too low and water level too high for Eastern Black Rail habitat.	

Photo Type: Ecotone	
Photo ID: 40	**Photo Date:** 9/2/2020
Water Level Class: 0	**Transect:** MB-016
Vegetation Plot: N/A	
Lat/Long: 37.887368,-75.441808	
Description: The transition from high marsh to low marsh in transect MB-016 of the south-west portion of the study area.	

Photo Type: Typical Water Level	
Photo ID: 41	**Photo Date:** 9/2/2020
Water Level Class: 1	**Transect:** MB-016
Vegetation Plot: N/A	
Lat/Long: 37.88725,-75.441945	
Description: Low marsh habitat in transect MB-016 with sparse vegetation density and water levels too high for Eastern Black Rail habitat.	

Photo Type: Vegetation Plot	
Photo ID: 42	**Photo Date:** 8/31/2020
Water Level Class: 1	**Transect:** MB-001
Vegetation Plot: Low Marsh Plot 2	
Lat/Long: 37.887813,-75.442925	
Description: The low marsh water level on the southwestern side of the island during low tide was 1 to 7 cm. There were areas of open water that remain impounded at low tide in Low Marsh Plot 2.	

Photo Type: Vegetation Plot	
Photo ID: 43	**Photo Date:** 8/31/2020
Water Level Class: 1	**Transect:** MB-001
Vegetation Plot: Low Marsh Plot 2	
Lat/Long: 37.887819,-75.442935	
Description: There was a small area, approximately 0.10 acre, that had a patch of *Juncus roemerianus* that appeared to be suitable habitat. This was the only location of this species found on the island. Due to the lack in acreage and low canopy coverage, it should be considered only marginal habitat.	

Photo Type: Vegetation Plot	
Photo ID: 44	**Photo Date:** 8/31/2020
Water Level Class: 1	**Transect:** MB-001
Vegetation Plot: Low Marsh Plot 2	
Lat/Long: 37.887819,-75.442935	
Description: View of the southeastern portion of the *J. roemerianus* vegetation in Low Marsh Plot 2, looking along the southern edge of the runway toward North Seawall Road.	

Photo Type: Vegetation Plot	
Photo ID: 45	**Photo Date:** 8/31/2020
Water Level Class: 0	**Transect:** N/A
Vegetation Plot: High Marsh Plot 2	
Lat/Long: 37.885155,-75.437932	
Description: High density areas of *P. australis* on the edge of the runway in High Marsh Plot 2.	

Photo Type: Typical Vegetation	
Photo ID: 46	**Photo Date:** 9/1/2020
Water Level Class: 2	**Transect:** CI-003
Vegetation Plot: N/A	
Lat/Long: 37.886244,-75.437688	
Description: An example of potential Eastern Black Rail Habitat in transect CI-003 on the northern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

Photo Type: Typical Vegetation	
Photo ID: 47	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-006
Vegetation Plot: N/A	
Lat/Long: 37.886159,-75.437505	
Description: An example of potential Eastern Black Rail Habitat in transect MB-006 on the north-ern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

Photo Type: Typical Vegetation	
Photo ID: 48	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** CI-004
Vegetation Plot: N/A	
Lat/Long: 37.885766,-75.436977	
Description: An example of potential Eastern Black Rail Habitat in transect CI-004 on the northern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

Photo Type: Typical Vegetation	
Photo ID: 49	**Photo Date:** 9/1/2020
Water Level Class: 1	**Transect:** MB-008
Vegetation Plot: N/A	
Lat/Long: 37.884875,-75.435379	
Description: An example of potential Eastern Black Rail Habitat in transect MB-008 on the northern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

Photo Type: Vegetation Plot	
Photo ID: 50	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** KN-004
Vegetation Plot: High Marsh Plot 4	
Lat/Long: 37.884436,-75.434794	
Description: An example of potential Eastern Black Rail Habitat in transect KN-004 on the northern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

Photo Type: Typical Vegetation	
Photo ID: 51	**Photo Date:** 9/1/2020
Water Level Class: 0	**Transect:** CI-006
Vegetation Plot: N/A	
Lat/Long: 37.884908,-75.434516	
Description: An example of potential Eastern Black Rail Habitat in transect CI-006 on the northern portion of the study area. Dense fine-stemmed herbaceous vegetation with some canopy coverage is present.	

APPENDIX G –

CULTURAL RESOURCES

PLACEHOLDER